

GK
370
F55
V.7
pt. 4

Dr. B. A. Krukoff
with regards from the General
Editor

FLORA MALESIANA

LIBRARY

JUL 20 1977

NEW YORK
BOTANICAL GARDEN

Presented by B. A. Krukoff

to

New York Botanical Garden
July 1977

SERIES I - SPERMATOPHYTA

Flowering Plants

Vol. 7, part 4

*Dedication - Revisions
Addenda - Index*

INDEX TO REVISED FAMILIES

Aceraceae	4: 3, 592	Dipsacaceae	4: 290	Passifloraceae	7: 405
Actinidiaceae s. str.	4: 37	Droseraceae	4: 377; 5: 557	Pedaliaceae	4: 216
Aizoaceae	4: 267	Elatinaceae	4: 203	Pentaphragmataceae	4: 517
Alismataceae	5: 317; 6: 915	Epacridaceae	6: 422	Pentaphragmataceae	5: 121
Amaranthaceae	4: 69, 593; 6: 915	Ericaceae	6: 469, 943	Philydraceae	4: 5
Ancistrocladaceae	4: 8	Erythroxylaceae	5: 543	Phytolaccaceae	4: 229
Aponogetonaceae	4: 11; 7: 213	Fagaceae	7: 265	Pittosporaceae	5: 345
Balanophoraceae	7: 783	Ficoidaceae	4: 267	Plumbaginaceae	4: 107
Basellaceae	5: 300	Flacourtiaceae	5: 1, 565; 6: 943	Podostemaceae	4: 65; 6: 963
Batidaceae	5: 414	Flagellariaceae	4: 245	Polemoniaceae	4: 195
Betulaceae	5: 207; 6: 917	Geraniaceae	6: 445	Pontederiaceae	4: 255
Bixaceae s. str.	4: 239	Gnetaceae	4: 336; 6: 944	Portulacaceae	7: 121
Burmanniaceae	4: 13, 592	Gonystylaceae	4: 349	Primulaceae	6: 173
Burseraceae	5: 209, 567; 6: 917	Goodeniaceae	5: 335, 567; 6: 949	Proteaceae	5: 147
Butomaceae	5: 118	Haemodoraceae	5: 111	Punicaceae	4: 226
Byblidaceae	7: 135	Haloragaceae	7: 239	Restionaceae	5: 416
Callitricaceae	4: 251	Hamamelidaceae	5: 363	Rhizophoraceae	5: 429; 6: 965
Campanulaceae	6: 107, 928	Hippocrateaceae	6: 389	Salicaceae	5: 107
Cannabinaceae	4: 223	Hydrocaryaceae	4: 43	Salvadoraceae	4: 225
Capparidaceae	6: 61	Hydrocharitaceae	5: 381; 6: 952	Sarcospermaceae	4: 32
Caprifoliaceae	4: 175, 598; 6: 928	Hydrophyllaceae	4: 207	Saururaceae	4: 47
Cardiopteridaceae	7: 93	Hypericaceae	8: 1	Scyphostegiaceae	5: 297; 6: 967
Celastraceae	6: 227, 389, 930	Icacinaceae	7: 1	Simaroubaceae	6: 193, 968
Centrolepidaceae	5: 421	Juglandaceae	6: 143	Sonneratiaceae	4: 280, 513; 6: 973
Ceratophyllaceae	4: 41	Juncaceae	4: 210	Sparganiaceae	4: 233
Chenopodiaceae	4: 99, 594; 6: 932	Juncaginaceae	4: 57	Sphenocleaceae	4: 27
Clethraceae	7: 139	Leeaceae	7: 755	Stackhousiaceae	4: 35
Cochlospermaceae	4: 61	Lemnaceae	7: 219	Staphyleaceae	6: 49
Combretaceae	4: 533; 5: 564; 6: 932	Loganiaceae	6: 293, 953	Stylidiaceae	4: 529
Connaraceae	5: 495; 6: 933	Lophopyxidaceae	7: 89	Styracaceae	4: 49
Convolvulaceae	4: 388, 599; 5: 558; 6: 936	Malpighiaceae	5: 125	Taccaceae	7: 806
Corynocarpaceae	4: 262; 5: 557	Martyniaceae	4: 216	Thymelaeaceae	4: 349; 6: 1, 976
Crassulaceae	4: 197	Molluginaceae	4: 267	Trapaceae	4: 43
Cyperaceae	7: 435	Moringaceae	4: 45	Trigonaceae	4: 59
Datisceae	4: 382	Myoporaceae	4: 265	Turneraceae	4: 235
Dichapetalaceae	5: 305; 6: 941	Myricaceae	4: 277	Typhaceae	4: 243
Dilleniaceae	4: 141	Najadaceae	6: 157	Umbelliferae	4: 113, 595; 5: 555; 6: 983
Dioscoreaceae	4: 293	Nyctaginaceae	6: 450	Valerianaceae	4: 253
		Nyssaceae	4: 29	Violaceae	7: 179
		Ochnaceae	7: 97	Xyridaceae	4: 366, 598
		Oxalidaceae	7: 151	Zygophyllaceae	4: 64
		Papaveraceae	5: 114		

TAXONOMICAL REVISIONS



REPUBLIK INDONESIA
REPUBLIC OF INDONESIA
LEMBAGA ILMU PENGETAHUAN INDONESIA (L.I.P.I.)
INDONESIAN INSTITUTE OF SCIENCES

FLORA MALESIANA

BEING

*AN ILLUSTRATED SYSTEMATIC ACCOUNT OF THE MALESIAN FLORA /
INCLUDING KEYS FOR DETERMINATION / DIAGNOSTIC DESCRIPTIONS /
REFERENCES TO THE LITERATURE / SYNONYMY / AND DISTRIBUTION /
AND NOTES ON THE ECOLOGY OF
ITS WILD AND COMMONLY CULTIVATED PLANTS*

PUBLISHED

UNDER THE AUSPICES OF LEMBAGA BIOLOGI NASIONAL
BOTANIC GARDENS OF INDONESIA / BOGOR / JAVA AND
OF THE RIJKSHERBARIUM / LEYDEN / NETHERLANDS

PREPARED

ON AN INTERNATIONAL CO-OPERATIVE BASIS UNDER THE SUPERVISION OF
SEVERAL DIRECTORS OF BOTANIC GARDENS / KEEPERS OF HERBARIA
AND VARIOUS PROMINENT BOTANISTS

FOR THE PROMOTION OF
BOTANICAL SCIENCE AND THE CULTURAL ADVANCEMENT OF
THE PEOPLES OF SOUTH-EASTERN ASIA TO
THE SOUTHWEST PACIFIC REGION

SERIES I
SPERMATOPHYTA



VOLUME 7

GENERAL EDITOR:
Dr C. G. G. J. VAN STEENIS
DIRECTOR OF THE FOUNDATION 'FLORA MALESIANA'

PUBLISHED BY
NOORDHOFF INTERNATIONAL PUBLISHING, LEYDEN
THE NETHERLANDS

PRINTED IN THE NETHERLANDS
1972-1976

COPYRIGHT 1976

*All rights reserved, including the right to reproduce
this book or parts thereof in any form*

ISBN 90 286 0615 7

PUBLICATION DATES

Part 1 26 Jan. 1972

Part 2 12 Jan. 1973

Part 3 13 Sept. 1974

Part 4 24 June 1976

Printed in the Netherlands

Flora Malesiana
Volume 7

Volume 7, preliminary matter,
page (4), under publication
dates, last line, change
1975 into 1976.

CONTENTS

<i>Title-page</i>	(3)
<i>Contents</i>	(5)
<i>Dedication</i>	(7)
<i>Abbreviations and signs</i>	(15)

TAXONOMICAL REVISIONS

in alphabetical sequence

<i>Aponogetonaceae</i> by H. W. E. van Bruggen	213
<i>Balanophoraceae</i> by B. Hansen	783
<i>Byblidaceae</i> by C. G. G. J. van Steenis	135
<i>Cardiopteridaceae</i> by H. Sleumer	93
<i>Clethraceae</i> by H. Sleumer	139
<i>Cyperaceae</i> (to be continued) by J. H. Kern	435
<i>Fagaceae</i> by E. Soepadmo (& C. G. G. J. van Steenis)	265
<i>Haloragaceae</i> by R. van der Meijden & N. Caspers	239
<i>Icacinaeae</i> by H. Sleumer	1
<i>Leeaceae</i> by C. E. Ridsdale	755
<i>Lemnaceae</i> by F. van der Plas	219
<i>Lophopyxidaceae</i> by H. Sleumer	89
<i>Ochnaceae</i> by A. Kanis	97
<i>Oxalidaceae</i> by J. F. Veldkamp	151
<i>Passifloraceae</i> by W. J. J. O. de Wilde	405
<i>Portulacaceae</i> by R. Geesink	121
<i>Taccaceae</i> by E. Drenth	806
<i>Violaceae</i> by M. Jacobs & D. M. Moore	179

ADDENDA

to volumes 4, 5, 6, and 7

<i>Addenda, corrigenda et emendanda</i> by C. G. G. J. van Steenis and collaborators	820
--	-----

INDEX

<i>Index to scientific plant names</i> by M. J. van Steenis-Kruseman	833
--	-----



Dedicated to
HERMAN JOHANNES LAM

DEDICATION

The completion of the seventh volume of this Flora gives me the occasion to dedicate this volume to HERMAN JOHANNES LAM, who from the beginning was intimately connected with the taxonomical study of the flora of the Malesian region, adopted the working team, provided for it a permanent niche in his institute, and finally played an important role when the perpetuating of its existence was threatened in 1958.

HERMAN LAM was born in Veendam, January 3rd, 1892. His father was an organic chemist and taught chemistry at Veendam. There was a possibility that he would be attached to the University at Groningen, but he accepted a new post in Rotterdam, in 1893, to set up the first municipal food-inspection department in Holland; this stood model for such inspections annex laboratories in other places. He also had a major share in the realisation of the Dutch 'Codex alimentarius'.

Thus, it was at Rotterdam that HERMAN grew up and received a 'classical' education at the 'Gymnasium Erasmianum' (1904–1911). Though he did not have an enthusiastic teacher he decided to study natural history, at his father's suggestion at the University of Utrecht.

This study lasted from 1911–1919. Just before the first World War (1914–1918) he managed to get his B.Sc., but during this war he was in military service part of each year. During the winter months he was allowed to pursue his academic studies, thanks to the support of his biology professors. It was quite an achievement to have this study crowned by a thick thesis (April 7th, 1919) within eight years under these difficult circumstances, as such would be the least required in peace-time. From this it can be deduced that HERMAN was an eager, devoted, and zealous personality, and during all his life he came up to this mark. In biology he felt not attracted or fit to devote his research to experimental work, and so his principal teacher became professor A. A. PULLE. As he had himself ideas to make a career in the tropics he got a training in acquiring form knowledge with plants of Surinam. PULLE, who tried to promote taxonomy of tropical plants at Utrecht, then the only centre in Holland where this was initiated, selected for him the family *Verbenaceae* of the Netherlands Indies, as LAM had in view to make a career there.

The thesis was entitled: 'The Verbenaceae of the Malayan Archipelago, together with those of the Malayan Peninsula, the Philippines, the Bismarck Archipelago, and the Palau, Marianne and Caroline Islands'. With these extensions beyond the boundaries of the former Netherlands Indies proper, he set a geographical standard delimitation which closely approaches the area covered by Flora Malesiana. Owing to the restricted wartime communications his voluminous thesis could only be based upon the materials in the herbaria of Utrecht, Leyden, and Berlin-Dahlem, without access to those at Kew and especially those at Bogor. In the brief chapter on plant geography he showed his interest in chorology and dispersal and the probable genesis of ranges. This was also reflected in the attached 'Stellingen' (theorems) on the Philippines as an area of junction of dispersal lines of *Verbenaceae*, origin and dispersal of *Cocos* and his defence of the then recently posed theory on continental drift by WEGENER (1917), then a novel and rather wild idea, on which he had to give a colloquium for his professor NIERSTRASZ. This just fitted him, as LAM felt always attracted by new ideas and theories. In the brief chapter on taxonomy he paid attention to affinities of genera, their place in the system, and derivation from others. This, again, is stressed in the 'Stellingen' where he posed an assumed polyphyletic derivation of *Geunsia* from *Callicarpa*¹, and, furthermore, he made a plea for biosystematics and delimitation of taxa by means of incompatibility. In both fields he was obviously led to

(1) This was premature jumping to conclusions. The disentangling of the *Callicarpa-Geunsia* complex is not yet solved and will require a great deal of detailed routine research, as I have recently pointed out.

deductions and theoretical reasoning. This characteristic facet of his scientific ambition, to synthesize main issues in addition to collecting factual material, was possibly to a certain degree due to his professor in zoology, H. F. NIERSTRASZ, to whom he referred in the preface of his thesis, and whose teachings had awakened in his mind a latent predilection for theorizing.

In one of the theorems he advanced, he mentioned with satisfaction that the Utrecht student corporation, 'Het Utrechtsch Studentencorps', showed a softening of its rigid traditions which he considered a sign of progress; this reflected an open, progressive state of mind.

I have dealt with this period and his thesis rather in detail because taken together they reflect in a nutshell LAM's scientific ambitions while allowing glimpses of his personality, and experience has taught that these hardly ever change after one has reached submature age.

In 1919 two positions were vacant for a botanical career in the Netherlands Indies, one at the rubber and coffee experiment station at Djember and one at the Herbarium of the Botanic Gardens at Buitenzorg (Bogor). He chose the latter and was appointed botanist in this institution, a division of the famous 's-Lands Plantentuin, mecca of tropical botany.

After having settled there in the same year, it appeared to his, not altogether agreeable, surprise that during 1917-1918, when, because of war conditions, communication between Holland and its overseas colony had been extremely difficult, Mr R. C. BAKHUIZEN VAN DEN BRINK had also and simultaneously prepared a MS-revision of the Verbenaceae, based on the Bogor material. These two treatises, of course, did not tally. Rather under pressure, this awkward situation led to the undertaking of a new revision of Malesian *Verbenaceae* which they performed together, dividing the genera between them. This paper was conceived in rather great haste; for brevity's sake descriptions were omitted, and it is found to be not very useful. It shows quite some deficiencies and proofs were badly corrected during LAM's absence in New Guinea. Also I have the impression that LAM did not perform his treatments with much enthusiasm and that he was more or less bored with this, what he called a rather dull and 'characterless' family, which gave him little synthetic satisfaction.

During this initial period at Bogor he tried, partly during holidays, to familiarize himself with the Javanese flora and he climbed several mountains. He gave accounts of most of these trips by publishing a small readable essay in 'De Tropische Natuur', the semi-popular journal of the Natural History Society in the Netherlands Indies. This he did also on certain shorter trips and it often appears that his is the only botanical information on such spots.

Then came soon the great opportunity to join a really large multidisciplinary expedition to Dutch New Guinea, led by staff-captain A. J. A. VAN OVEREEM, June 1920-January 1921. This was an immense experience, the manual work being facilitated by his able assistant, mantri AJOEB. The immense Papuan land caught his fancy for ever and besides the collecting work he paid full attention to all sorts of ecological observations and to the agricultural methods of the mountain Papuans. He made unique collections on the summit of Mt Doorman, a massif isolated from the Main Range, the only ones ever made. His experiences he laid down in a series of interesting and well-written papers, under the general title 'Fragmenta Papuana' (1927-1929) of which two decades later Miss L. M. PERRY, at Harvard, published an abbreviated version in English in 'Sargentia'.

Subsequently LAM's official work in the Bogor Herbarium was focussed on giving an account of the family *Sapotaceae* in the general scheme of the series 'Contributions à l'étude de la flore des Indes Néerlandaises'. This scheme was set up between the Botanic Gardens and the Forestry Experiment Station at Bogor by which the Herbarium should give priority of revisions to 'useful' families, yielding important timbers or other forest products. This knowledge was in turn of importance to the Museum of Economic Botany of which the chief, K. HEYNE, was engaged to

Dedication

compose the 2nd edition of his 'Nuttige Planten van Nederlandsch Indië' (published 1927), up to now the standard work on this matter.

The revision of this large, and taxonomically difficult family *Sapotaceae* was published in 1925. Systematically LAM found it a 'rebellious' family, and undisciplined by its abundant reticulated connections of characters, resisting satisfactory efforts towards its revision. It led him to a study of geographical subdivisions and demarcation lines within Malesia published in 1927; in this he tried to reconstruct the pathways along which *Sapotaceae* had distributed in Malesia.

As a pastime he continued to think about genetic plant-geography and composed a paper (1930) on Wegener's continental drift theory in relation to Malesian plant-geography, stimulated by IRMSCHER's work on the same subject, which he fully supported. This paper, however, was in fact largely a review of the general geophysical theory, but not based on an analysis of the plant-geography, living and fossil, of Malesia.

End 1923 LAM agreed to act as general secretary of the 3rd Netherlands Indian Congress of Natural Sciences which took place at Bogor, 25–28 September 1924. These congresses, organised at intervals of 3–4 years, were fairly large events, and required efficient preparation and administration. As its general secretary LAM had to report and was also responsible for the publication of the Proceedings ('Handelingen') which appeared mid-1925. The diligent way in which he smoothed the way of this congress and its Proceedings was probably the reason why later he was entrusted with the same position for the much bigger 4th Pacific Science Congress in 1929.

In 1925 E. D. MERRILL, who had then just left Manila and had always been very much interested in the plant-geographical division of Malesia, especially its central part 'Wallacea', suggested to the then director of the Botanic Gardens, professor Dr W. M. DOCTERS VAN LEEUWEN, that a closer study should be made on the phytogeographical connections of the Philippines with the adjacent parts of the Netherlands Indies. DOCTERS VAN LEEUWEN, who was always enthusiastic to favour explorations by his younger staff members, accepted this project and paved LAM's way to make another large expedition, lasting three months, to northeast Celebes and the northern Moluccas: Talaud Is., Karakelong, Miangas, and northern Moluccas (Morotai, Ternate, and Tidore). In agreement with the Bogor strategy or policy of taxonomical research, these collections, as well as those from his earlier New Guinea expedition, were filed to be worked out by specialists, instead of having them hurriedly and uncritically worked out and published separately, the strategy followed by MERRILL in the Philippines and RIDLEY in Malaya, and from which so many hurriedly conceived superfluous names emanated. Much later the results of this expedition were mostly worked out at leisure during World War II (together with his student Mr L. B. HOLTHUIS) in two large papers (1942, 1945), followed by a sketch of the plant-geography of Celebes (1945).

After his successful expedition to 'Wallacea' in 1926 LAM became engaged in the revision of another important tree family, *Burseraceae*. This he found a family to his taste, 'entirely disciplined, well-bred, you could almost say civilized', yet not dull, but showing a limited number of interesting problems, some of which he tackled and solved to his satisfaction and that of others. It led him to a new system of part of the family, but also to the study of comparative morphology and phylogenetic hypothesis in conjunction with taxonomy and plant-geographic speculation. After some precursory studies the final revision was published several years later, in 1932.

In this study he believed to have detected real phylogenetic (evolutionary) lines. This stimulated him, as he said, towards phylogenetic problems. But at the same time he began to feel

uneasy, 'as everybody who is familiar with this matter will realize how difficult it is to discriminate in such cases, between various degrees of probability, and how easy it is to be carried along by the conclusion most alluring to yourself, on whatever account.' He felt himself on slippery ground, and this confused his mind, making him doubt the value and rigidity of scientific achievements and truths. This confusion, he told me, was strengthened when he read HAYATA's 'Dynamic System' and, impulsive and romantic as he was, it appealed to him and he wrote a paper (1936) 'on the various types and methods to express or figure phylogenetic trees, and use phylogenetic symbols, testing as it were their scientific value'. Amongst others he introduced the phylogenetic concept of the 'genorheithrum' (1938). At the same time W. ZIMMERMANN's book on phylogeny of plant life (1930) stimulated him still more towards phylogenetic speculation, but doubt about the scientific value of these speculations gradually undermined his self-confidence to no mean degree, he told me recently, and led him towards thought about the real powers and limits of science and religion. Obviously he really suffered from this doubt and was always nagged by his conscience by treading on hypothetical terrain. Through his emotional nature he felt it more deeply than others.

I have inserted this digression at his special request because his mental difficulties started with the conclusion of his revision of the *Burseraceae*. I extracted it from a larger MS note.

The delay in the publication of this work on *Burseraceae* was partly caused by his appointment as general secretary of the 4th Pacific Science Congress, a mighty and most successful enterprise, centered in 1929 at Batavia (Jakarta) and Bandung. The preparation of this large event occupied most of his time for almost two years; it showed his excellent capacity of efficient organisation. This was officially recognized by the Dutch Government by his nomination to 'Officer of the Order of Oranje Nassau'.

In these years he was also secretary of the Netherlands Indian Society of Nature Preservation which was successfully rehabilitated by him and his friend Dr K. W. DAMMERMAN, chief of the Zoological Museum at Bogor.

During the world-wide economic slump set in with the thirties, severe reduction and reorganisation of the staff of the Gardens led to his appointment as chief of the Treub Laboratory at Bogor in 1932, while he simultaneously succeeded the retired director of the Gardens, Prof. Dr W. M. DOCTERS VAN LEEUWEN as extra-ordinary professor of botany at the Medical School at Batavia (Jakarta).

This was soon followed, in 1933, by his appointment as director of the Rijksherbarium and extra-ordinary professor of plant taxonomy and geography at the University of Leyden. This brought his fourteen years of tropical career to a close, but of course did not dim his interest in tropical botany. At Leyden, activities in connection with tropical plants had, since MIQUEL's death in 1870, been in a deep slumber — apart from BOERLAGE's interest — a most regrettable lapse of over 60 years after the preceding BLUME-MIQUEL period from 1829–1870, when tropical botany had been the main task of the Rijksherbarium.

With great energy LAM engaged himself to revive Malesian botany, starting with a minute staff. In 1934, one year after his appointment, he erected a new journal 'Blumea' to replace the earlier 'Mededelingen', focussed interest on New Guinea botany, attracted students and colleagues to work on Malesian botany, and succeeded in slowly building up a larger staff, whom he tried to stimulate towards contributing revisions of tropical plants. He also emphasized the necessity, or at least desirability, of botanists making at least one large expedition to the tropics, which from his own experience he regarded as a major means of confrontation, not so much for pure collecting alone, but for the widening of the interest and horizon of the student, and his personal development, in that he was faced with all sorts of facets of life, from organising

Dedication

trips to packing material, recruiting native helpers, and bargaining about prices of transport, but also spotting desirable plants in the field and gaining experience with tropical plants, their variability, way of habit and habitat, and thinking about their possible origin. Making such expeditions has become a tradition at the Rijksherbarium since LAM took the helm. As a matter of fact it had been proposed long before, by MELCHIOR TREUB, for students of all branches of botany.

Being himself a pur sang individualist, he always left students freedom, had an open mind for suggestions, and allowed them to follow their predilection. Thus he also built up a division for algology, with the help of Miss Dr J. TH. KOSTER. This division became opportune after the donation of Mrs WEBER-VAN BOSSE's very large collection of Algae, and also a division of Fungi, which properly started when Dr MAAS GEESTERANUS wanted to specialize in Lichens. Rather sensitive to appreciation, LAM guided the staff as an enlightened autocrat, who took great care in maintaining most pleasant mutual relationships, thus creating an atmosphere of intimacy and appreciation: everybody knew that the boss was personally interested in him or her; often he invited staff members at his home. He always had patience to listen to arguments and weigh them; he wanted people to be straight and open, to make proposals and to defend them, and to expose freely their aims and desires. This sometimes tended to be somewhat difficult for shy persons, whom he tried to stimulate by making provocative remarks, no doubt having in mind to contribute in this way to overcome their shyness and develop their individuality. He always thinks in relative, shaded terms, adhering to the philosophy of 'omnia dubia', being not shy to throw his own opinions to the wolves and having a laugh at himself. Through his sensitivity he felt often more or less attracted by the lame duck and tried to shield the underdog.

This agreeable atmosphere was in my opinion one of the greatest human assets of his leadership; it stimulated work in no mean degree. We still harvest the benefit of it, even now that the staff has so much increased, which necessarily leads towards slackening of personal relationships. There is now an internal 'staff society' which organises festivities, and through which even the once famous Santa Klaus feast survives, be it only for children and grandchildren and without the superb rhymes of which LAM had the monopoly. LAM used to receive staff members on the first of January at his home; at present this reception is given by the director in the spacious canteen which is then for a few hours wet for the occasion.

Before World War II, and still more after it, LAM was much occupied with organising and administration, lecturing and teaching, practical courses, excursions, he had to set up from scratch. This lamed his personal research: it became so to speak embodied in the output of his students and promovendi which he charged with new revisions of the families which he worked on himself earlier: chiefly *Burseraceae* and *Sapotaceae*.

In passing, it should be realized that his own attempts, and those of others, at making (sub-final) revisions of Malesian plant families at Bogor in the twenties had been premature, largely due to inadequacy of available collections, as well as to insufficient contact with and benefit of the large European taxonomic centres. Even now, after the tremendous influx of collections in the past forty years, the riches of the Malesian flora are by no means exhausted and new species, even new genera or records of these appear each year. We assume that the bulk of the flora is now represented in herbaria, but high priority for exploring 'under-collected' islands has become urgent because the destruction of the virgin flora increases at an alarming rate.

At the end of the thirties a plan was made among Dutch professors and professional botanists to make a joint tour through South Africa. LAM decided to participate, but also to use the occasion to attach to it a collecting expedition to the Mascarenes and Madagascar, during which he was accompanied by his assistant Mr A. D. J. MEEUSE, now professor of botany at Amsterdam.

In 1939 he attended the Pacific Science Congress at Berkeley where he suggested the publication of plant maps of Pacific plants; long afterwards I could realize the publication of 'Pacific Plant Areas' of which now 3 volumes have been published.

Only during the war LAM could perform some taxonomic research work, mainly on his former collections, but since then he occupied himself largely with theoretical botany on phylogeny of *Cormophyta* including the fossil record, in conjunction with ideas about morphological derivations. This interest led, amongst others, to the appointment of W. A. VAN HEEL as plant morphologist. These morphological considerations held his full attention; he was especially interested in the telome theory, and in the concepts stachyosporry and phyllosporry in *Cormophyta*, in the frame of phylogenetic thinking. LAM liked concepts, and by the way, introduced the term 'taxon', now in universal use for taxonomic entity.

Since his work with the *Burseraceae* phylogeny, in conjunction with morphological derivation on the basis of typology (primitive to advanced, homology and analogy), palaeontology and plant-geography had occupied him deeply and he made it also the subject of his inaugural lectures at Batavia in 1932 and Leyden in 1933, as well as of his oration as a Rector Magnificus of the University (1959). In his 'Tradenda' he wrote that he had often experienced that his interest and way of thinking agreed more with that of historians and comparative linguists than with that of many a biologist.

When World War II broke out in 1940 LAM realized that this might threaten the lifelong effort of Dr C. A. BACKER, whose voluminous MSS on the Flora of Java existed as a single copy and were in the private possession of the author. Dr BACKER agreed that its safeguarding should be managed by the Rijksherbarium through multiplication by stencil. Of this so-called 'Nooduitgave' (emergency edition) of the Flora of Java the first part appeared already in November 1940; it was printed in 25 copies. As BACKER had not finished all families LAM also had to attract temporary collaborators (mainly Mr A. G. L. ADELBERT and Dr R. C. BAKHUIZEN VAN DEN BRINK Jr) to complete this first Dutch version. Much later he also succeeded to have the completed Flora of Java translated into English and attract funds to have this standard work printed in its final form.

During the war when many plans for the future were designed LAM, LANJOUW and others contemplated a taxonomical counterpart of REINDERS & KONINGSBERGER's textbook of general botany. With the closing of Leyden University during the occupation, in 1942, LAM resigned as professor and director. During this time he spent much time in drawing chapters for this textbook, but abandoned this effort as soon as the University was re-opened on May 5th, 1945, and he was re-appointed in his positions. The textbook was never completed; small parts of his MSS were incorporated in botanical chapters of a new Dutch systematical encyclopaedia, 'E.N.S.I.E.'.

In post-war years LAM made two larger tours abroad, both connected with the tropics. In 1949 he attended officially the 7th Pacific Science Congress in New Zealand, travelling there via North America and the Pacific Islands. In 1954 he was away from June to October, to attend officially the 2nd Pan Indian Ocean Congress at Perth. Here he was awarded a honorary doctorate; going by boat and returning by plane he was able to visit and collect in Ceylon, Australia, New Guinea, Manila, and Bangkok.

As mentioned before, New Guinea, the site of his first large expedition, and really a dorado for the botanist, held his fascination. In the fifties LAM was the driving force of an attempt towards organizing a large multidisciplinary expedition, equipped with modern means of transport. The main purpose was exploring the Dutch, western part of the Star Mountains, in Central New Guinea, near the frontier with the Territories of Papua and New Guinea; it lasted from March to September 1959. Owing to some bad luck but largely through inefficient organi-

Dedication

sation, the botanical results were less than expected. The word 'multidisciplinary' sounds promising, but such large-scale undertakings are clumsy affairs now out of date, and small one-purpose expeditions which are far cheaper and more efficient should be preferred.

Besides building up the Herbarium and its international reputation, looking for ways to increase collections especially of the eastern tropics, attempting to increase staff for new projects or strengthening existing ones, LAM ran into serious difficulties with the available working space in the building. On two occasions in the fifties he was offered a temporary new abode in an abandoned factory in the town of Leyden. Partly because of insufficient safety against fire and partly because of the undesirability of then becoming separated from the Hortus and annex botanical laboratories, he declined these offers.

This lack of space was to quite some degree caused by the fact that he had granted working space to the team of the Foundation Flora Malesiana which had grown to a force of six persons. When by December 1957 the financial basis, from Indonesian source, fell away under this Foundation, and no other international support appeared to be available, LAM very strongly supported my plea to Leyden University to keep the team intact. With the intermediary of the 'Netherlands Foundation for Pure Scientific Research (Z.W.O.)' the University agreed to adopt this team and in the course of three years incorporated it in the staff of the Rijksherbarium. By this most fortunate decision the working scheme of Flora Malesiana became the official project of the tropical division of the Rijksherbarium, a most important achievement for this division which now got manpower and definite purpose. We cannot be too thankful for LAM's loyal and wise support.

It did not solve his space problem, however, and finally he gave in when the University proposed to accommodate four University institutes — among which the Rijksherbarium — in a 'Provisorium' for which the wool and stocking factory of PARMENTIER on the Schelpenkade 6, situated at a few minutes on foot from the old site, would be purchased and accommodated. He realized that this was the only, opportune solution to his space problem, the main worry being for him, and for me, that it was not fully fire-proof. As his successor it fell to my task to realize this accommodation. It would give opportunity for expansion of tasks and more efficient work for the staff, especially the technical staff. Moreover, it was intended to serve for only ten years; in 1970 it was envisaged in the then University planning that a permanent, fully fire-proof 'Rijksherbarium definitivum' would be built outside the town near the new Hortus. I must confess that, personally, I mistrusted this rosy perspective, and was not surprised when preparations for the planning of this new building were very soon abandoned.

I should not omit to mention that LAM's ideas about the organisation of taxonomic research work in the Netherlands had been quite different in the late forties. Shortly after the war, in 1947, there was a special meeting of the Netherlands Botanical Society, held at Utrecht, in which LAM made a strong plea for a 'Central Research Institute for Taxonomic Botany', not necessarily at Leyden. This would be affiliated with all Dutch Universities in such a way that all students in biology would get a primary training for their B.Sc. in their own University, but would receive research subjects and training for their M.Sc. or Ph.D. at the Central Institute. This ideal of his did not meet with the unanimous approval which was compulsory for success to approach the Government. I believe he always regretted this, but accepted the alternative principle that there would be no competition or overlapping between the taxonomic centres in the Netherlands, of which there are now three main ones: Leyden for the East, Wageningen for Africa, and Utrecht for the Neotropics. After all, I believe he will now realize that the alternative idea has worked out very well indeed and that its acceptance need not to be regretted.

The last years of LAM being in office took a large toll of his energy as he spent two years on

administrative and representative work for the University, first as Secretary to the Senate, followed by a year as Rector Magnificus, during which years he had to delegate part of his lecturing to younger staff members. The last years of his tenure were unfortunately darkened by a prolonged severe illness of Mrs LAM and a decline of his own physical condition.

During these years his many activities had led him to live more or less above his physical capacity and, though he was given all facilities after his retirement, he understandably enough did not immediately make the effort to take up personal research work of his fancy.

After having finished the printed version of his valedictory lecture 'Tradenda. Mijmeringen bij een afscheid' (June 1962), he set up a 'Rijksherbarium Foundation Professor Lam', starting himself with a modest grant and inviting other botanists to contribute a yearly donation. This Foundation, which is administered by the University, serves for purposes of importance to the Rijksherbarium. As yet it remained a small Fund and has been used to stimulate students: each two years a prize is awarded to the graduate student who has, during the intervening period, performed the best subject study for his doctoral examination. The prize is a large paper-weight in the shape of a lamb, in bronze, with inscription.

We are happy LAM still enjoys life and attends most colloquia at the Rijksherbarium. We wish him many happy years to come.

SOURCES

- M. J. VAN STEENIS-KRUSEMAN. 1949. Cyclopaedia of Collectors. Fl. Males. I, 1: 308-309.
 Blumea Supplement IV. 1958. Jubilee volume for Professor Lam. Besides contributions from colleagues it contains also a list of plant and animal names commemorating Professor LAM (by P. VAN ROYEN) and further a complete bibliography up to 1958 (compiled by L. VOGELZANG).
 H. J. LAM. 1962. Tradenda. Mijmeringen bij een afscheid. Leyden.
 C. G. G. J. VAN STEENIS. 1962. Bij het aftreden van Lam. Leids Universiteitsblad 27 (no 31): 5-6, portr.

C. G. G. J. VAN STEENIS

ABBREVIATIONS AND SIGNS

- acc. = according
 Ak. Bis. = Aklan Bisáya (Philip. language)
 Alf. Cel. = Alfurese Celebes (language)
 alt. = altitude
 Anat. = Anatomy
 Ap. = Apáyao (Philip. language)
 app. = appendix, appendices
 appr. = approximate
 Apr. = April
 Arch. = Archipelago
 atl. = atlas
auct. div. = *auctores diversi*; various authors
auct(t). mal. = *auctores malayenses*; authors dealing with Malesian flora
auct(t). plur. = *auctores plures*; several authors
 Aug. = August
 Bag. = Bagóbo (Philip. language)
 basionym = original name of the type specimen; its epithet remains permanently attached to the taxon which is typified by it provided it is of the same rank
 Bg. = Buginese (language)
 Bik. = Bikol (Philip. language)
 Bil. = Bilá-an (Philip. language)
 Bill. = Billiton
 Bis. = Bisáya (Philip. language)
 Bon. = Bontók (Philip. language)
 Born. = Borneo
 Bt = Bukit; mountain
 Bug. = Buginese (language)
 Buk. = Bukidnon (Philip. language)
c. = *circiter*; about
 C. Bis. = Cebu Bisáya (Philip. language)
cf. = *confer*; compare
 Chab. = Chabecáno (Philip. language)
 citations = see references
 cm = centimetre
c.n. = see *comb. nov.*
comb. nov. = *combinatio nova*; new combination
 CS = cross-section or transversal section of an organ
c.s. = *cum suis*; with collaborators
cum fig. = including the figure
cur. = *curante*; edited by
 D (after a vernacular name) = Dutch
 Daj. = Dyak (language)
 Dec. = December
 D.E.I. = Dutch East Indies
descr. added behind a reference = means that this contains a valid description
 diam. = diameter
 Distr. (as an item) = Distribution
 Distr. (with a geographical name) = District
ditto = the same, see *do*
 Div. = Division, or Divide
div. = *diversus* (masc.); various
do = *ditto* (Ital.); the same
 Dum. = Dumágat (Philip. language)
 dupl. = duplicate
 E = east (after degrees: eastern longitude)
 E (after a vernacular name) = English
 Ecol. = Ecology
 ed. = edited; edition; editor
e.g. = *exempli gratia*; for example
elab. = *elaboravit*; revised
em(end). = *emendavit*; emended
 em(erg). ed. = emergency edition
 Engl. = English
etc., &c. = *et cetera*; and (the) other things
ex auctt. = *ex auctores*; according to authors
excl. = *exclusus* (masc.); excluding, exclusive of
ex descr. = known to the author only from the description
f. (before a plant name) = *forma*; form
f. (after a personal name) = *filius*; the son
 f. (in citations) = figure
 fam. = family
 Feb(r). = February
vide = according to
 fig. = figure
fl. = *flore, floret (floruit)*; (with) flower, flowering
 For. Serv. = Forest Service
fr. = *fructu, fructescit*; (with) fruit, fruiting
 Fr. (after a vernacular name) = French
 G. = Gunung (Malay); mountain
 Gad. = Gaddáng (Philip. language)
gen. = *genus*; genus
genus delendum = genus to be rejected
 Germ. = German
geront. = Old World
haud = not, not at all
 holotype = the specimen on which the original description was actually based or so designated by the original author
 homonym = a name which duplicates the name of an earlier described taxon (of the same rank) but which is based on a different type species or type specimen; all later homonyms are nomenclaturally illegitimate, unless conserved
 I. = Island
ib(id). = *ibidem*; the same, in the same place
 Ibn. = Ibanág (Philip. language)
ic. = *icon, icones*; plate, plates
ic. inedit. = *icon ineditum, icones inedita*; inedited plate(s)
id. = *idem*; the same
i.e. = *id est*; that is
 If. = Ifugáo (Philip. language)
 Ig. = Igorot (Philip. language)
 Ilg. = Ilongót (Philip. language)
 Ilk. = Ilóko (Philip. language)
in adnot. = *in adnotatione*; in note, in annotation
incl. = *inclusus* (masc.); including, inclusive(ly)
 indet. = indetermined
 Indr. = Indragiri (in Central Sumatra)
inedit. = *ineditus* (masc.); inedited
in herb. = *in herbario*; in the herbarium
in litt. = *in litteris*; communicated by letter
in sched. = *in schedula*; on a herbarium sheet
in sicc. = *in sicco*; in a dried state
in syn. = *in synonymis*; in synonymy
 Is. = Islands
 Is. (after a vernacular name) = Isinái (Philip. language)
 Ism. = Isámál (Philip. language)
 isotype = a duplicate of the holotype; in arboreous plants isotypes have often been collected from a single tree, shrub, or liana from which the

holotype was also derived
 Iv. = Ivatán (Philip. language)
 J(av). = Javanese (language)
 Jan. = January
 Jr = Junior
 Klg. = Kalinga (Philip. language)
 Kul. = Kuláman (Philip. language)
 Kuy. = Kuyónon (Philip. language)
 Lamp. = Lampong Districts (in S. Sumatra)
 Lan. = Lánao (Philip. language)
 lang. = language
l.c. = *loco citato*; compare reference
 lectotype = the specimen selected *a posteriori*
 from the authentic elements on which the taxon
 was based when no holotype was designated or
 when the holotype is lost
 livr. = livraison, part
ll.cc. = *l.c.* (plur.)
 LS = longitudinal or lengthwise section of an
 organ
 m = metre
 M = Malay (language)
 Mag. = Magindanáo (Philip. language)
 Mak. = Makassar, Macassar (in SW. Celebes)
 Mal. = Malay(an)
 Mal. Pen. = Malay Peninsula
 Mand. = Mandáya (Philip. language)
 Mang. = Mangyán (Philip. language)
 Mar. = March
 Mbo = Manóbo (Philip. language)
 Md. = Madurese (language)
 Minangk. = Minangkabau (a Sumatran language)
min. part. = *pro minore parte*; for the smaller part
 mm = millimetre
 Mng. = Manguárgan (Philip. language)
 Morph. = Morphology
 ms(c), MS(S) = manuscript(s)
 Mt(s) = Mount(ains)
n. = *numero*; number
 N = north (after degrees: northern latitude); or
 New (*e.g.* in N. Guinea)
 NE. = northeast
nec = not
neerl. = Netherlands, Netherlands edition
 Neg. = Negrito (Philip. language)
 N.E.I. = Netherlands East Indies
 neotype = the specimen designated to serve as
 nomenclatural type when no authentic speci-
 mens have existed or when they have been lost;
 a neotype retains its status as the new type as
 long as no authentic elements are recovered and
 as long as it can be shown to be satisfactory in
 accordance with the original description or
 figure of the taxon
 N.G. = New Guinea
 N.I. = Netherlands Indies
no = *numero*; number
nom. = *nomen*; name (only) = *nomen nudum*
nom. al. = *nomen aliorum*; name used by other
 authors
nom. alt(ern). = *nomen alternativum*; alternative
 name
nom. cons(erv). = *nomen conservandum*, *nomina*
conservanda; generic name(s) conserved by the

International Rules of Botanical Nomenclature
nom. fam. cons. = *nomen familiarum conservan-*
dam; conserved family name
nom. gen. cons. = see *nomen conservandum*
nom. gen. cons. prop. = *nomen genericum conser-*
vandum propositum; generic name proposed for
 conservation
nom. illeg(it). = *nomen illegitimum*; illegitimate
 name
nom. leg(it). = *nomen legitimum*; legitimate name
nom. nov. = *nomen novum*; new name
nom. nud. = *nomen nudum*; name published with-
 out description and without reference to pre-
 vious publications
nom. rej(ic). = *nomen rejiciendum*; name rejected
 by the International Rules of Botanical No-
 menclature
nom. seminudum = a name which is provided with
 some unessential notes or details which cannot
 be considered to represent a sufficient descrip-
 tion which is, according to the International
 Rules of Botanical Nomenclature, compulsory
 for valid publication of the name of a taxon
nom. subnudum = *nomen seminudum*
nom. superfl. = a name superfluous when it was
 published; in most cases it is a name based on
 the same type as an other earlier specific name
non followed by author's name and year, not
 placed in parentheses, and put at the end of a
 citation = means that this author has published
 the same name mentioned in the citation *in-*
dependently. These names (combinations) are
 therefore homonyms.
 Compare p. 247a lines 2-4 from top, where
 there appear to be two different species named
Haloragis oligantha, one by ARNOTT published
 in 1836, and another by WIGHT & ARNOTT
 published in 1834. The latter has priority over
 the former which is thus invalidated.
 The same can happen with generic names.
 Compare p. 76 where there appear to be two
 quite different taxa described as *Miquelia*, one
 by BLUME published June 1838 and one by
 MIQUEL published Sept. 1838. The first has
 priority, but the latter has been proposed to be
 conserved over the first.
 (*non* followed by abbreviation of author's name)
 before a reference (citation) headed by an other
 author's name = means that the second author
 has misinterpreted the taxon of the first author.
 Compare for example p. 213b line 5 from top
 where it appears that ANDREWS in his Botanical
 Repository has misapplied the name *Aponogeton*
monostachyon as described by LINNÉ *f.*
non al. = *non aliorum*; not of other authors
non vidi = not seen by the author
nov. = *nova* (femin.); new (species, variety, etc.)
 Nov. = November
n.s. = new series
n. sp. = *nova species*; new species
n. (sp.) prov. = *nomen (specificum) provisorium*;
 provisional new (specific) name
n.v. = *non vidi*; not seen
 NW. = northwest

Abbreviations and signs

- Oct. = October
op. cit. = *opere citato*; in the work cited
 p. = *pagina*; page
 P. = Pulau, Pulu (in Malay); Island
 Pal(emb). = Palembang
 Pamp. = Pampáŋgan (Philip. language)
 Pang. = Pangasinán (Philip. language)
 paratype = a specimen cited with the original description other than the holotype
part. alt. = for the other part
 P. Bis. = Panay Bisáya (Philip. language)
 P.I. = Philippine Islands
 pl. = plate
plurim. = *plurimus*; most
p.p. = *pro parte*; partly
pr. max. p. = *pro maxima parte*; for the greater part
pro = as far as is concerned
prob. = *probabiliter*; probably
prop. = *propositus*; proposed
 Prov. = Province
pr.p. = *pro parte*; partly
 pt = part
quae est = which is
quoad basionym, syn., specimina, *etc.* = as far as the basionym, synonym(s), specimen(s), *etc.* are concerned
 references = see for abbreviations the list in vol. 5, pp. cxlv-clxv
 Res. = Residency
 resp. = respective(ly)
 S = south (after degrees: southern latitude)
 S (after a vernacular name) = Sundanese (language)
 Sbl. = Sambáli (Philip. language)
 SE. = southeast
sec. = *secus*; according to
sect. = *sectio*; section
sens. ampl. (*ampliss.*) = *sensu amplo (amplissimo)*; in a wider sense, in the widest sense
sens. lat. = *sensu lato*; in a wide sense
sens. str. (*strictiss.*) = *sensu stricto (strictissimo)*; in the narrow sense, in the narrowest sense
 Sept. = September
seq., seqq. = *sequens, sequentia*; the following
 ser. = series
s.l. = *sensu lato*; in a wide sense
 S.-L. Bis. = Samar-Leyte Bisáya (Philip. language)
 Sml. = Sámal (Philip. language)
s.n. = *sine numero*; (specimen) without the collector's number
 Sp. = Spanish (language)
sp(ec). = *species*; species
specim. = specimen(s)
sphalm. = *sphalmate*; by error, erroneous
spp. = *species*; species (plural)
 Sr = Senior
s.s. = see *sens. str.*
ssp. = *subspecies*; subspecies
s.str. = see *sens. str.*
stat. nov. = *status nova*; proposed in a new rank
 ſ. = Subánun (Philip. language)
subg(en). = *subgenus*; subgenus
subsect. = *subsectio*; subsection
subsp. = *subspecies*; subspecies
 Sul. = Súlu (Philip. language)
 Sum. E.C. = Sumatra East Coast
 Sum. W.C. = Sumatra West Coast
 Suppl. = Supplement
 SW. = southwest
syn. = *synonymum*; synonym
 synonyms = the names of taxa which have been referred to an earlier described taxon of the same rank and with which they have been united on taxonomical grounds or which are bound together nomenclaturally
 syntypes = the specimens used by the original author when no holotype was designed or more specimens were simultaneously designated as type
 t. = *tabula*; plate
 Tag. = Tagálog (Philip. language)
 Tagb. = Tagbanúa (Philip. language)
 Tagk. = Tagaká-ólo (Philip. language)
 Tapan. = Tapanuli (in NW. Sumatra)
 taxon = each entity throughout the hierarchic ranks of the plant kingdom which can be described and discriminated from other taxa of the same rank
 Taxon. = Taxonomy
 Tg = Tandjung (Malay); cape
 Ting. = Tinggián (Philip. language)
 Tir. = Tirurai (Philip. language)
 transl. = translated
 type = each taxon above the rank of a species is typified by a type belonging to a lower rank, for instance a family by a genus, a genus in its turn by a species; a species or infraspecific taxon is typified by a specimen. The name of a taxon is nomenclaturally permanently attached to its type; from this it cannot be inferred that the type always represents botanically the most typical or average structure found in the circumscription of the taxon
 type specimen = the specimen or other element to which the name of a species or infraspecific taxon is (nomenclaturally) permanently attached; botanically a type specimen is a random specimen on which the name was based by description. Therefore, it does not need to represent the average or most typical representative of a population. See holotype, isotype, lectotype, syntype, paratype, and neotype
typ. excl. = *typo excluso*; type excluded
typ. incl. = *typo incluso*; type included
typus = see type and type specimen
var. = *varietas*; variety
var. nov. = *varietas nova*; new variety
 Vern. = Vernacular
vide = see
viz = *videlicet*; namely
 vol. = volume
 W = west (after degrees: western longitude)
 Yak. = Yakán (Philip. language)
 ± = about
 & = and
 ∅ = diameter
 ♂ = male (flower, *etc.*)

FLORA MALESIANA

♀ = female (flower, *etc.*)

♂, ♀ = bisexual (flower)

(♂) (♀) = dioecious with unisexual flowers

(♂♀) = monoecious with unisexual flowers

(♂♀) = polygamous

(♀♀) = polygamous

∞ = many

> = more than (in size, number, *etc.*)

< = less than (size, number, *etc.*)

× 2/5 = 2/5 of natural size

× *montana* = means that the epithet *montana* is that of a hybrid

LEEACEAE (C. E. Ridsdale¹, Leyden)

The monogeneric family is placed in the *Rhamnales* in the system of ENGLER and is closely allied to the *Vitaceae*, sometimes considered as a subfamily or tribe of that family. Distinguished from the *Vitaceae* by the development of a complex staminodial tube, by the presence of one ovule in each locule of the ovary. Pollen is also distinct from that in *Vitaceae*, supporting the segregation into a separate family. Seed and embryo features and the presence of pearl glands on the vegetative organs indicate a very close affinity with the *Vitaceae* but not to other families.

LEEAE

VAN ROYEN *ex* LINNÉ, Syst. Nat. ed. 12, 2 (1767) 627 & Mantissa 1 (1767) 17, 124, *nom. cons.*; CLARKE, J. Bot. 19 (1881) 101–138; GAGNEP. Bull. Soc. Bot. Fr. 57 (1910) 331–336; SUESSENGUTH in E. & P. Nat. Pfl. Fam. ed. 2, 20d (1953) 382; RIDSDALE, Blumea 22 (1974) 57–100, with full synonymy and typification. — *Nalagu* ADANS. Fam. Pl. 2 (1763) 445, 581, *nom. rej.*; DENNST. Schlüssel Hort. Mal. (1818) 13, 27. — *Aquilicia* LINNÉ, Mantissa 2 (1771) 146, 211. — *Otillis* GAERTN. Fruct. 1 (1788) *icon. tab.* 57 f. 7, *nom. inval.* — *Ticorea* BLANCO, Fl. Filip. (1837) 85. — **Fig. 1–24.**

Trees, erect or creeping shrubs, scramblers, or herbaceous plants with a woody base; stems noded, unarmed, rarely with rows of spines. *Leaves* distichous, 1-foliolate, 3-foliolate, or 1- to 4-pinnate, usually imperfectly imparipinnate. Petiole or base of petiole expanded to form at both margins a stipular structure surrounding the stem apex, stipules narrowly sheathing and somewhat persistent or large, obovate and caducous. Leaflets opposite on noded rachis, glabrous or pubescent with hairs simple; pearl glands usually present on the undersurface, globular or stellate; margins crenate to serrate-dentate, lobes glandular. *Inflorescences* in leaf-opposed cymes, lax or condensed by reduction of inflorescence branches, or peduncle, or both, erect or pendulous. *Flowers* bisexual, actinomorphic, 4- or 5-merous, rarely both in the same inflorescence. *Calyx* campanulate with triangular lobes, lobes glandular at the apex. *Corolla* lobes valvate in the bud cohesing by an apical keel, reflexed at maturity; basal portion choripetalous, adnate to androecium. *Staminodial tube* joined to the corolla at one point dividing the structure into an upper and lower portion. Upper portion of 4 or 5 thickened lobes connate to each other by thinner tissues which form sinuses over which the filaments pass; lobes retuse, retusely apiculate to bifid at apex. Lower portion forming a free collar, sometimes extending as far as the ovary. *Filaments* arising from a basal portion of the upper part of the staminodial tube and extending over the sinuses; anthers introrse, usually syngenesious and detaching as a unit by breakage at the base of the filaments, rarely free, sometimes becoming extrorse by inflexion. *Ovary* discoidal, 4–8-celled, each cell with 1 ovule; style short, entire; stigma slightly thickened, glabrous; ovules anatropous, basally attached. *Fruit* a berry, depressed-subglobose; seeds triangularly ovate in section. endosperm ruminant. Embryo linear.

(1) B. A. KRUKOFF botanist of Malesian Botany.

Distribution. A genus of 34 *spp.* of which 25 *spp.* are endemic in Malesia (with a few species extending to Queensland, Micronesia, and Fiji), 6 in SE. Asia (from Ceylon to S. China), 1 being widely distributed from tropical Africa and Madagascar through SE. Asia and Malesia to Taiwan and Micronesia, 1 *sp.* endemic in Madagascar and 1 *sp.* in the isle of Sao Tomé (W. Africa). Fig. 1.

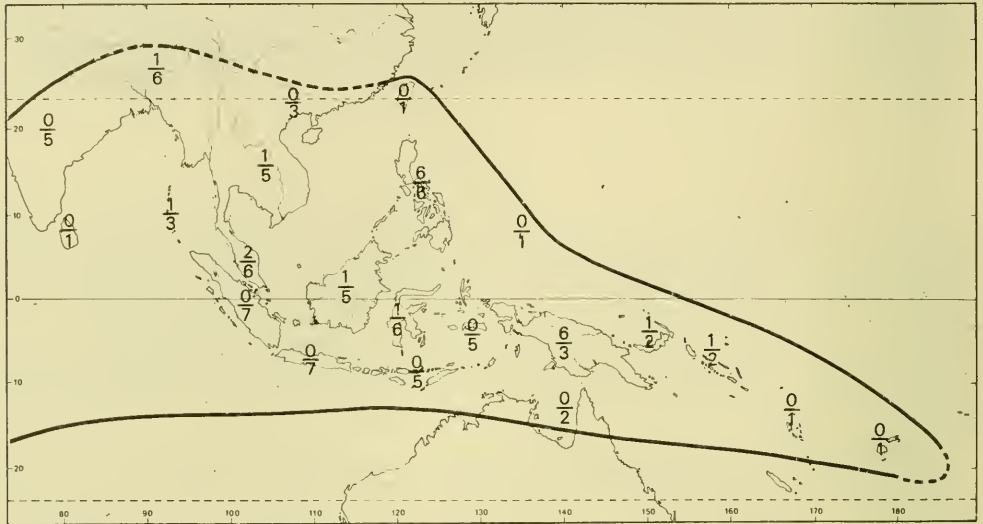


Fig. 1. Range of *Leea* in Indo-Pacific (Africa and Malagasy omitted); numbers above the hyphen indicate endemic species for each area or inland group, those below the hyphen the other non-endemic species.

The occurrence of *L. philippinensis* in the island of Botel Tobago, near Taiwan, is plant-geographically interesting as this is not collected in the mainland of Taiwan.

Fossil species have been described (fossil wood) from the Tertiary in Japan and Nagpur (India).

Ecology. The majority of the wide-spread species is limited to secondary vegetation, particularly riverine forest, some extending into areas with a temporary dry, seasonal climate. Species with limited distributions tend to be confined to the understorey of primary forest, and are also frequently found along streams.

Most Malesian species are found below 1000 m, but there are a few ascending somewhat higher and occasionally to 1500 m (*L. coryphantha*, *L. guineensis*) or even to 1700 m (*L. indica*); it is noteworthy that *L. guineensis* and *L. indica* find their highest stations in the Himalayan range, at 2250 and 2500 m respectively.

Little is known about the flower biology but Dr M. A. LIEFTINCK assured us that the inconspicuous scentless flowers of the greenish-white flowered species are frequented by short-tongued bees and sylphids. It should be added that in the flowers no disk is found; it might occur that honey is produced by receptacular tissue or that the insects are attracted by the conspicuous glandular tissue on the (dorsal) connective; field observations are needed.

Taxonomy. CLARKE, *l.c.*, has proposed a subdivision of series and sections, but I found them unreliable and refrain from any subdivision.

Some species appear to be very variable, while no tangible infraspecific subdivision can be made on the basis of herbarium specimens.

In many species the degree of pinnation of the leaf is exceedingly variable. Recognition of species differentiated solely on whether the leaves are 1-foliolate, 3-foliolate, or pinnate is abandoned. This is also the developmental sequence of leaves in growing seedlings. In such variable species flowering of plants with 1- or 3-foliolate leaves is considered to be precocious. These observations have led to a considerable reduction in the number of species.

Morphology. *Habit.* Most species are smallish shrubs, some only woody at the base. Several may, however, attain some 10 m in height (*L. aequata*, *L. aculeata*) and four are even recorded to 15 m tall (*L. angulata*, *L. indica*, *L. macropus*, *L. tetramera*).

Two Malesian species are armed with spines (enations), *viz* *L. aculeata* (mostly on trunk and main branches) and *L. angulata* (from trunk to ultimate branches). Fig. 3 (17').

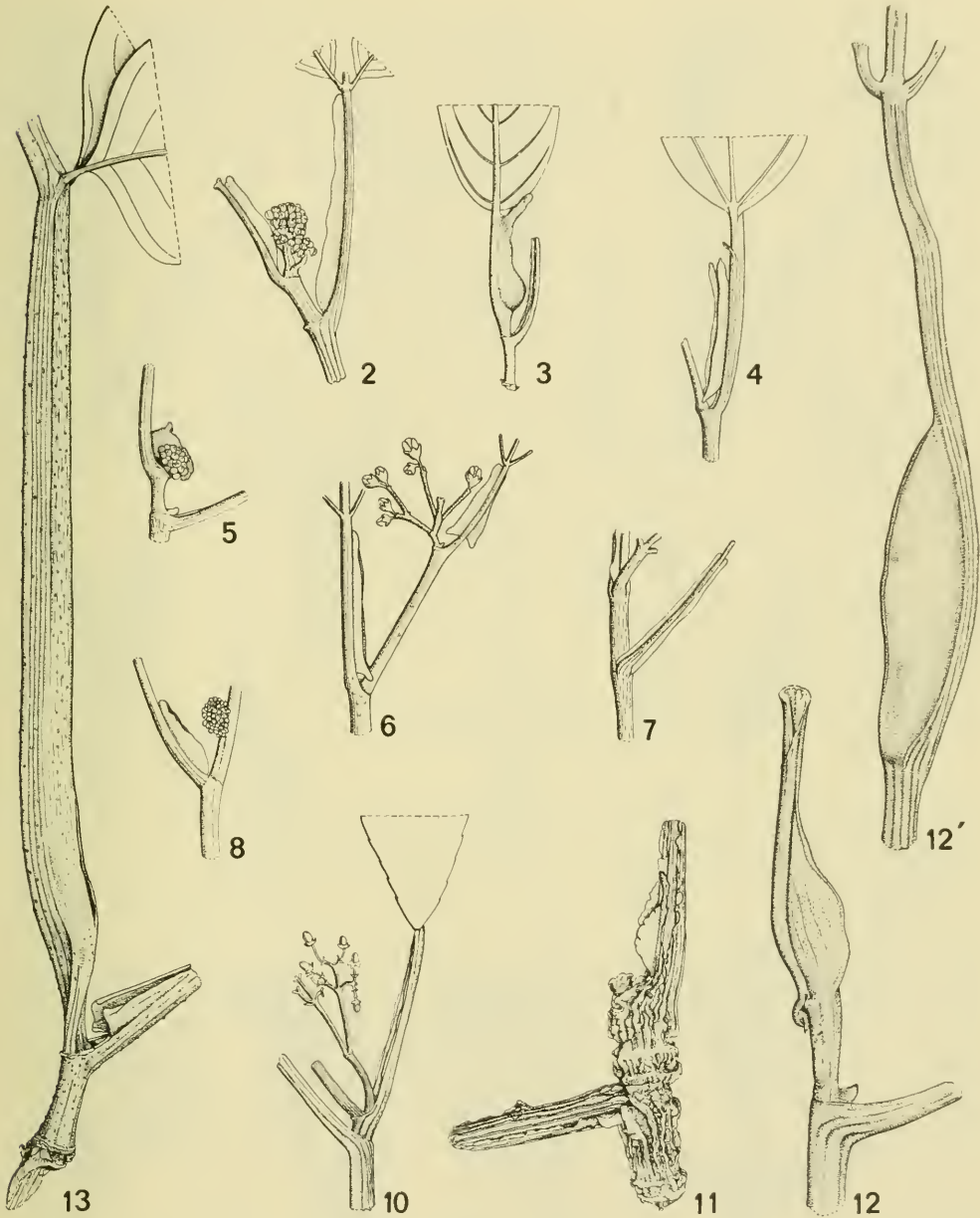


Fig. 2. Shapes of stipules in *Leea* species, the numbers corresponding with the species numbers in the text: 2. LOHER 352; 3. JACOBS 7803; 4. BS 33633; 5. VIDAL 1027; 6. PNH 21592; 7. HALLIER 2462; 8. KERR 7535; 9. VAN ROYEN & SLEUMER 7270; 10. VAN ROYEN & SLEUMER 7270; 11. BW 3405; 12. DOCTERS VAN LEEUWEN 9333, 12'. NGF 31590; 13. PULLEN 5436. All $\times \frac{1}{2}$.



Fig. 3. Shapes of stipules in *Leea* species, the numbers corresponding with the species numbers in the text: 16. BSIP 11244, 16'. NGF 31590; 17. Ja. 3742, 17'. VAN STEENIS 5333; 18. MERRILL 1825; 19. KREMPF *s.n.*; 20. KERR 21534, 21'. SPECHT 1305; 22. RIDLEY 305; 23. HAINES 4755, 23'. BS 31254, 23''. BS 30338, 23'''. BS 41900; 24. JACOBS 7945, 24'. RUTTEN *s.n.*, 24''. BSIP 5371; 25. KOORDERS 15876. All $\times \frac{1}{2}$.

Two species are occasionally recorded to be stilt-rooted, at least in large specimens, viz *L. indica* and *L. macropus*, while *L. tetramera* is said to have buttresses.

Seedlings. Leaf development is from 1- to 3-foliolate and pinnate. See for further details BURGER (Seedlings of some tropical trees and shrubs, mainly of S.E. ASIA, 1972, 379-383, fig. 154, 155).

Stipules. The stipular structures of the distant leaf are adpressed to form together a sheath surrounding the apex of the stem. As the latter continues growth the stipules are forced apart and drop off or remain as torn structures. There are basically two types, the long, narrow wing type which is usually semi-persistent and, when caducous, leaving but a thin scar, and the obovate type which is rapidly caducous and leaves a broad triangular scar. Some intermediate forms are sometimes encountered. See fig. 2, 3, and also 5 and 18.

Floral morphology. The conspicuous feature of the flowers is the presence of a staminodial tube within the whorl of stamens. Fig. 23 c-f. Basipetally the staminodial tube continues beyond the insertion, thus dividing the staminodial tube into an upper free part and a lower collar-like part which is usually free. Fig. 5f. The upper part of the staminodial tube is composed of 4 or 5 lobes divided from each other by sinuses over which the filaments pass. The apex of the lobes of the staminodial tube is usually retusely notched (fig. 9b) but in some cases may be deeply bifid. The lower portion of the staminodial tube is usually a free collar of varying length. It may also be adnate to the lower part of the corolla tube, from which it may be differentiated by the presence of a large number of raphids. The corolla tube itself is a composite structure composed of corolla and staminodial elements. In the descriptions the length of the 'corolla tube + staminodial lobes' is given, being the length from the base of the composite corolla tube to the tip of the lobes of the upper part of the staminodial tube. The length of the free corolla lobes is given separately. Distally from the line of insertion of the staminodial tube on the corolla tube the tissues often form a small rim on which the stamens are inserted. The filaments pass over the sinus of the staminodial tube. The anthers are basically dorsifixed. The connective is well developed on the dorsal side of the anthers and is purple-black in colour and conspicuously glandular. Filament-like tissue continues over the connective acropetally and basipetally beyond the point of insertion.

In most taxa the anthers in the bud and newly opened flowers are strongly syngenesious. At anthesis the anthers bend outwards and backwards, the movement causes the anthers to gradually be elevated and pulled out of the staminodial tube. For the stamens to actually elevate a degree of breakage of the tissue holding the anthers together is required. If this is slight or non-existent then only partial movement can occur, the anthers remain together in a cylinder and usually a number of the filaments break. The unit then moves out of the staminodial tube and soon detaches from the flower. A high degree of rupture of the tissue enables the anthers to leave the staminodial tube completely. They then sit as a star-shaped plate above the tube (fig. 23a). Complete breakage of the tissue will cause the anthers to complete reflex and to appear seemingly introrse.

Seeds. Endosperm ruminant, basically with 5 ingrowths, one along the median plane, two from the raphe, and one at each lateral face. The latter ingrowths leave a pattern on the outer surface of the seed, referred to as the 'ruminant outline'. Fig. 5g. The ingrowths are produced by meristematic activity of the middle layers of the outer integument which causes the inner layers to be intruded. Extra ingrowths may also occur on the lateral faces. The ingrowths themselves may also become much branched and reticulate, either the median plate alone, the ingrowths of the lateral faces alone, or both lateral face and median plate. Fig. 4.

Chemotaxonomy. Detailed chemical investigations are lacking. Most species of *Leea* seem to be non-toxic and mucilaginous (see for Indian species: The Wealth of India, Raw Materials, vol. 6, New Delhi 1962, 56-57). Medicinal uses of roots, stems and leaves in India and Africa seem to be connected mainly with an abundance of phenolic constituents. Flavonols, p-hydroxybenzoic acid, syringic acid and gallic acid and flavan-3, 4-diols (= leucoanthocyanidins) were demonstrated to be present in leaves of *L. guineensis* G. DON (= *L. coccinea* PLANCH.), *L. indica* MERR. (= *L. sambucina* WILLD.), and *L. rubra* BL. ex SPRENG. Tannins may also be present in appreciable amounts in some species. At present it is still impossible to appreciate the chemistry of *Leeaceae* from a systematic point of view, because too little information is available. The type of polyphenolic constituents known to be present and the fact that oxalate of lime occurs in the form of raphids, however, point to an affinity with *Vitaceae* (for references see: R. HEGNAUER, Chemotaxonomie der Pflanzen, vol. 6, Birkhäuser-Verlag, Basel, 1973). — R. HEGNAUER.

Anatomy. For general surveys also covering the older literature see SOLEREDER, Syst. Anat. Dicot. Stuttgart (1899) 251-257 and *ibid.* (1908) 103-104, METCALFE & CHALK, Anat. Dicot. Oxford (1950) 413-419, and SUESSENGUTH in E. & P. Nat. Pfl. Fam. ed. 2, 20d (1953) 375. Selected references: DEN BERGER, Determinatietabel Malesië, Veenman, Wageningen (1949) (wood identifications); DESCH, Mal. For. Rec. 15 (1941) 5 (wood); JANSSONIUS, Blumea 6 (1950) 430 (wood anatomical affinities); JANSSONIUS, Key to Javanese woods, Leyden (1952); JUTTE, Nova Guinea n.s. 10 (1959) 272 (wood anatomy); MOLL & JANSSONIUS, Mikr. 2 (1911) 303-316 (wood anatomy); RACIBORSKI, Flora 85 (1898) 358-361 (glands, 'food-bodies', hairs); ZUBKOVA, Bot. J. USSR 50 (1965) 1556-1567 (petiole).

The wood of *Leea* is characterized by diffuse solitary and grouped vessels with scalariform inter-vessel pits, large and simple vessel-ray pits and simple perforations. Scalariform perforations have been noted

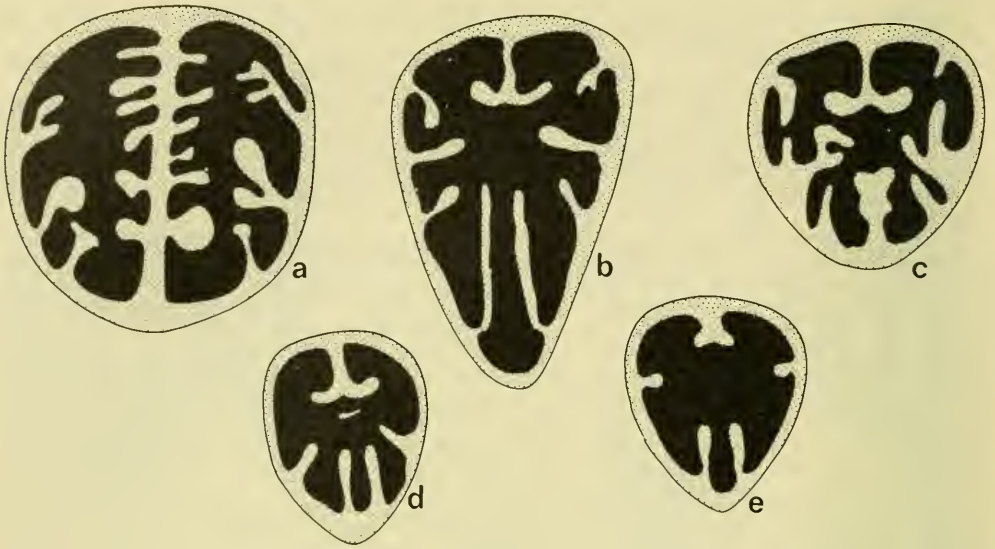


Fig. 4. Different types of ruminated endosperm in seeds of *Leea*, all in section. a. *L. acuminatissima*, b. *L. coryphantha*, c. *L. magnifolia*, d. *L. compactiflora*, e. *L. indica*.

near the primary xylem of a few species only. The septate fibres are provided with minutely bordered pits. Parenchyma is scanty paratracheal, and the rays are usually of two distinct sizes. Broad heterogeneous rays are always present. The occurrence of raphides in the ray cells of most species is one of the outstanding characters. Solitary crystals may also occur.

The young stem is characterized by many raphide-cells also containing mucilage in the gland tissue, broad primary rays, fibre bundles near the primary phloem and superficial cork.

Characters of the leaves include globular glands, which possess a stoma more or less in apical position (fig. 19), and of which the anatomy seems to differ slightly from the 'classical' pearl glands of *Vitaceae sens. str.* Simple uniseriate hairs also occur, and according to RACIBORSKI the petiole may be clad with 'Ameisenfutterkörper' (food-bodies for ants), the anatomy of which recalls Vitaceous pearl glands but which lack stomata. The stomata are recorded to be anomocytic, but are in need of further studies.

Raphides and large druses occur in the mesophyll in varying frequencies. The petiole is supplied with a closed ring of vascular tissue, whether or not with an extra dorsal 'cortical' bundle.

In spite of some wood anatomical differences, which may be interpreted as due to different habits (tree versus liane), *Leea* shares many characters with *Vitaceae sens. str.* in which it was formerly included. The wood anatomy bears also strong resemblance to that in *Arthrophyllum* of the *Araliaceae*, but this seems due to convergent evolution in the absence of other evidence supporting mutual affinities. — P. BAAS.

Note. Identification of fruiting material without stipules present on the material is difficult; good flowering material with adequate field notes is required. Distinguishing some forms of *L. indica* from *L. guineensis* without some knowledge of flower colour is difficult.

KEY TO THE SPECIES

1. Leaves 1-foliolate (or rarely 3-foliolate).
 2. Flowers 4-merous. Fruit usually 4-seeded. Philippines.
 3. Leaflets obovate, pair of foliar outgrowths (rarely seen as reduced leaflets) above the stipular wing. 1. *L. magnifolia*
 3. Leaflets elliptic or ovate, foliar outgrowths absent.
 4. Seeds complexly ruminated (fig. 4a). Leaflets up to 22 by 9 cm 3. *L. acuminatissima*
 4. Seeds simply ruminated (compare fig. 4d-e). Leaflets usually over 22 by 9 cm 4. *L. unifoliata*
 2. Flowers 5-merous. Fruits usually 6-seeded (sometimes less by abortion). Not in Philippines.
 5. Corolla tube + staminodial lobes less than 3 mm long, lower free part of staminodial tube up to 1/2 mm. Fruit usually up to 10 mm \varnothing . Malaya, Sumatra, Java 8. *L. simplicifolia*
 5. Corolla tube + staminodial lobes over 3 mm long, lower free part of staminodial tube over 1/2 mm. Fruit usually over 10 mm \varnothing . New Guinea.

6. Corolla tube + staminodial lobes less than $4\frac{1}{2}$ mm. Leaflet base subauriculate. 9. *L. gonioptera*
 6. Corolla tube + staminodial lobes over $4\frac{1}{2}$ mm. Leaflet base cuneate to truncate 10. *L. zippeliana*
1. Leaves 1-4-pinnate.
 7. Stipule a narrow wing, somewhat persistent, scar long and thin. Compare fig. 2 (4, 7, 13).
 8. Flowers 4-merous. Fruits usually 4-seeded (if 6-seeded then fruit over 20 mm \varnothing).
 9. Staminodial tube over 5 mm long. Fruits over 20 mm \varnothing , 6-seeded. New Guinea and Solomon Is.
 10. Lobes of staminodial tube strongly bifid. Inflorescences condensed, erect. Flowers orange-yellow. Mainland of New Guinea 13. *L. papuana*
 10. Lobes of staminodial tube retuse. Inflorescences lax, pendulous. Flowers white. Solomon Is. 16. *L. tetramera*
9. Staminodial tube less than 5 mm. Fruit less than 20 mm \varnothing , 4-seeded. Philippines.
 11. Style over 3 mm long; staminodial tube 4-5 mm long; filaments over 2 mm. Inflorescence generally condensed, 3-branched, peduncle usually up to 3 cm. Young parts sometimes fulvously pubescent. Leaflets usually elliptic to elliptic-lanceolate, over 7 cm wide; ultimate venation distinct. Rumination outline in seed simple to slightly branched. 2. *L. quadrifida*
 11. Style up to 2 mm long; staminodial tube $2\frac{1}{2}$ -4 mm; filaments up to 2 mm. Inflorescence generally lax and multi-branched, peduncle over 3 cm. Young parts never fulvous pubescent. Leaflets generally ovate to ovate-lanceolate and less than 7 cm wide; ultimate venation indistinct. Rumination outline in seed complexly reticulate 6. *L. philippinensis*
8. Flowers 5-merous. Fruit usually 6-seeded.
 12. Stems spiny.
 13. Leaves 1-pinnate 18. *L. aculeata*
 13. Leaves 2- or 3-4-pinnate. 17. *L. angulata*
12. Stems not spiny or information lacking.
 14. Corolla tube + staminodial lobes 6 mm or more and staminodial tube over $5\frac{1}{4}$ mm long. Fruit where known over 20 mm \varnothing . New Guinea and Solomon Is.
 15. Leaves 3- or 4-pinnate, leaflets up to 14 by 5 cm. Flowers pink. Mainland New Guinea 14. *L. krukoffiana*
15. Leaves 1- or 2-pinnate, leaflets mostly over 14 by 5 cm. Flowers not pink.
 16. Lobes of staminodial tube strongly bifid. Inflorescence condensed, erect. Flowers orange-yellow. Mainland New Guinea. 13. *L. papuana*
 16. Lobes of staminodial tube retuse. Inflorescence lax, pendulous. Bismarck Archipelago and Solomon Is.
 17. Inflorescence usually glabrous. Corolla tube + staminodial lobes 8-11 mm, filaments 5-7 mm, anthers 3-5 mm. Young parts not fulvously pubescent. Bismarck Archipelago 15. *L. macropus*
 17. Inflorescence usually fulvously pubescent. Corolla tube + staminodial lobes 6-8 mm, filaments 3 mm, anthers 2 mm. Young parts usually fulvously pubescent. Solomon Is. 16. *L. tetramera*
14. Corolla tube + staminodial lobes up to 6 mm or staminodial tube less than $5\frac{1}{4}$ mm long. Fruit less than 20 mm \varnothing . Not in New Guinea except for *L. gonioptera* and *L. aculeata*.
 18. Leaves 1-pinnate.
 19. Corolla tube + staminodial lobes up to $2\frac{1}{2}$ mm, staminodial tube up to $1\frac{1}{2}$ mm long. Small shrubs with creeping rootstock 8. *L. simplicifolia*
 19. Corolla tube + staminodial lobes over $2\frac{1}{2}$ mm; staminodial tube over $1\frac{1}{2}$ mm. Shrubs or trees.
 20. Flowers red 22. *L. saxatilis*
 20. Flowers green or white.
 21. Calyx \pm inflated around the corolla tube, completely enclosing the corolla in the bud. Corolla tube + staminodial lobes over 5 mm, staminodial tube over 4 mm. Fruit c. 20 mm \varnothing 7. *L. amabilis*
 21. Calyx not enclosing the corolla in the bud, not so inflated. Corolla tube + staminodial lobes less than 5 mm, staminodial tube less than 4 mm. Fruit usually less than 15 mm (rarely to 20 mm) \varnothing .
 22. Leaflet base subauriculate. Stem smooth. Staminodial tube up to 3 mm long, lower free part up to $1\frac{1}{4}$ mm long. New Guinea 9. *L. gonioptera*
 22. Leaflet base rounded to cuneate. Stem spiny. Staminodial tube 3- $3\frac{1}{2}$ mm long, lower free part over $1\frac{1}{4}$ mm long. Scattered throughout Malesia, except Malaya, very rare in W. New Guinea 18. *L. aculeata*
18. Leaves 2- to 4-pinnate.
 23. Staminodial tube up to $2\frac{1}{4}$ mm long. Stipules up to 6 cm long. Petiole generally less than 10 cm.
 24. Corolla tube + staminodial lobes over $3\frac{1}{4}$ mm, sinuses of staminodial tube shallow. Flowers greenish white. Fruit greyish blue. Stems and ultimate branches spiny. 17. *L. angulata*

24. Corolla tube + staminodial lobes at least $2\frac{1}{4}$ mm long, sinuses of staminodial tube shallow. Flowers red. Fruit red. Stems and branches not spiny **21. *L. rubra***
23. Staminodial tube at least $2\frac{1}{2}$ mm long. Stipules usually over 6 cm long. Petiole generally over 10 cm **19. *L. curtisii***
7. Stipule obovate, caducous, leaving a broad scar. Compare fig. 3 (21, 23, 24).
25. Flowers 4-merous. Fruits usually 4-seeded. Philippines. **5. *L. congesta***
25. Flowers 5-merous. Fruits usually 6-seeded.
26. Leaves 1-pinnate.
27. Flowers red to orange-yellow **23. *L. guineensis***
27. Flowers greenish white.
28. Corolla tube + staminodial lobes over 4 mm, staminodial tube over $2\frac{3}{4}$ mm. Fruit c. 20 mm \varnothing .
29. Sinuses of staminodial tube deep, c. 1 mm. Leaflets generally over 30 cm long. **12. *L. coryphantha***
29. Sinuses of staminodial tube shallow to $\frac{1}{2}$ mm. Leaflets generally but not exclusively up to 30 cm long. **11. *L. heterodoxa***
28. Corolla tube + staminodial lobes less than 4 mm, staminodial tube less than $2\frac{3}{4}$ mm. Fruit up to 15 mm \varnothing **24. *L. indica***
26. Leaves 2-4-pinnate.
30. Corolla tube + staminodial lobes over 4 mm, staminodial tube over 3 mm. Fruit at least 20 mm \varnothing . New Guinea.
31. Sinuses of staminodial tube deep, c. 1 mm. Leaflets generally over 30 by 9 cm, nerves usually over 10 pairs. Stipular scar generally over 4 cm long **12. *L. coryphantha***
31. Sinuses of staminodial tube shallow, less than $\frac{1}{2}$ mm. Leaflets generally less than 30 by 9 cm, nerves generally less than 10 pairs. Stipular scar up to 4 cm long. **11. *L. heterodoxa***
30. Corolla tube + staminodial lobes less than 4 mm, staminodial tube less than 3 mm. Fruit less than 20 mm \varnothing .
32. Inflorescence and leaflets with large, discoidal, pallid brown pearl glands. Bracts of inflorescence large, conspicuous, up to 8 by 5 mm **20. *L. aequata***
32. Pearl glands inconspicuous, or absent. Bracts smaller, inconspicuous.
33. Petiole, rachis, and costa with crisped fluted emergences. Leaflets large, 30-40 by 10-17 cm. Celebes **25. *L. smithii***
33. Emergences absent. Leaflets usually, but not exclusively, smaller.
34. Flowers greenish-white **24. *L. indica***
34. Flowers red to orange-yellow.
35. Corolla tube + staminodial lobes generally over 3 mm, staminodial tube over 2 mm, sinuses of staminodial tube shallow **23. *L. guineensis***
35. Corolla tube + staminodial lobes up to 3 mm, staminodial tube less than 2 mm, sinuses of staminodial tube deep **21. *L. rubra***

1. *Leea magnifolia* MERR. Publ. Govt. Lab. Philip. 35 (1906) 37; En. Philip. 3 (1923) 12; SUESSENG. in E. & P. Nat. Pl. Fam. ed. 2, 20d (1953) 386; RIDSDALE, *Blumea* 22 (1974) 79, f. 2/7, 5, 6/4, 8/3. — *L. banahaensis* ELM. Leaf. Philip. Bot. 1 (1908) 318; MERR. En. Philip. 3 (1923) 11; SUESSENG. l.c. — *L. pycnantha* QUIS. & MERR. Philip. J. Sc. 37 (1928) 166; SUESSENG. l.c. — *L. catanduanensis* QUIS. Philip. J. Sc. 76 (1944) 203 (erroneously numbered as pt 3 page 47). — Fig. 4c, 5.

Small treklet 1-3 m, stem often corrugated to fluted. Leaves usually appearing as 1-foliolate by reduction of the lowest pair of leaflets of a 3- or 5-foliolate leaf to structureless foliar outgrowths. Petiole 1-12 cm; stipules a narrow wing, 3-11 mm broad, along the entire length of the petiole, scars similarly long, narrow. Leaflets broadly obovate to obovate (-oblong), (18-) 25-60 (-75) by (10-) 15-25 (-30) cm (lateral leaflets if present to 6 by 4 cm), glabrous, subcoriaceous; pearl glands numerous, black, stellate; margin toothed; apex acuminate; base rounded to obtuse; nerves 12-20 pairs, veins minutely pubescent. *Inflorescences*

3-9 (-14) cm long, condensed, glabrous; bracts narrowly triangular up to 5 by 3 mm; peduncle up to 4 cm long, usually bearing 3 main branches, ultimate branches highly condensed. *Flowers* 4-merous, creamy white. Calyx c. 4 by 4 mm, lobes 2 by 2 mm. Corolla tube + staminodial lobes 5 mm; corolla lobes 3 by 2 mm. Staminodial tube c. 4 mm long; upper free part $2\frac{1}{2}$ -3 mm, lobes shallowly retuse, somewhat fleshy, sinuses shallow; lower free part $\frac{1}{2}$ mm. Filaments 2 mm, anthers 2 mm. Ovary 4-celled, style 3 mm. *Fruit* 10-12 mm \varnothing , yellow to orange-brown; seeds usually 4, c. 7 by 7 mm, rumination outline complexly reticulate, endosperm complexly ruminant.

Distr. *Malesia*: Philippines: Luzon (Aurora, Nueva Vizcaya, Rizal, Tayabas), Alabat, Catanduanes, Mindoro (Orient.). Fig. 8.

Ecol. Primary lowland and foothill forest, to 1500 m, particularly along streambanks.

2. *Leea quadrifida* MERR. Philip. J. Sc. 5 (1910) Bot. 196; En. Philip. 3 (1923) 14; SUESSENG. in E. & P. Nat. Pl. Fam. ed. 2, 20d (1953) 388; RIDSDALE, *Blumea* 22 (1974) 80, f. 2/6. — *L.*



Fig. 5. *Leea magnifolia* MERR. a. Habit, b. ditto, c. leaf, d. inflorescence and stipules, all $\times \frac{1}{3}$, e. flower, f. ditto in LS, both $\times 5$, g. embryo, $\times 2$ (a PNH 18176, b, e-f JACOBS 7946, c JACOBS 7734, d BS 40670, g ELMER 14692).

agusanensis ELM. Leaf. Philip. Bot. 8 (1915) 2881; MERR. En. Philip. 3 (1923) 10; SUESSING. *l.c.* 386. — *L. platyphylla* MERR. Philip. J. Sc. 17 (1920) 280; En. Philip. 3 (1923) 14; SUESSING. *l.c.* 386. — Fig. 2.

Small treelet up to 5 m, stem up to 4 cm \varnothing . Leaves 1-pinnate, 5–9 crowded at the apex of the stem; leaflets (5–) 7–11 (–13). Petiole 5–25 cm; *stipules* a narrow wing 5–12 mm broad, along the whole length of the petiole, scars similarly long, narrow; rachis (8–) 11–30 (–45) cm long. Leaflets elliptic to elliptic-oblong (–lanceolate), (7–) 15–30 (–35) by (3–) 8–12 (–16) cm, glabrous to sparsely fulvously pubescent, (sub)coriaceous; pearl glands sometimes dense and conspicuous, stellate; margin repand to shallowly dentate; apex acuminate; base obtuse to cuneate; nerves 8–16 pairs; petiolules 5–20 mm. *Inflorescences* 2–12 (–20) cm long, condensed, glabrous to densely fulvously pubescent; bracts deltoid to narrowly triangular, up to 4 by 2 mm; peduncle 1–3 (–6) cm long, usually bearing 3 branches, ultimate branches highly condensed. *Flowers* 4-merous, white. Calyx 4 by 4 mm, lobes $1\frac{3}{4}$ by 2 mm. Corolla tube + staminodial lobes 5–6 mm long; corolla lobes 3–4 by 2– $2\frac{1}{2}$ mm. Staminodial tube 4–5 mm long; upper free part 3– $3\frac{1}{2}$ mm, lobes shallowly retuse, sinuses shallow; lower free part 1 mm. Filaments 2– $2\frac{1}{2}$ mm, anthers 1–2 mm. Ovary 4-celled; style 2–4 mm. *Fruit* 15 mm \varnothing , orange-brown; seeds usually 4, *c.* 7 by 5 mm, rumination outline simple or slightly branched.

Distr. *Malesia*: Philippines: Luzon (Benguet, Cagayan, Ilocos Norte, Isabela, Laguna, Nueva Ecija, Nueva Vizcaya, Pampanga), Biliran, Bohol, Mindanao (Agusan, Davao, Surigao). Fig. 13.

Ecol. Primary rain forest to 1000 m, often on ridges.

Note. In general the material previously included in taxa other than *L. quadrifida* has a tendency to have larger, more glabrous leaves and a seed with a simpler rumination outline. Material corresponding to that described as *L. quadrifida* tends to occur more commonly on ridges, particularly those bearing mossy forest.

3. *Leea acuminatissima* MERR. Philip. J. Sc. 12 (1917) Bot. 281; En. Philip. 3 (1923) 10; SUESSING. in E. & P. Nat. Pfl. Fam. ed. 2, 20d (1953) 386; RIDSDALE, *Blumea* 22 (1974) 80, f. 2/5, 8/1. — Fig. 2, 4a.

Treelet up to 3 m. Leaves 1-foliolate, 7–9 clustered at the apex of the stem. Petiole 2–6 cm; *stipules* a narrow wing *c.* 5 mm broad along the entire length of the petiole. Leaflets elliptic to elliptic-oblong or ovate-oblong, 13–22 by 4–9 cm, glabrous, coriaceous; pearl glands sparse, stellate; margin crenately lobed; apex acuminate; base subcordate; nerves *c.* 14 pairs. *Inflorescences* *c.* 5 cm long, condensed, few-flowered, \pm glabrous; bracts triangular, up to 5 by 3 mm; peduncle 1–3 cm, usually with 3 short main branches, ultimate branches few. *Flowers* 4-merous, only fragments seen. Calyx *c.* $2\frac{1}{2}$ by $1\frac{1}{2}$ mm, lobes

triangular, 1 by $1\frac{1}{2}$ mm. Corolla tube + staminodial lobes *c.* 3 mm; corolla lobes *c.* 2 mm long. Staminodial tube: upper free part *c.* $1\frac{1}{2}$ mm, lobes slightly cleft, sinuses shallow; lower free part indiscernible. Filaments $1\frac{1}{4}$ mm, anthers 1 mm. Ovary appearing 4-celled; style *c.* 1 mm. *Fruit* 15 mm \varnothing , red; seeds usually 4, *c.* 6 by 6 mm, rumination outline complexly reticulate, endosperm complexly ruminant.

Distr. *Malesia*: Philippines: Luzon (Aurora-Sierra Madre Mts, Nueva Ecija), only 2 collections. Fig. 6.

Ecol. Primary lowland and foothill forest to 1250 m.

Note. The status of this species is uncertain and further collections and field observations are required. It may only be a precociously flowering, 1-foliolate form of a pinnately leaved species.

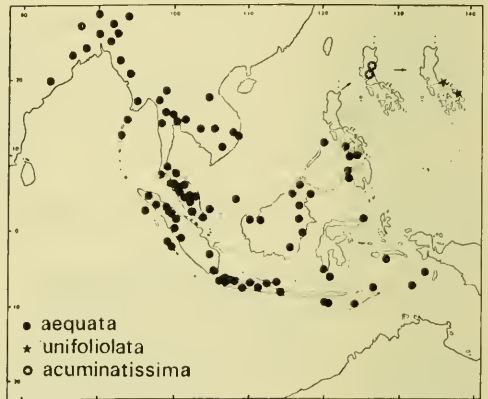


Fig. 6. Range of three *Leea* species; of *L. aequata* *L.* the localities from the western part of India are omitted.

4. *Leea unifoliolata* MERR. Philip. J. Sc. 11 (1916) Bot. 193; En. Philip. 3 (1923) 14; SUESSING. in E. & P. Nat. Pfl. Fam. ed. 2, 20d (1953) 383, 390; RIDSDALE, *Blumea* 22 (1974) 80, f. 2/4. — *L. longipetiolata* MERR. Philip. J. Sc. 17 (1920) 282; En. Philip. 3 (1923) 12; SUESSING. *l.c.* 386. — Fig. 2.

Small treelet, young parts rusty pubescent. Leaves 1-foliolate. Petiole 3–7 cm; *stipules* a narrow wing *c.* 5 mm broad along the entire length of the petiole, scar similarly long. Leaflets elliptic-oblong, 22–30 by 9–13 cm, sparsely pubescent, chartaceous to subcoriaceous; pearl glands sparse, sphaeroid-depressed; margin shallowly toothed; apex acuminate to cuspidate; base acute; nerves 10–14 pairs, rusty pubescent. *Inflorescences* *c.* 3 cm, condensed, few-flowered, rusty pubescent; bracts narrowly triangular up to 5 by 2 mm; peduncle short, *c.* 1 cm, with 3 short main branches, ultimate branches few, condensed. *Flowers* 4-merous, immature. Calyx *c.* 4 by 4 mm,

lobes triangular, 1 by $1\frac{1}{2}$ -2 mm. Lobes of staminodial tube shallowly retuse, sinuses shallow. *Fruit* c. 20 mm \varnothing ; seeds usually 4, c. 7 by 5 mm, rumination outline simple, endosperm simply ruminant.

Distr. *Malesia*: Philippines: Luzon (Camarines), Samar, only 2 collections. Fig. 6.

Ecol. Lowland primary forest, particularly often along stream-sides.

Note. From the collections available this species appears to be distinct from *L. acuminatissima*. However, it could well represent a precociously flowering 1-foliolate form of one of the pinnately leaved species, particularly of *L. quadrifida*. Further collections and field observations are required.

5. *Leea congesta* ELM. Leaf. Philip. Bot. 1 (1908) 318; C. B. ROB. Philip. J. Sc. 6 (1911) Bot. 209; MERR. En. Philip. 3 (1923) 11; SUESSENG. in E. & P. Nat. Pfl. Fam. ed. 2, 20d (1953) 386; RIDSDALE, Blumea 22 (1974) 80, f. 4/1. — *L. capitata* MERR. Philip. J. Sc. 17 (1920) 281; En. Philip. 3 (1923) 11; SUESSENG. *l.c.* — Fig. 2.

Treelet 1-5 (-8) m high, c. 1 cm \varnothing . *Leaves* 1-pinnate, 3-5 clustered at the apex of the stem; leaflets 5-13. Petiole $2\frac{1}{2}$ -11 cm; *stipules* obovate, up to $2\frac{1}{2}$ by $\frac{1}{2}$ cm, scar broadly triangular of similar length; rachis 13-30 cm. Leaflets elliptic to elliptic-oblong, (12-) 15-30 (-40) by (2-) 4-10 (-14) cm, glabrous, coriaceous; pearl glands sparse, globular-depressed; margin crenately toothed; apex acuminate; base obtuse to subcordate; nerves 10-14 pairs, sometimes pubescent. *Inflorescences* 3-5 cm long, condensed, glabrous; bracts deltoid to obtuse, inconspicuous; peduncle to $1\frac{1}{2}$ cm, main branches short usually, 3 ultimate branches highly condensed. *Flowers* 4-merous, greenish white. Calyx c. 5 by 5 mm, somewhat inflated around the corolla tube, lobes 1 by 2 mm. Corolla tube + staminodial lobes 6 mm long; corolla lobes $3\frac{1}{2}$ by $2\frac{1}{2}$ mm. Staminodial tube 5 mm long; upper free part $2\frac{1}{2}$ -3 mm, lobes shallowly retuse, sinuses shallow; lower free part 2 mm. Filaments 2 mm, anthers 2 mm. Ovary 4-celled, style 2 mm. *Fruit* 10-15 mm \varnothing , orange; seeds usually 4, 5-7 by 5 mm, rumination outline reticulate, endosperm complexly ruminant.

Distr. *Malesia*: Philippines: Luzon (Apayao, Aurora, Benguet, Laguna, Nueva Ecija, Tayabas), Polillo, Samar. Fig. 21.

Ecol. Primary lowland rain-forest to 500 m.

6. *Leea philippinensis* MERR. Philip. J. Sc. 1 (1906) Suppl. 89; *ibid.* 3 (1908) Bot. 419; En. Philip. 3 (1923) 13, *incl. var. pauciflora* (ELM.) MERR. *l.c.*; SUESSENG. in E. & P. Nat. Pfl. Fam. ed. 2, 20d (1953) 387; LIU, SASAKI & KENG, Quart. J. Taiw. Mus. 8 (1955) 306; HATUSIMA, Mem. Fac. Agr. Kagosh. Un. 5 (1966) 39; RIDSDALE, Blumea 22 (1974) 80, f. 2/3. — *L. pauciflora* ELM. Leaf. Philip. Bot. 8 (1919) 3103, *non* KING, 1896. — *L. nitida* MERR. Philip. J. Sc. 20 (1922) 406; En. Philip. 3 (1923) 13; SUESSENG. *l.c.* — Fig. 2.

Tree up to 10 m high. *Leaves* 1- (rarely 2- to 3-) pinnate; leaflets 5-15 (-~). Petiole (2-) 3-8 (-11) cm; *stipules* a narrow wing (2-) 3-6 (-8) by $\frac{1}{4}$ - $\frac{1}{2}$ cm; rachis $2\frac{1}{2}$ -10 (-18) cm. Leaflets ovate to ovate-lanceolate or elliptic to elliptic-lanceolate, (3-) 6-20 (-30) by ($1\frac{1}{2}$ -) 2-6 (-11) cm, glabrous, chartaceous to subcoriaceous; pearl glands stellate and globose, infrequent; drying colour often bluish grey-green above; margin shallowly crenate to repand, rarely dentate; apex acuminate; base rounded to acute; nerves 4-14 pairs; ultimate venation immersed and indistinct; petioles 2-20 mm. *Inflorescences* 3-15 (-25) cm long, somewhat lax, glabrous or minutely pubescent particularly at the nodes; bracts deltoid to ovate, inconspicuous; peduncle 2-8(-14) cm, main branches numerous, laxly branched, ultimate branches reduced. *Flowers* 4-merous, cream. Calyx 3-4 by 4-5 mm, glabrous, lobes 1-2 by 2-3 mm. Corolla tube + staminodial lobes 5-6 mm; corolla lobes 3-4 by 2-3 mm. Staminodial tube $2\frac{1}{2}$ -4 mm long; upper free part $1\frac{3}{4}$ -3 mm long, lobes shallowly retuse, sinus shallow to $\frac{1}{2}$ mm; lower free part $\frac{3}{4}$ -1 mm. Filaments $1-1\frac{3}{4}$ mm, anthers 1.7-2 mm. Ovary 4-celled, style 1-2 mm. *Fruit* 10-15 mm \varnothing , orange-brown; seeds usually 4, c. 6 by 6 mm, dark brown, rumination outline reticulate, endosperm complexly ruminant.

Distr. *Malesia*: Philippines: Batan Is., Luzon (Apayao, Aurora, Bataan, numerous collections from Lamao River, Benguet, Cagayan, Laguna, numerous collections from Mt Makiling, Nueva Ecija, Pangasinan, Rizal, Tayabas, Zambales), Mindoro (Occid., Orient.), Mindanao (Davao, Surigao, Zamboanga de Norte); Taiwan: Botel Tobago (= Orchid I.). Fig. 16.

Ecol. Primary rain-forest to 750 m.

7. *Leea amabilis* VEITCH [Catalogue (1882) 19, *nom. nud.*] ex MASTERS, Gard. Chron. 27 (1882) 492, f. 77; W. ROB. Garden 21 (1882) 352; LINDEN & RODRIGAS, Ill. Hort. 31 (1884) 59, t. 518, *incl. var. splendens*; HALL. f. Ann. Jard. Bot. Btzg 14 (1897) 241; ANON. Kew Bull. Add. Ser. IV (1900) 234; MERR. En. Born. (1921) 368; C. BONSTEDT, Parey's Blumengart. (1931) 895; SUESSENG. in E. & P. Nat. Pfl. Fam. ed. 2, 20d (1953) 385; RIDSDALE, Blumea 22 (1974) 80, f. 2/2, 5/8-10. — Fig. 2, 7.

Treelet up to 2 m high. *Leaves* 1-pinnate, leaflets 7-9. Petiole 8-16 cm; *stipules* a narrow wing 3-5 mm broad, 3-8 cm long, scar narrow, similarly long; rachis 10-25 cm. Leaflets elliptic to elliptic-lanceolate, (10-) 15-25 (-30) by (3-) 5-9 (-12) cm, glabrous; pearl glands globular-depressed, sparse; margins shallowly serrately toothed; apex acuminate; base cuneate; nerves 8-13 pairs, midrib conspicuously constricted at point of junction of lateral nerves; lamina pallid in region of midrib in some collections; petioles up to 25 mm. *Inflorescences* 4-8 cm long, somewhat contracted, few-flowered, pubescent; bracts deltoid to narrowly triangular, up to 5 by 2 mm, early caducous; peduncle up to 2 cm, main branches 3-6, ultimate branches reduced in number. *Flowers* 5-merous,

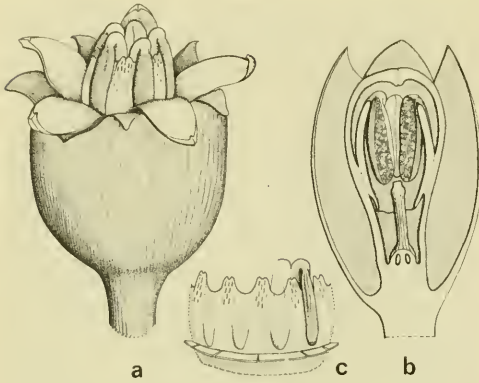


Fig. 7. *Leea amabilis* VEITCH ex MASTERS. a. Flower, b. ditto in LS, c. staminodial tube, the calyx, corolla, and stamens removed, all $\times 5$ (a-c KOSTERMANS 10605).

white. Calyx 4 by 6 mm, conspicuously inflated around the corolla tube, in young flowers enclosing the corolla, lobes c. 2 by 2 mm, often ill defined. Corolla tube + staminodial lobes 6 mm; corolla lobes 3-4 by $2\frac{1}{2}$ -3 mm. Staminodial tube $4\frac{1}{2}$ -5 mm long; upper part joined to corolla for $1\frac{1}{2}$ - $2\frac{1}{4}$ mm, free part $1\frac{3}{4}$ -2 mm long, lobes shallowly retuse, sinuses shallow; lower free part 1 mm. Filaments $2\frac{1}{2}$ mm, anthers $2\frac{1}{2}$ mm. Ovary usually 6-celled, style 2 mm. *Fruit* 15-20 mm \varnothing , deeply grooved between segments; seeds usually 6, 6 by 5 mm, rumination outline simple, endosperm simply ruminant.

Distr. *Malesia*: West Borneo (Sarawak: ?Kuching area; Kalimantan: E. Kutei). Fig. 8.

Ecol. Primary lowland rain-forest, apparently rare.

Note. Originally described from a plant introduced into cultivation by VEITCH & Sons from a collection of CURTIS in Borneo. Independently collected by TEUSCHER and introduced into cultivation in Belgium via Comp. Contin. d'Hort. à Gand. No longer known to be cultivated in Europe.

8. *Leea simplicifolia* ZOLL. & MOR. Nat. Geneesk. Arch. N. I. 2 (1845) 578; MIQ. Fl. Ind. Bat. 1, 2 (1859) 612; Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 101; CLARKE, J. Bot. 19 (1881) 166; KING, J. As. Soc. Beng. 65, ii (1896) 411; BACKER, Schooffl. Java (1911) 254; RIDL. Fl. Mal. Pen. 1 (1922) 483; SUESSING. in E. & P. Nat. Pfl. Fam. ed. 2, 20d (1953) 393; BACKER & BAKH. f. Fl. Java 2 (1965) 93; RIDSDALE, Blumea 22 (1974) 81, f. 1/8, 10. — *L. pauciflora* KING, J. As. Soc. Beng. 65, ii (1896) 412; RIDL. Fl. Mal. Pen. 1 (1922) 483; CRAIB, Fl. Siam. En. 1 (1926) 319, incl. var. *ferruginea* CRAIB, l.c.; SUESSING. l.c. 385. — *L. forbesii* BAKER f. J. Bot. 62 (1924) Suppl. 24; SUESSING. l.c. 385. — Fig. 2.

Woody shrub up to 1 m, rootstock creeping. *Leaves* 1-foliolate, 3-foliolate or pinnate, leaflets 1-7. Petiole 4-18 cm; *stipules* a narrow wing 2-5 mm broad, 2-4 cm long; scar narrow, similarly long; rachis up to 25 cm. Leaflets, in 1-foliolate examples: elliptic to elliptic-oblong or obovate, (6-) 12-24 (-28) by (3-) 8-12 (-14) cm, in 3-foliolate and pinnate examples: elliptic to elliptic-lanceolate or ovate to ovate-lanceolate, (8-) 10-20 (-24) by (3-) 4-8 (-12) cm, glabrous, chartaceous to subcoriaceous; pearl glands stellate, infrequent; margin repand to dentate; apex acuminate; base rounded to cordate; nerves 9-14 pairs, usually 5-nerved at the base; petiolules up to 25 mm. *Inflorescences* up to 5 cm long, condensed, glabrous to sparsely pubescent; bracts deltoid to triangular, inconspicuous; peduncle 1-2 cm, main branches usually 3, ultimate branches condensed. *Flowers* 5-merous, white. Calyx c. $2\frac{1}{2}$ by $2\frac{1}{2}$ mm, lobes 1 by $1\frac{1}{2}$ -2 mm. Corolla tube + staminodial lobes $1\frac{3}{4}$ -2 (- $2\frac{1}{2}$) mm; corolla lobes $2-2\frac{1}{2}$ by 1 mm. Staminodial tube $1-1\frac{1}{4}$ mm long; upper free part 1 mm, lobes retuse, sinuses shallow; lower free part 0.3-0.5 mm. Filaments 1 mm, anthers $\frac{1}{2}$ -1 mm. Ovary 4-6-celled, style 1 mm. *Fruit* c. 10 mm \varnothing ; seeds frequently only 1-3 by abortion, 6 by 4 mm, rumination outline simple, endosperm simply ruminant.

Distr. Thailand (Peninsular: Pattani); *Malesia*: Malaya (Kelantan, Perak), Sumatra (Atjeh, Tapanuli, Lampung), West and East Java. Fig. 8.

Ecol. Primary lowland forest to 800 m, particularly streamsides. Apparently rather rare.

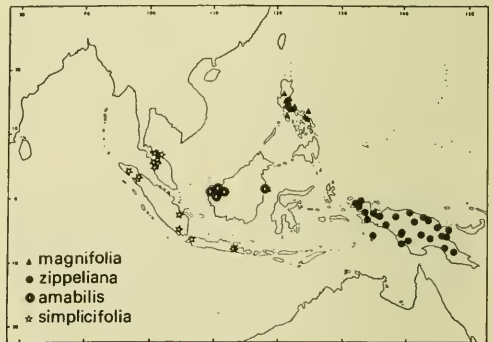


Fig. 8. Range of four *Leea* species.

9. *Leea gonioptera* LAUT. Nova Guinea 8 (1912) 832; *ibid.* 14 (1924) 138; Bot. Jahrb. 59 (1925) 529; SUESSING. in E. & P. Nat. Pfl. Fam. ed. 2, 20d (1953) 388; RIDSDALE, Blumea 22 (1974) 81.

Undershrub up to 3 m. Young parts sometimes rusty pubescent. *Leaves* 1-foliolate or pinnate, leaflets 1-9. Petiole up to 6 cm long; *stipules* a narrow wing 2-5 mm wide, in 1-foliolate examples extending the length of the petiole, in pinnate examples 2-3 cm long; scar narrow, similarly long. Leaflets elliptic to elliptic-oblong, (3-) 8-27 (-35)

by (1½-) 2-5 (-9) cm, glabrous to sparsely pubescent, chartaceous; pearl glands black, globular-depressed, sometimes frequent; margin shallowly crenate to repand; apex (long-) acuminate; base subauriculate; nerves 6-20 pairs, glabrous to pubescent. *Inflorescences* to 4 cm, condensed, pubescent; bracts narrowly triangular, inconspicuous; peduncle to 1 cm, main branches usually 3, ultimate branches short, few-flowered. *Flowers* 5-merous, greenish white. Calyx 2½ by 2½ mm, pubescent, lobes 1 by 1½ mm. Corolla tube + staminodial lobes 3-4 mm; corolla lobes 2-3 by 1-1½ mm. Staminodial tube 2-2½ mm; upper free part 1-1½ mm, lobes shallowly retuse, sinuses shallow; lower free part ¾-1 mm. Filaments 1½ mm, anthers 1 mm. Ovary 4- or 5-celled, style 1-2 mm. *Fruit* 9-12 mm Ø; seeds usually (2) 3-5, c. 5 by 5 mm, rumination outline simple, endosperm simply branched.

Distr. *Malesia*: New Guinea (Vogelkop, Mimika and Digul Districts).

Ecol. Primary rain-forest to 500 m.

Note. A little known species represented by scant herbarium material. Unifoliolate specimens can not easily be distinguished from *L. zippeliana*, differing chiefly in the tapering leaflets with subauriculate base. Further collections are required to establish the species limits as the flowers in most of available material are immature.

10. *Leea zippeliana* MIQ. Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 101; SCHEFF. Ann. Jard. Bot. Btzg 1 (1876) 16; F. v. M. Pap. Pl. 1 (1876) 37; CLARKE, J. Bot. 19 (1881) 166; LAUT. Bot. Jahrb. 59 (1925) 529, *incl. var. ornata* LAUT. l.c.; SUESENG, in E. & P. Nat. Pfl. Fam. ed. 2, 20d (1953) 384, 388; RIDSDALE, *Blumea* 22 (1974) 81, f. 1/3. — *L. micholitzii* SANDERS, Cat. (1889) 20, *nom. nud.* — *L. monophylla* LAUT. *Nova Guinea* 8 (1910) 302; *ibid.* (1912) 832, *pro parte*; *ibid.* 14 (1924) 137; Bot. Jahrb. 59 (1925) 529; SUESENG, l.c. 388. — Fig. 2.

Slender shrub or tree up to 7 m. Young parts sometimes rusty pubescent. *Leaves* 1-foliolate. Petiole 3-6 cm; *stipules* a narrow wing 3-5 mm wide extending the length of the petiole. Scar narrow, similarly long. Leaflets elliptic to elliptic-oblong, (10-) 14-25 (-38) by (3-) 7-10 (-13) cm, glabrous, chartaceous to subcoriaceous; pearl glands black, stellate, infrequent; margin shallowly toothed; apex acuminate; base narrowly cuneate to truncate; nerves 10-20 pairs, slightly pubescent. *Inflorescences* 2-6 cm, condensed, pubescent; bracts deltoid, inconspicuous; peduncle to 1½ cm, main branches usually 3, ultimate branches few-flowered. *Flowers* 5-merous, greenish yellow. Calyx 4 by 4 mm, lobes 1½ by 2 mm. Corolla tube + staminodial lobes 5 mm; corolla lobes 3½ by 2 mm. Staminodial tube 3-3½ mm; upper free part 2-2½ mm, lobes shallowly retuse, sinuses shallow; lower free part ¾-1 mm. Filaments 2 mm, anthers 2 mm. Ovary 4-6-locular, style 3-4 mm. *Fruit* 10-15 mm Ø, reddish orange; seeds usually 6, 8 by 5 mm, rumination outline slightly branched, endosperm simply ruminant.

Distr. *Malesia*: New Guinea (not yet recorded from Central, Northern and Milne Bay Districts). Fig. 8.

Ecol. Primary rain-forest from the lowland up to 1300 m, frequently in riverine forest, occasional in foothill forest, rare in savannah gallery forest.

11. *Leea heterodoxa* K. SCH. & LAUT. Fl. Schutzgeb. (1900) 431, *ex char.*; LAUT. Bot. Jahrb. 59 (1925) 530; RIDSDALE, *Blumea* 22 (1974) 81, f. 1½. — *L. gigantea* K. SCH. & LAUT. Fl. Schutzgeb. (1900) 433, *non* GRIFF. 1864. — *L. tuberculata* LAUT. *Nova Guinea* 8 (1912) 832; Bot. Jahrb. 59 (1925) 533; SUESENG, in E. & P. Nat. Pfl. Fam. ed. 2, 20d (1953) 388. — *L. rodatzii* LAUT. Bot. Jahrb. 59 (1925) 533; SUESENG, l.c. — Fig. 2.

Treelets up to 3 m, stem and petiole base often ribbed and fluted. *Leaves* clustered at the stem apex, 1- to 3-pinnate. Petiole 6-35 cm; *stipule* half elliptic, c. 2-4 by 2 cm, glabrous, scar narrowly triangular, 2-3½ cm long; rachis 5-40 cm. Leaflets elliptic to elliptic-lanceolate or ovate to ovate-lanceolate, (8-) 14-28 (-38) by (4-) 5-8 (-12) cm, glabrous, chartaceous to coriaceous; pearl glands globose, infrequent; margin shallowly sinuate; apex acuminate; base rounded to cuneate, sometimes attenuate; nerves 6-8 on each side; petiolules 3-15 mm. *Inflorescences* to 5 cm long, condensed, glabrous or pubescent; bracts deltoid to triangular, up to 3 by 2 mm; peduncle to 2 cm long, main branches usually 3, short, ultimate branches reduced, often few-flowered. *Flowers* 5-merous, white. Calyx 3 by 4 mm, glabrous to pubescent; lobes 1 by 2 mm. Corolla tube + staminodial lobes 5 mm; corolla lobes 4 by 2 mm. Staminodial tube 3-4 mm long; upper free part 2-3 mm, lobes shallowly retuse, sinuses shallow, c. 0.3 mm; lower free part c. 1 mm. Filaments 1½ mm, anthers 3 mm. Ovary 6-celled, style 3 mm. *Fruit* c. 25 mm Ø, orange-brown; seeds usually 6, c. 10 by 7 mm, rumination outline complexly branched, endosperm semi-complex with an extra outgrowth on the lateral face.

Distr. *Malesia*: New Guinea (Vogelkop, Jayapura, West & East Sepik and Madang Districts). Fig. 13.

Ecol. Lowland rain-forests, often in ridge forest.

Notes. From the description and key of LAUTERBACH I cannot see sufficient characters to separate *L. heterodoxa* from *L. tuberculata*, an opinion inferred by LAUTERBACH himself (Bot. Jahrb. 59, 1925, 530 *in nota*). No extant type material of *L. heterodoxa* has been traced. Both taxa were only known from single collections at the time of LAUTERBACH.

12. *Leea coryphantha* LAUT. *Nova Guinea* 8 (1912) 832; Bot. Jahrb. 59 (1925) 530; SUESENG, in E. & P. Nat. Pfl. Fam. ed. 2, 20d (1953) 388; RIDSDALE, *Blumea* 22 (1974) 81, f. 1/4-5, 8/2. — Fig. 2, 4b.

Understorey tree up to 7 m, stem often ribbed and fluted. *Leaves* clustered at the apex of the stem,



Fig. 9. *Leea papuana* MERR. & PERRY showing its unbranched habit (L. J. BRASS 7325, the type specimen — Photogr. L. J. BRASS).

(?1-) 2-pinnate. Petiole 10-50 cm; *stipules* half elliptic (3-) 5-9 by $1\frac{1}{2}$ - $2\frac{1}{2}$ cm, scar narrowly triangular, similarly long; rachis 20-50 cm (or more). Leaflets ovate to ovate-oblong, (12-) 30-40 (-50) by (6-) 11-20 cm, glabrous, chartaceous to subcoriaceous; pearl glands globular, black, sparse; margin shallowly serrulate; apex acuminate; base obtuse, rarely cuneate; nerves (8-) 14-18 pairs; petiolules up to 2 cm, often winged and fluted. *Inflorescences* up to 25 cm long, then lax with few branches, usually to 6 cm and highly condensed, rusty pubescent when young; bracts deltoid to triangular; peduncle up to 13 cm, main and ultimate branches usually condensed, rarely with 3 main branches. *Flowers* 5-merous, white. Calyx $3\frac{1}{2}$ -5 by $3\frac{1}{2}$ -5 mm, lobes 1 by 2 mm. Corolla tube + staminodial lobes 5 mm; corolla lobes 3-4 by 2 mm. Staminodial tube $3\frac{1}{2}$ - $5\frac{1}{2}$ mm; upper free part $2\frac{1}{2}$ - $3\frac{1}{2}$ mm, lobes shallowly retuse, sinuses c. 1 mm deep; lower free part 1-2 mm. Filaments $1\frac{1}{2}$ -2 mm, anthers $2\frac{1}{2}$ -3 mm. Ovary 6-10-celled, style 3-4 mm. *Fruit* 20-25 (-40) mm \varnothing , red with thick fleshy skin; seeds usually 6, 6-10 by 4-5 mm, rumination outline simple, endosperm semi-complex with an extra ingrowth on the lateral face.

Distr. *Malesia*: New Guinea (Vogelkop, West & East Sepik and Morobe Districts). Fig. 21.

Ecol. Primary rain-forest to 1500 m, often in riverine forest.

13. *Leea papuana* MERR. & PERRY, J. Arn. Arb. 22 (1941) 382; RIDSDALE, Blumea 22 (1974) 81, f. 1/1, 6/8-9. — *L. macropus* (non K. SCH. & LAUT.) BAKER f. J. Bot. 61 (1923) Suppl. 11; *ibid.* 62 (1924) 54. — Fig. 2, 9, 10.

Treetlet up to 5 m, single- or multi-stemmed, ultimate parts of the stem glabrous to pubescent, sometimes slightly ribbed. *Leaves* 1- (or 2-) pinnate, clustered at the apex of the stem. Petiole 15-30 cm; *stipules* a narrow wing, 17-25 by $\frac{3}{4}$ -1 cm, scar broad, similarly long; rachis 30-80 cm. Leaflets ovate-oblong to ovate-lanceolate, less frequently elliptic-oblong to elliptic-lanceolate, (15-) 20-30 (-45) by 6-20 cm, glabrous to densely pubescent; pearl glands depressed-globular, black, numerous; margin sinuate to shallowly dentate; apex acuminate; base obtuse to cuneate; nerves 8-20 pairs; petiolules up to 4 cm. *Inflorescences* 4-8 cm long, condensed, glabrous to pubescent; bracts narrowly triangular up to 8 by 3 mm; peduncle up to 2 cm, main branches short, ultimate branches few-flowered. *Flowers* 5-merous, orange-yellow. Calyx c. 7 by 7 mm, somewhat inflated around the corolla tube, glabrous, lobes $1\frac{1}{2}$ -2 by 2-3 mm. Corolla tube + staminodial lobes 7-8 mm; corolla lobes 5-6 by $1\frac{1}{2}$ - $2\frac{1}{2}$ mm. Staminodial tube 7-8 mm long; upper free part 3-4 mm, lobes deeply (1- $1\frac{1}{2}$ mm) strongly bifid, sinuses deep, c. 2 mm; lower part $2\frac{1}{2}$ - $3\frac{1}{2}$ mm, appearing fused with corolla tube in material available. Filaments 3-4 mm, anthers 3- $3\frac{1}{2}$ mm. Ovary 6-8-celled, style 4-5 mm. *Fruit* 25-40 mm \varnothing , orange-red; seeds usually 6, c. 15 by

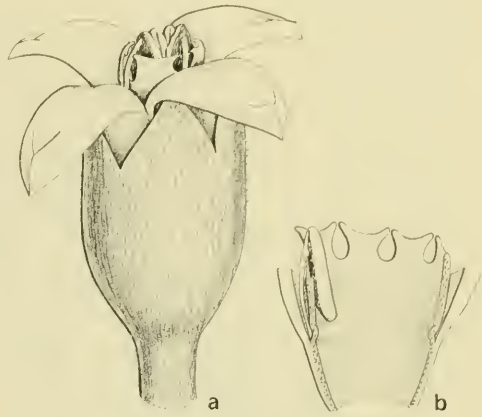


Fig. 10. *Leea papuana* MERR. & PERRY. a. Flower, b. LS showing interior of staminodial tube and insertion of one stamen, both $\times 5$ (a-b FORBES PP 95).

6 mm, rumination outline complexly branched, endosperm semi-complex with extra ingrowth on the lateral face.

Distr. *Malesia*: New Guinea: Papua (Western, Central, Northern, and Milne Bay Districts). Fig. 17.

Ecol. Lowland rain-forest to 1200 m, often in shaded riverine gullies.

14. *Leea kruckoffiana* RIDSDALE, Blumea 22 (1974) 83, f. 7/4-7. — Fig. 11, 12.

Small tree up to 3 m. *Leaves* unequally 3-4-pinnate, leaflets numerous. Petiole 35 cm; *stipules* not seen, assumed to be a narrow wing, scar 20 cm long; rachis 55 cm. Leaflets ovate to ovate-oblong (4-) 8-14 by (2-) 3-5 cm, glabrous, chartaceous; pearl glands globular, sparse; margin sinuately toothed; apex acuminate; base obtuse to acute, sometimes unequal; nerves 4-9 pairs; petiolules 2-5 mm. *Inflorescences* multibranched, up to 10 cm long, lax, pubescent; bracts small, deltoid up to 2 mm long; peduncle 1 cm, main branches compact, ultimate branches short. *Flowers* 5-merous, pink. Calyx glabrous, 4 by 4 mm, lobes $1\frac{1}{2}$ by $2-2\frac{1}{2}$ mm. Corolla tube + staminodial lobes $6\frac{1}{2}$ - $7\frac{1}{2}$ mm; corolla lobes 5-6 by 2 mm. Staminodial tube $5\frac{1}{2}$ mm long; upper free part $3\frac{1}{2}$ mm, lobes shallowly retuse, sinuses shallow; lower free part 2 mm. Filaments 3 mm, anthers $2\frac{1}{2}$ mm. Ovary 6-celled, style 3 mm. *Fruit* unknown.

Distr. *Malesia*: New Guinea (Morobe Distr.: Kassam Pass), one collection. Fig. 13.

Ecol. Shaded forest gully, 1200 m.

Note. Named in honour of Dr B. A. KRUCKOFF for his enthusiastic support of and interest in Malesian botany.



Fig. 11. *Leea krukoffiana* RIDSDALE. Habit, $\times \frac{1}{5}$, (NGF 37403).

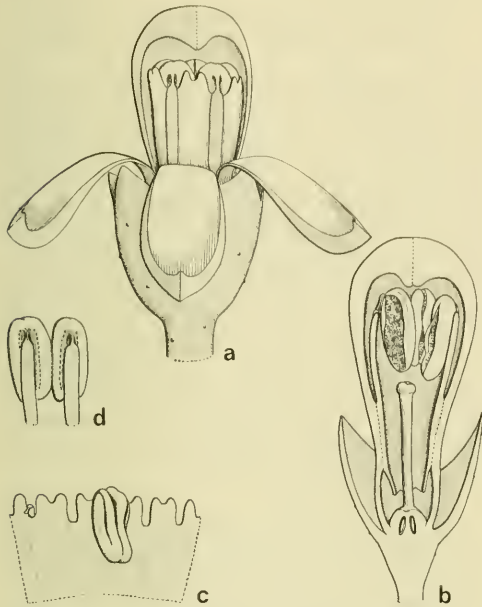


Fig. 12. *Leea kruckhoffiana* RIDSDALE. a. Flower, b. ditto in LS, c. inside of staminodial tube with one anther, d. two stamens, all $\times 5$ (a-d NGF 37403).

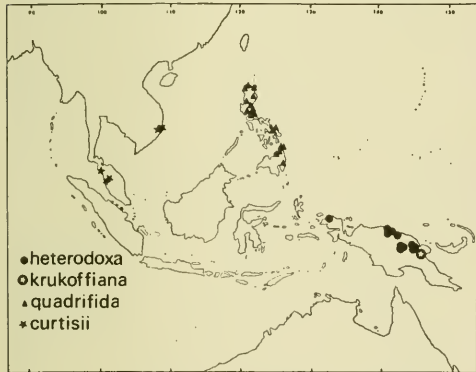


Fig. 13. Range of four species of *Leea*.

15. *Leea macropus* K. SCH. & LAUT. Notizbl. Berl.-Dahl. 2 (1898) 130; Fl. Schutzgeb. (1900) 430; Nachtr. (1905) 313; VAL. Ic. Bog. 3 (1908) 147, t. 258; LAUT. Bot. Jahrb. 59 (1925) 530; KANEH. & HATUS. Bot. Mag. Tokyo 52 (1938) 415; MERR. & PERRY, J. Arn. Arb. 22 (1941) 382; SUESSENG. in E. & P. Nat. Pfl. Fam. ed. 2, 20d (1953) 388, f. 104; RIDSDALE, Blumea 22 (1974) 83, f. 7/1-3. — Fig. 14.

Tree up to 15 m, often stilt-rooted. *Leaves* 1-pinnate, leaflets (5-) 7 (-9). Petiole 5-10 cm; *stipules* a narrow wing 3-5 mm broad extending the whole length of the petiole; scar narrow; rachis up to 50 cm. Leaflets elliptic to elliptic-

-oblong (-lanceolate or ovate-lanceolate), (8-) 15-30 (-35) by (5-) 7-12 (-15) cm, usually glabrous, rarely with sparse coarse hairs, subcoriaceous to coriaceous; pearl glands black, globose; margin sinuate to repand; apex acuminate; base rounded to obtuse; nerves 6-20 pairs; petiolules 5-25 mm long. *Inflorescences* (20-) 30-70 cm long, usually glabrous, (if pubescent then coarsely so and not fulvous), pendulous, lax; bracts deltoid, up to 2 mm long, inconspicuous; peduncle 5-20 cm, lateral branches of inflorescence long, ultimate branches somewhat spreading. *Flowers* 5-merous, cream. Calyx glabrous to sparsely pubescent, 3 by 4 mm, lobes $1\frac{1}{2}$ -1 mm. Corolla tube + staminodial lobes 8-11 mm long; corolla lobes 7-8 by 2 mm, usually glabrous. *Staminodial tube* 6-10 mm long; upper free part 6-9 mm, lobes retuse, sinuses shallow; lower free part $1\frac{1}{2}$ -1 mm. Filaments 5-7 mm, anthers 3-5 mm. *Ovary* 6-celled, style 4-6 mm. *Fruit* c. 30 mm \varnothing , red-orange; seeds usually 6, 10 by 5 mm, rumination outline simple, endosperm simply ruminant.

Distr. Malesia: Bismarck Archipelago (New Britain, New Ireland, Manus I.). Fig. 15.

Ecol. Understorey tree of primary forest, coastal plains and foothills to 500 m.

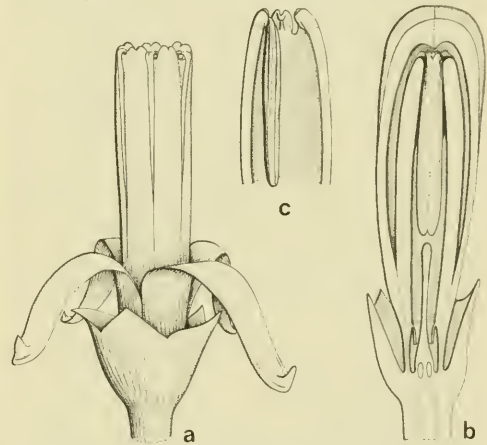


Fig. 14. *Leea macropus* K. SCH. & LAUT. a. Flower, b. ditto in LS, c. inside staminodial tube with one stamen, all $\times 5$ (a KOSTERMANS 11199, b-c NGF 32599).



Fig. 15. Range of two species of *Leea*.

16. *Leea tetramera* BURTT, Kew Bull. (1935) 304; SUESSENG, in E. & P. Nat. Pfl. Fam. ed. 2, 20d (1953) 390; RIDSDALE, Blumea 22 (1974) 83, f. 1/6-7. — *L. solomonensis* MERR. & PERRY, J. Arn. Arb. 22 (1941) 380. — *L. suaveolens* MERR. & PERRY, l.c. 381. — Fig. 3.

Tree up to 15 m, flying buttresses sometimes present, up to 1½ m high. Twigs and young parts usually minutely fulvously pubescent. *Leaves* 1- (or 2-)pinnate, leaflets 7-15. Petiole (3-) 5-10 cm; *stipules* a narrow wing 5-10 mm broad extending the length of the petiole; scar narrow; rachis (5-) 8-20 (-30) cm. Leaflets elliptic or narrowly ovate, (6-) 14-22 (-30) by (3-) 5-9 (-11) cm, usually glabrous, sometimes finely fulvously pubescent or with indumentum of coarse hairs, subcoriaceous to coriaceous; pearl glands globose, black, sometimes conspicuous; nerves 8-16 pairs; petiolules 5-25 mm. *Inflorescences* 13-35 cm long, when young usually finely fulvously pubescent, glabrous when older, pendulous, lax; bracts deltoid, up to 2 mm long, inconspicuous; peduncle 4-10 cm, main branches long, numerous, ultimate branches somewhat compact. *Flowers* 4- or 5-merous, sometimes both in one inflorescence, creamy white. Calyx usually pubescent, 4 by 4 mm, lobes 1½-2 by 1½-2 mm. Corolla tube + staminodial lobes 6-8 mm; corolla lobes 6 by 2 mm, usually pubescent. Staminodial tube c. 6 mm long; upper free part 4-4½ mm, lobes shallowly retuse, sinuses shallow; lower free part 1½-2 mm. Filaments 3 mm, anthers 2 mm. Ovary 6-celled, style 3-4 mm, anthers 2 mm. Ovary 6-celled, style 3-4 mm. *Fruit* c. 30 mm Ø, red-orange; seeds usually 6, c. 15 by 10 mm, rumination outline complexly branched, endosperm semi-complex with extra ingrowths on the lateral face.

Distr. Solomon Islands (Bougainville, Choiseul, New Georgia, Santa Isabel, Guadalcanal, Malaita, San Cristobel). Fig. 15.

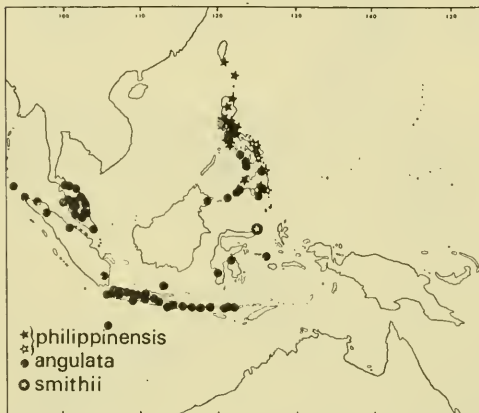


Fig. 16. Range of three species of *Leea*. Of *L. philippinensis* MERR. the solid stars refer to localities of specimens with 1-pinnate leaves, the open stars to those with 2-pinnate leaves.

Ecol. Understorey tree of primary forest; coastal plains, foothills, and ridges up to 600 m.

17. *Leea angulata* KORTH, ex MIQ. Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 97; CLARKE, J. Bot. 19 (1881) 166; KING, J. As. Soc. Beng. 65, ii (1896) 414; K. & V. Bijdr. 9 (1903) 9; BACKER, Schoofl. Java (1911) 255; RIDL, Fl. Mal. Pen. 1 (1922) 485; MERR. En. Philip. 3 (1923) 11; BURK. Dict. (1935) 1326; CORNER, Ways. Trees 1 (1940) 97; SUESSENG, in E. & P. Nat. Pfl. Fam. ed. 2, 20d (1953) 384, 385; BACKER & BAKH. f. Fl. Java 2 (1965) 94; RIDSDALE, Blumea 22 (1974) 84, f. 3/2-3, with full synonymy. — *L. horrida* T. & B. Cat. Hort. Bog. (1866) 169, *nom. nud.*; CLARKE, J. Bot. 19 (1881) 166; CERON, Cat. Pl. Herb. Manilla (1892) 51. — *L. aculeata* (non BL.) KURZ, J. As. Soc. Beng. 45, ii (1876) 124; CLARKE, J. Bot. 19 (1881) 105. — *L. sambucina* (non WILLD.) BAKER f. in Andrews, Monogr. Christmas I. (1900) 176. — *L. sambucina* var. *intermedia* RIDL. J. Str. Br. R. As. Soc. 45 (1906) 185. — Fig. 3.

Weak straggler, bushy shrub or tree up to 15 m, frequently multi-stemmed and suckering; trunk, main and ultimate branches with triangular thorns. *Leaves* 2- or 3-pinnate, leaflets numerous. Petiole 3-6 cm long; *stipules* a narrow wing 2-5 mm by 2½-5 mm, usually extending the whole length of the petiole, scar narrow, similarly long; rachis (5-) 12-20 (-25) cm. Leaflets elliptic to elliptic-lanceolate or ovate to ovate-lanceolate, (2½-) 8-12 (-15) by (1½-) 2½-3½ (-5) cm, glabrous; pearl glands globular, rarely seen; margin crenate, less frequently shallowly serrate; apex acuminate; base rounded to cuneate; nerves 4-10 pairs, often with hairy domatia, rarely sparsely pubescent along the whole length; petiolules up to 10 mm. *Inflorescences* up to 25 cm long, broad, multi-branched, pubescent; bracts triangular to narrowly triangular up to 3 by 2 mm; peduncle 4-10 cm long, main branches long, ultimate branches lax. *Flowers* 5-merous, greenish white. Calyx 2½ by 2½ mm, pubescent; lobes 1 by 1 mm. Corolla tube + staminodial lobes 3½-4 mm long; corolla lobes 2-3 by 1-1½ mm. Staminodial tube 1¾-2¼ mm long; upper free part 1¼-1½ mm, lobes retuse, sinuses shallow; lower free part ½-¾ mm, conspicuously thickened. Filaments 1½ mm, anthers 1½ mm. Ovary 6-celled, style 2 mm. *Fruit* 7-10 mm Ø, greyish blue; seeds usually 6, c. 5 by 3 mm, rumination outline simple, endosperm simply ruminate.

Distr. Nicobar Is., Thailand (Peninsular: Songkhla, Pattani, Narathiwat); *Malesia*: Malaya (Kedah, Penang, Perak, Kelantan, Pahang, Selangor), Singapore, Sumatra (Atjeh, E. Coast, Lampong), Java (common, incl. Bawean and Christmas I.), Lesser Sunda Is. (Bali, Lombok, Sumbawa, Flores), N. Borneo (Sabah, Tawau), Philippines (Negros, Panay, Mindanao, Basilan, Sulu Is.), Celebes (SE. and SW. Peninsula), Moluccas (Sula Is.: Sanana). Fig. 16.

Ecol. Secondary vegetation, particularly sandy heaths and riverine forest, up to 1500 m.

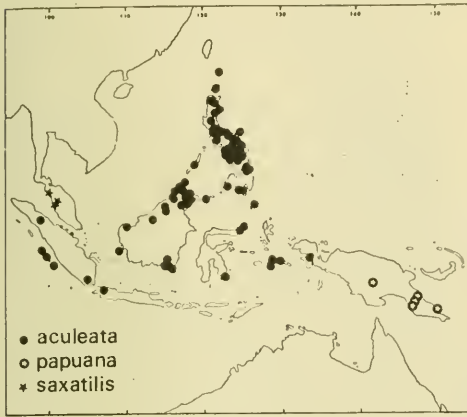


Fig. 17. Range of three species of *Leea*.

18. *Leea aculeata* BL. ex SPRENG. Syst. Veg. 1 (1824) 670; BL. Bijdr. 1 (1825) 197; SPRENG. Syst. Veg. 4, 2 (1827) Cur. post. 70; G. DON, Gen. Hist. 1 (1831) 713; STEUD. Nom. Bot. ed. 2, 2 (1840) 21; HASSK. Cat. Hort. Bog. (1844) 167; MIQ. Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 99, incl. var. *moluccana* MIQ. l.c.; KOORD. Minah. (1898) 397; MERR. Philip. J. Sc. 2 (1907) Bot. 280; *ibid.* 3 (1908) Bot. 419; WINKLER, Bot. Jahrb. 44 (1910) 537; BACKER, Schoolfl. Java (1911) 254; MERR. Int. Rumph. (1917) 347; Sp. Blanc. (1918) 247; En. Born. (1921) 368; BROWN, Min. Prod. Philip. For. 3 (1921) 206; MERR. En. Philip. 3 (1923) 10; SUESSENG. in E. & P. Nat. Pfl. Fam. ed. 2, 20d (1953) 383; BACKER & BAKH. f. Fl. Java 2 (1965) 93; RIDSDALE, Blumea 22 (1974) 85, f. 3/5. — [*Frutex aquosus mas* RUMPH. Herb. Amb. 4 (1743) 102, t. 44.] — *Ticorea aculeata* BLANCO, Fl. Filip. (1837) 85. — *L. aculeata* (BLANCO) BLANCO, Fl. Filip. ed. 2 (1845) 127, non BL. ex SPRENG. 1824; NAVES, *ibid.* ed. 3, 1 (1877) 227, t. 306. — *L. serrulata* MIQ. Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 99. — *L. angulata* (non KORTH.) KURZ, J. As. Soc. Beng. 45, ii (1876) 124; CLARKE, J. Bot. 19 (1881) 105. — *L. biserrata* (non MIQ.) NAVES in Blanco, Fl. Filip. ed. 3 (1877) t. 306. — *L. javanica* (non BL.) KOORD. Minah. (1898) 398. — *L. sandakanensis* RIDL. Kew Bull. (1931) 499; SUESSENG. in E. & P. Nat. Pfl. Fam. ed. 2, 20d (1953) 386. — Fig. 3.

Shrub to small tree up to 10 m, trunk and main branches with spines. Leaves 1-pinnate, leaflets (5-) 7 (-9). Petiole 2-6 cm; stipules a narrow wing, c. 1/2 by (1-) 2-3 (?-4) cm, scar of similar length; rachis (3-) 6-12 (-15) cm. Leaflets elliptic to elliptic-oblong, occasionally ovate to ovate-oblong, (6-) 10-20 (-25) by (2 1/2-) 4-6 (-10) cm, glabrous, subcoriaceous; pearl glands globose, black, infrequent; margin serrulate; apex long-acuminate; base rounded to cuneate; mature leaves with a characteristic yellowish-grey reticulate drying pattern; nerves 6-12 pairs; petiolules up to 2 cm. Inflorescences 7-20 cm long, broad and multi-

-branched; bracts deltoid to narrowly triangular up to 3 by 1 1/2 mm; peduncle 0-10 cm. Flowers 5-merous, greenish white. Calyx 3 by 3 mm, glabrous; lobes 2 by 1 mm. Corolla tube + staminodial lobes 4 mm long; corolla lobes 3 by 1 1/2-2 mm. Staminodial tube 3-3 1/2 mm long; upper free part 1 1/2 mm, lobes slightly cleft, sinuses shallow; lower free part 1 1/2-1 3/4 mm, extending downwards to the ovary (the upper portion of this lower part often thickened to form a conspicuous rim). Filaments 1 1/4 mm, anthers 1 1/4 mm. Ovary 4-6-celled, style 2 mm. Fruit 10-15 (-20) mm ø, shallowly grooved, blue-black; seeds usually 6, 6-12 by 3-6 mm, often less by abortion, rumination outline simple, endosperm simply ruminate.

Distr. *Malesia*: N. Sumatra (East Coast Res., Lampung, Mentawai and Nassau Is.), W. Java (rare; Karimata Is.), Borneo (SE. Kalimantan; Sarawak, 4 records; common in Sabah), Philippines (common), Celebes (N. and SE. Peninsulas), Moluccas (Talaud Is., Ceram, Ambon), New Guinea (Fakfak). Fig. 17.

A rather interesting distribution pattern with the species exceedingly common in the Philippines and Sabah but apparently very rare over the southwestern part of its range to Sumatra.

Ecol. Wide-spread component of mainly secondary vegetation, particularly riverine areas, up to 1300 m, usually at lower altitudes.

Note. Unlike *L. angulata*, the spines in this species are found only on the trunk and main branches and are lacking on fertile shoots.

19. *Leea curtisii* KING, J. As. Soc. Beng. 65, ii (1896) 416; RIDL. Fl. Mal. Pen. 1 (1922) 485; BURK. Dict. (1935) 1326; SUESSENG. in E. & P. Nat. Pfl. Fam. ed. 2, 20d (1953) 385; RIDSDALE, Blumea 22 (1974) 85, f. 2/1. — *L. stipulosa* GAGNEP. Fl. Gén. 1.-C. Suppl. (1950) 849, t. 106, *nom. inval.*; SUESSENG. l.c. 387. — Fig. 3.

Erect shrub, 1-4 m. Leaves 2-pinnate, leaflets numerous. Petiole c. 22 cm; stipules a narrow elongated wing 1/4-1/2 by 5-10 (or more?) cm, scar of similar length; rachis c. 60 cm. Leaflets elliptic, 7-15 by 3-6 cm, glabrous; margins shallowly lobed to dentate; apex acuminate; base cuneate; nerves 4-10 pairs; petiolules 4-10 mm. Inflorescences 18-25 mm long, finely sparsely pubescent, lax, multi-branched; bracts deltoid, small; peduncle 6-9 cm. Flowers 5-merous, yellowish white. Calyx 3-4 by 3-5 mm, pubescent; lobes 1 by 2 mm. Corolla tube + staminodial lobes 3 1/2-4 1/2 mm long. Staminodial tube 2 1/2-4 1/4 mm; upper free part 1 1/2-2 1/4 mm, lobes shallowly retuse, sinuses shallow; lower free part 1-2 mm. Filaments 1 1/2-2 1/4 mm, anthers 1 1/2-2 mm. Ovary 6-celled, style 2 mm. Fruit unknown.

Distr. N. Vietnam (Nhatrang); *Malesia*: Malaya (Pahang, Perak). Only 4 collections. Fig. 13.

Ecol. Primary lowland forest.

Note. CURTIS noted: 'Leaves of very young plants partly masked with silvery grey variegation down either side of the midrib'. Introduced and cultivated in Penang Botanic Gardens, but has not



Fig. 18. *Leea aequata* L. a. Habit, b. young leaf with stipules, both $\times \frac{1}{3}$, c. venation with hairs and pearl glands, $\times 10$ (a, c SCHIFFNER 2190, b BAKHUIZEN VAN DEN BRINK f. 4865).

been traced in the last 33 years and Mr K. C. CHANG considers it unlikely that it survives.

20. *Leca aquata* L. Syst. Nat. ed. 12, 2 (1767) 627 & Mantissa 1 (1767) 124; W. AIT. Hort. Kew. 1 (1789) 283; LAMK, Encycl. Méth. 3 (1792) 460; ROEM. & SCHULTES, Syst. Veg. 4 (1819) 705; SPRENG. Syst. Veg. 1 (1824) 670; G. DON, Gen. Hist. 1 (1831) 713; STEUD. Nom. Bot. ed. 2, 2 (1840) 21; KURZ, J. As. Soc. Beng. 44, ii (1875) 180; HEMSLEY, Rep. Chall. Exp. 1 (1885) 134; VIDAL, Rev. Pl. Vasc. Filip. (1886) 93; KING, J. As. Soc. Beng. 65, ii (1896) 419; COOKE, Fl. Pres. Bomb. 1 (1902) 261; PRAIN, Beng. Pl. (1903) repr. (1963) 239; USTERI, Beitr. Kenntn. Philip. Veg. (1905) 114; BRANDIS, Ind. Trees (1906) 179; TALBOT, For. Fl. Bomb. Pres. 1 (1909) 330; WINKLER, Bot. Jahrb. 44 (1910) 537; BACKER, Schooffl. Java (1911) 256; GAGNEP. Fl. Gén. I.-C. 1 (1912) 940; GAMBLE & FISCH. Fl. Pres. Madras 1 (1918) 240; MERR. En. Born. (1921) 368; En. Philip. 3 (1923) 10; RIDL. Fl. Mal. Pen. 1 (1922) 486; HAINES, Bot. Bihar & Orissa 1 (1925) 209; COWAN & COWAN, Trees N. Beng. (1929) 40; BURK. Dict. (1935) 1326; KANJILAL & DAS, Fl. Assam 1 (1936) 307; CORNER, Ways. Trees 1 (1940) 97; GAGNEP. Fl. Gén. I.-C. Suppl. (1950) 848; SUESSING. in E. & P. Nat. Pfl. Fam. ed. 2, 20d (1953) 385, 387, 388; HUNDLEY & U CHIT KO KO, List Tr. Shr. Herbs & Climb. Burma (1961) 54; BACKER & BAKH. f. Fl. Java 2 (1965) 94; HARA, Fl. E. Himal. (1966) 200; SUWAL, Med. Pl. Nepal (1970) 22; BURGER, Seedl. Trop. Tr. Shr. SE. Asia (1972) 379, f. 154; RIDSDALE, Blumea 22 (1974) 90, f. 3/12. — *Frutex aquosus femina* RUMPH. Herb. Amb. 4 (1743) 107, t. 45. — *L. hirta* ROXB. ex HORNEM. Hort. Hafn. 1 (1813) 231; ROXB. Hort. Beng. (1814) 18; Fl. Ind. ed. 1, 2 (1824) 469; DC. Prod. 1 (1824) 635; SPRENG. Syst. Veg. 1 (1824) 670; BL. Bijdr. 1 (1825) 196; G. DON, Gen. Hist. 1 (1831) 713; ROXB. Fl. Ind. ed. 2, 1 (1832) 656; DECNE, Nouv. Ann. Mus. Hist. Nat. Paris 3 (1834) 446; STEUD. Nom. Bot. ed. 2, 2 (1840) 21; HASSK. Cat. Hort. Bog. (1844) 168; VOIGT, Hort. Sub. Calc. (1845) 30; MIQ. Fl. Ind. Bat. 1, 2 (1859) 612; DRURY, Handb. Fl. Ind. 1 (1864) 34; WATT, Dict. Ec. Prod. India 4 (1890) 617; HUNDLEY & U CHIT KO KO, List Tr. Shr. Herbs & Climb. Burma (1961) 55. — *L. scabra* ROXB. ex ROEM. & SCHULTES, Syst. Veg. 4 (1819) 814; STEUD. Nom. Bot. ed. 2, 2 (1840) 21. — *L. hirsuta* BL. ex SPRENG. Syst. Veg. 1 (1824) 670; BL. Bijdr. (1825) 197; HASSK. Cat. Hort. Bog. (1844) 167; MIQ. Fl. Ind. Bat. 1, 2 (1859) 612. — *L. anacolona* MIQ. Fl. Ind. Bat. 1, 2 (1859) 611; Sum. (1861) 202. — *L. kurzii* CLARKE, J. Bot. 19 (1881) 165; SUESSING. l.c. 385. — *L. hispida* GAGNEP. Not. Syst. 1 (1910) 229; Fl. Gén. I.-C. 1 (1912) 939; *ibid.* Suppl. (1950) 847, pl. 25 f. 1-8; SUESSING. l.c. 387. — Fig. 18, 19.

Shrub, treelet or less frequently small tree up to 10 m, young branches usually densely hairy. Leaves 1-3-pinnate, leaflets 5 to numerous. Petiole (5-) 8-14 (-20) cm; stipules oblong-ovovate, 1½-4½ by 3-6 (-10) cm, pubescent to densely hairy, scar

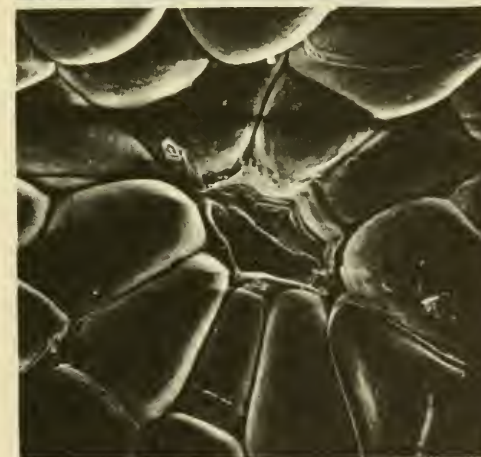


Fig. 19. *Leca aquata* L. Pearl glands on underside of leaf, stereoscan photographs, from top to bottom $\times 40$, $\times 125$, $\times 500$ (SCHIFFNER 2190).

1½-2½ (-4) cm long, slightly shorter than the stipule; rachis 7-20 (-25) cm, petiole and rachis usually hairy. Leaflets ovate to ovate-lanceolate or elliptic to elliptic-lanceolate, (3-) 10-22 (-30) by (1½-) 4-8 (-12) cm, above glabrous to hairy, particularly over the nerves, below sparsely to densely hairy, chartaceous; pearl glands globular to discoidal, brown, large and conspicuous to naked eye (in rare cases absent from the leaflets); margins serrate; apex acuminate to long acuminate; base cuneate to truncate, sometimes subcordate or unequal; nerves (5-) 8-14 (-18) pairs, usually densely hairy; petiolules 5-15 (-25) mm, hairy. *Inflorescences* 4-14 (-20) cm long, rusty pubescent to hairy; bracts ovate, up to 8 by 5 mm, conspicuous; peduncle 1-4 (-8) cm, lateral and ultimate branches rather short, sometimes condensed. *Flowers* 5-merous, greenish white. Calyx 3-4 by 3-4 mm, glabrous to densely pubescent, usually with pearl glands; lobes 1 by 2 mm. Corolla tube + staminodial lobes 2½-4½ mm; corolla lobes 2-3½ by 1-1½ mm. Staminal tube 1¾-2½ mm long; upper free part 1½-2 mm, lobes deeply notched, sinuses shallow, to ½ mm; lower free part 0.2-0.4 mm. Filaments 1-1¼ mm, anthers 1-1¼ mm. Ovary 4-7-celled, style 1½-2½ mm. *Fruit* 8-15 mm Ø, orange-red, often drying pallid; seeds usually 5 or 6, 4-6 by 4-6 mm, ruminations outline simple, endosperm simply ruminant.

Distr. India (Bombay, Mysore, Madras, Central Prov., Orissa, Bihar, Bengal, United Prov., Sikkim, Assam), Bhutan, Nepal, Bangladesh, Andaman Is., Upper & Lower Burma, Thailand, Cambodia, Laos, N. & S. Vietnam; *Malesia*: Malaya, Singapore, Sumatra, Java (also Madura I.), Lesser Sunda Is. (Sumba, Timor, Wetar), Borneo (Kalimantan; Bandjermasin, Butungan, W. Kutai; Sarawak; Sabah), Philippines (Bohol, Coron I., Negros, Panay, Mindanao), Celebes (NE. & SW.), Moluccas (Tanimbar, Kai). Fig. 6.

Ecol. Wide-spread, but scattered, in secondary vegetation, apparently rather rare in Malaya and Borneo, up to 1400 m but usually at lower altitudes.

21. *Leea rubra* BL. ex SPRENG. Syst. Veg. 1 (1824) 670; BL. Bijdr. (1825) 197; G. DON, Gen. Hist. 1 (1831) 712; DECNE, Nouv. Ann. Mus. Hist. Nat. Paris 3 (1834) 445; STEUD. Nom. Bot. ed. 2, 2 (1840) 21; HASSK. Cat. Hort. Bog. (1844) 167; Pl. Jav. Rar. (1848) 453; MIQ. Fl. Ind. Bat. 1, 2 (1859) 610; Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 96, *incl. var. polyphylla* (MIQ.) MIQ. *et var. apifhylla* ZIPP. ex MIQ. l.c. 97; KURZ, J. As. Soc. Beng. 44, ii (1875) 180; Fl. Burma 1 (1877) 279; CLARKE, J. Bot. 19 (1881) 104; ENGL. Bot. Jahrb. 7 (1886) 465; KING, J. As. Soc. Beng. 65, ii (1896) 416; KOORD. Minah. (1898) 398, *incl. forma celebica* KOORD. *nom. nud.*; PRAIN, Beng. Pl. (1903) repr. (1963) 239; VAL. Bull. Dép. Agr. Ind. Néerl. 10 (1907) 31; LAUT. Nova Guinea 8 (1910) 302; GAGNEP. Fl. Gén. I.-C. 1 (1912) 939; MERR. En. Born. (1921) 396; RIDL. Fl. Mal. Pen. 1 (1922) 485; CRAIB, Fl. Siam. En. 1 (1926) 320; BURK. Dict. (1935)

1327; CORNER, Ways. Trees 1 (1940) 97; GAGNEP. Fl. Gén. I.-C. Suppl. (1950) 846; SUESSING. in E. & P. Nat. Pfl. Fam. ed. 2, 20d (1953) 383, 387, 388; DUONG, Fl. Vietnam (1960) 266; BACKER & BAKH. f. Fl. Java 2 (1965) 94; CORNER & WATANABE, Ill. Guide Trop. Pl. (1969) 454; RIDSDALE, Blumea 22 (1974) 91, f. 3/10-11, 6/6-7. — *L. polyphylla* MIQ. Fl. Ind. Bat. 1, 2 (1859) 610. — *L. sanguinea* (non WALL.) KURZ, J. As. Soc. Beng. 42, ii (1873) 66, *pro parte*. — *L. coccinea* (non PLANCH.) KURZ, *ibid.* 44, ii (1875) 179. — *L. brunoniana* CLARKE, J. Bot. 19 (1881) 166; BAILEY, Queensl. Fl. 1 (1899) 284; SUESSING. l.c. 383, *pro parte*; SPECHT, Rec. Am.-Austr. Sc. Exp. Arnhem Land 3 (1958) 257. — *L. linearifolia* CLARKE, J. Bot. 19 (1881) 165; GAGNEP. Fl. Gén. I.-C. 1 (1912) 943; *ibid.* Suppl. (1950) 851; SUESSING. l.c. 383, 387. — Fig. 3, 20.

Small semi-herbaceous shrub up to 3 m. *Leaves* 2- to 4-pinnate, leaflets numerous. Petiole 2-8 (-15) cm long; *stipules* a narrow wing, 2-4 by 0.3-0.5 cm, scar rather broad, similarly long; rachis (2½-) 5-25 (-42) cm. leaflets ovate to ovate-oblong, less frequently elliptic to elliptic-lanceolate or linear-lanceolate, (2-) 4-8 (-14) by (0.3-) 1.5-4 (-6) cm, glabrous, or less frequently with small hairs along the nerves, chartaceous; pearl glands apparently absent from the leaflets; margin crenate to shallowly serrate; apex acute to shortly acuminate; base rounded to acute; nerves 5-10 pairs, sometimes with minute hairs; petiolules 2-5 (-10) mm, often winged. *Inflorescences* (4-) 8-14 (-16) cm long, rusty pubescent, generally compact; bracts deltoid-triangular, inconspicuous; peduncle 3-8 (-16) cm, main branches numerous, ultimate branches short. *Flowers* 5-merous, bright red. Calyx 2-2½ by 1½-2½ mm, glabrous; lobes 1 by 1 mm. Corolla tube + staminodial lobes 2-3 mm; corolla lobes 1½-2½ by 1½ mm.

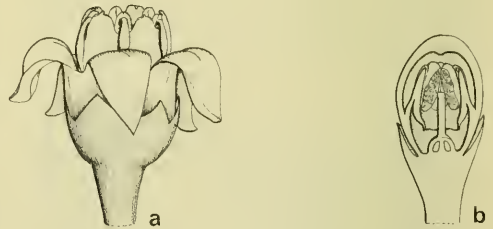


Fig. 20. *Leea rubra* BL. ex SPRENG. a. Flower, b. ditto in LS, both $\times 5$ (a-b PULLEN 6703).

Staminodial tube 1.2-2 mm long; upper free part 1-1¼ mm, lobes shallowly retuse or cleft, sinuses deep ½-¾ mm; lower free part 0.3-0.5 mm. Ovary 4-6-celled, style 1-2 mm. Filaments 1 mm, anthers 1 mm. *Fruit* 8-10 mm Ø, dark red; seeds c. 4 by 4 mm, usually 6, ruminations outline simple, endosperm simply ruminant.

Distr. India (Assam, Khasia, Bengal), Bangladesh, Burma, Thailand, Cambodia, Laos, N. & S.

Vietnam; *Malesia*: Malaya (incl. Penang), Singapore, S. Sumatra (Palembang), Java (incl. Madura I.), Lesser Sunda Is. (Sumbawa, Flores, Sumba, Timor), Borneo (SE. Kalimantan, Sabah), Philippines (Palawan), Celebes, Moluccas (Tanimbar, Kai), New Guinea (Papua: Western & Central Distr.); N. Australia. Fig. 21.

Ecol. Dry monsoon forest, savannah, and secondary vegetation, up to 500 m.

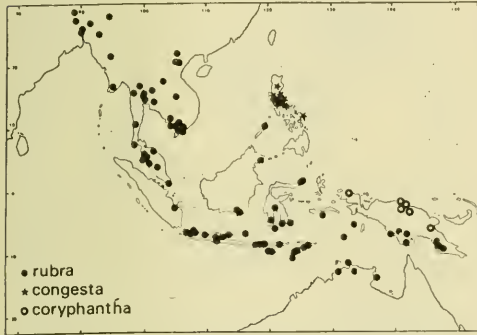


Fig. 21. Range of three *Leea* species.

22. *Leea saxatilis* RIDL. J. Str. Br. R. As. Soc. 75 (1917) 26; Fl. Mal. Pen. 1 (1922) 486; CRAIB, Fl. Siam. En. 1 (1926) 320; SUESSENG. in E. & P. Nat. Pfl. Fam. ed. 2, 20d (1953) 385; RIDSDALE, Blumea 22 (1974) 92, f. 3/4. — Fig. 3.

Small shrub up to 2 m. *Leaves* 1-pinnate, leaflets 9–13. Petiole (6–) 14–30 (–45) cm long; *stipules* a narrow wing 3–9 by 0.3–0.5 cm, scar narrow, similarly long; *rachis* 15–30 (–48) cm, ferruginously pubescent. Leaflets elliptic to elliptic-oblong, basal leaflets occasionally ovate, (10–) 15–21 (–25) by (3–) 5–7 (–9) cm, glabrous, chartaceous; pearl glands not seen; margin serrate to biserrate; apex acuminate; base obtuse to rounded (sometimes cuneate in apical leaflets); nerves (8–) 10–13 pairs, ferruginously pubescent; petiolules 3–15 mm. *Inflorescences* up to 8 (–12) cm long, condensed, ferruginously pubescent; bracts narrowly triangular up to 5 by 2 mm; peduncle up to 8 cm, lateral and ultimate branches of inflorescence highly condensed. *Flowers* 5-merous, red. Calyx 2 by 2 mm, pubescent; lobes 1 by 1 mm. Corolla tube + staminodial lobes 3 mm; corolla lobes 2 by 1½ mm. Staminodial tube 3 mm long; upper free part 1¼–1½ mm, lobes retusely apiculate, sinuses shallow, to ½ mm; lower free part 1½ mm. Filaments 1 mm, anthers 1 mm. Ovary 6-celled, style 2 mm. *Fruit* c. 12 mm Ø, red; seeds usually 6, c. 5 by 4 mm, rumination outline simple, endosperm simply ruminant.

Distr. *Malesia*: Malaya (Perak, Selangor). Fig. 17.

Ecol. Shaded rocks and riverine areas, up to 500 m.

Note. A rarely collected species most probably related to *L. setuligera* CLARKE; further collections and field observations required.

23. *Leea guineensis* G. DON, Gen. Hist. 1 (1831) 712; HOOK. f. Niger Fl. (1849) 268; HUTCH. & DALZ. Fl. W. Trop. Afr. 1 (1928) 479, Appendix (1937) 304; SUESSENG. in E. & P. Nat. Pfl. Fam. ed. 2, 20d (1953) 388; RIDSDALE, Blumea 22 (1974) 92, f. 4/2–5, with full synonymy. — *L. arborea* TELF. ex W. & A. Prod. (1834) 132. — *L. manillensis* WALP. Nov. Act. Ac. Caes. Leop.-Car. 19 (1843) Suppl. 1: 314; Reperit. 5 (1845) 378; VIDAL, Phan. Cuming. (1885) 104; Rev. Pl. Vasc. Filip. (1886) 94; MERR. Philip. J. Sc. 1 (1906) Suppl. 89; *ibid.* 3 (1908) Bot. 419; Fl. Manila (1912) 312; Sp. Blanc. (1918) 247; BROWN, Min. Prod. Philip. For. 3 (1921) 206; MERR. in E. & P. Nat. Pfl. Fam. ed. 2, 20d (1953) 383; LIU, Illustr. Nat. Introd. Lign. Pl. Taiwan (1962) 851; LI, Woody Fl. Taiwan (1963) 524, f. 203. — *L. staphylea* (non ROXB.) WIGHT, Ill. Ind. Bot. 1 (1845) t. 58; Ic. Pl. As. 1 (1854) t. 78. — *L. aurantiaca* ZOLL. & MOR. Nat. Geneesk. Arch. N. I. 2 (1851) 577; MIQ. Fl. Ind. Bat. 1, 2 (1859) 612; BACKER & BAKH. f. Fl. Java 2 (1965) 94; BANERJEE & BABU, Ind. For. 97 (1971) 19. — *L. javanica* (non BL.) MIQ. Ann. Mus. Bot. Lugd.-Bat. 1 (1869) 100; VIDAL, Rev. Pl. Vasc. Filip. (1886) 93; MERR. Philip. Bur. For. Bull. (1903) 36; En. Born. (1921) 369; En. Philip. 3 (1923) 12. — *L. laetae* WALL. [Cat. (1832) n. 6831; STEUD. Nom. Bot. ed. 2, 2 (1849) 21; all *nom. nud.*] ex KURZ, J. As. Soc. Beng. 42, ii (1873) 65; *ibid.* 44, ii (1875) 179; Fl. Burma 1 (1877) 278; CLARKE, J. Bot. 19 (1881) 163; SUESSENG. in E. & P. Nat. Pfl. Fam. ed. 2, 20d (1953) 383. — *L. sanguinea* WALL. [Cat. (1832) n. 6824; BOJ. Hort. Maurit. (1837) 61; all *nom. nud.*] ex KURZ, J. As. Soc. Beng. 42, ii (1873) 66, *pro parte*. — *L. acuminata* WALL. [Cat. (1832) n. 6830; STEUD. Nom. Bot. ed. 2, 2 (1840) 21; KURZ, Rep. Veg. And. Isl. (1870) 34; all *nom. nud.*] ex CLARKE, J. Bot. 19 (1881) 141; J. Linn. Soc. Bot. 25 (1889) 13; KING, J. As. Soc. Beng. 65, ii (1896) 415; BRANDIS, Ind. Trees (1906) 179; BACKER, Schoolfl. Java (1911) 256; GAGNEP. Fl. Gén. I.-C. 1 (1912) 941; CRAIB, Aberd. Univ. Stud. 57 (1912) 43; HAINES, Bot. Bihar & Orissa 1 (1925) 207; CRAIB, Fl. Siam. En. 1 (1926) 316; COWAN & COWAN, Trees N. Beng. (1929) 40; KANJILAL & DAS, Fl. Assam 1 (1936) 304; GAGNEP. Fl. Gén. I.-C. Suppl. (1950) 851; SUESSENG. in E. & P. Nat. Pfl. Fam. ed. 2, 20d (1953) 383, 387; HUNDLEY & U CHIT KO KO, List Tr. Shr. Herbs & Climb. Burma (1961) 54; HARA, Fl. E. Himal. (1966) 199; Fl. E. Himal. 2nd Rep. (1971) 78. — *L. cumingii* CLARKE, J. Bot. 19 (1881) 166; ROLFE, J. Bot. 23 (1885) 211; VIDAL, Phan. Cuming. (1885) 104; Rev. Pl. Vasc. Filip. (1886) 94; MERR. En. Philip. 3 (1923) 11; SUESSENG. in E. & P. Nat. Pfl. Fam. ed. 2, 20d (1953) 383. — *L. wrightii* CLARKE, J. Bot. 19 (1881) 105; JACKSON, Ind. Kew. 2 (1895) 48 ('*wrightii*'); BRANDIS, Ind. Trees (1906) 179; GAMBLE & FISCH. Fl. Pres. Madras 1 (1918) 239;

SUESSING. *l.c.* 383. — *L. parva* ELM. Leaflet. Philip. Bot. 1 (1908) 317; C. B. ROB. Philip. J. Sc. 6 (1911) Bot. 210; MERR. En. Philip. 3 (1923) 13; SUESSING. *l.c.* 387. — *L. negrosense* ELM. Leaflet. Philip. Bot. 2 (1908) 494; C. B. ROB. Philip. J. Sc. 6 (1911) Bot. 209; MERR. En. Philip. 3 (1923) 13; SUESSING. *l.c.* 386. — *L. palawanensis* ELM. Leaflet. Philip. Bot. 5 (1913) 1851. — *L. euphlebica* MERR. Philip. J. Sc. 9 (1915) Bot. 453; En. Philip. 3 (1923) 13; SUESSING. *l.c.* 386. — *L. parvifoliola* MERR. Philip. J. Sc. 11 (1916) Bot. 145; En. Philip. 3 (1923) 13; SUESSING. *l.c.* 386. — *L. papillosa* MERR. Philip. J. Sc. 13 (1918) Bot. 307; En. Philip. 3 (1923) 13; SUESSING. *l.c.* 386. — *L. luzonensis* ELM. Leaflet. Philip. Bot. 8 (1919) 3104. — *L. robusta* (non ROXB.) RIDL. Fl. Mal. Pen. 1 (1922) 486; CRAIB, Fl. Siam. En. 1 (1926) 320. — *L. dentata* CRAIB, Kew Bull. (1926) 357; Fl. Siam. En. 1 (1926) 317; GAGNEP. Fl. Gén. I.-C. Suppl. (1950) 846; SUESSING. *l.c.* 386, 387. — *L. schomburgkii* CRAIB, Kew Bull. (1926) 358; Fl. Siam. En. 1 (1926) 321; GAGNEP. Fl. Gén. I.-C. Suppl. (1950) 855; SUESSING. *l.c.* 387. — *L. brunoniana* (non CLARKE) LAUT. Bot. Jahrb. 63 (1930) 277; KANEHIRA, Bot. Mag. Tokyo 45 (1931) 295; Fl. Micronesia (1933) 208; J. Dep. Agr. Kyushu Imp. Univ. 4 (1936) 362. — *L. pallidifolia* KANEHIRA, Bot. Mag. Tokyo 49 (1935) 354; SUESSING. *l.c.* 388. — *L. bulusanensis* ELM. Leaflet. Philip. Bot. 10 (1939) 3801. — Fig. 3.

Shrub, sometimes with a creeping rootstock, or ± herbaceous branches, or tree 1–5 (–10) m; branches usually glabrous or finely pubescent, rarely densely hairy, villose or papillose. Leaves (1–) 2– or 3 (–4)-pinnate, leaflets numerous. Petiole (5–) 10–20 (–25) cm; *stipule* obovate, 2–4 (–6) by (1–) 1½–3 cm, early caducous, glabrous, sparsely pubescent to woolly; scar broadly triangular (1–) 2–3 (–4) cm long, slightly shorter than the stipule; rachis (10–) 25–75 (–100) cm. Leaflets (broadly) ovate to ovate-lanceolate or (broadly) elliptic to elliptic-lanceolate, (3–) 8–20 (–30) by (1½–) 3–8 (–14) cm, rarely irregularly incised, above usually glabrous, rarely sparsely hairy to hispid, below glabrous to sparsely pubescent, rarely densely pilose or hispid, chartaceous to subcoriaceous; pearl glands globose, small, rapidly caducous; margin repand to denticulate; apex (long-)acuminate; base cuneate to rounded, less frequently truncate or unequal; nerves (4–) 6–10 (–18) pairs, often with hairy domatia; petiolules (2–) 6–12 (–20) mm, glabrous or pubescent. Inflorescences (3–) 10–25 (–40) cm long, compact to lax, less frequently condensed, rusty pubescent, less frequently glabrous or hairy, rarely woolly; bracts ovate to deltoid to narrowly triangular, up to 3 mm long; peduncle (1–) 3–10 (–25) cm, lateral and ultimate branches long and spreading, or ultimate branches condensed. Flowers 5-merous, red to reddish orange, staminal tube red to citrous white. Calyx 1–3 by 2–4 mm, glabrous or pubescent; lobes 1–2 by 1–2 mm. Corolla tube + staminodial lobes (2–) 3–5 mm long; corolla lobes 2–4 by 1–2½ mm. Staminal tube (1¼–) 2–3 mm long; upper free part (1–) 1½–2½ mm,

lobes shallowly retuse, notched or cleft, sometimes continuing growth to appear apiculate, sinuses thin, shallow 0.2–0.6 mm; lower free part (0.2) 0.5–1.25 mm. Filaments ½–1¼ mm, anthers ¾–2 mm. Ovary (4–) 6 (–8)-celled, style 1–2½ mm. Fruit 5–15 mm Ø, red; seeds usually 6, c. 5 by 4 mm, rumination outline simple, endosperm simply ruminant.

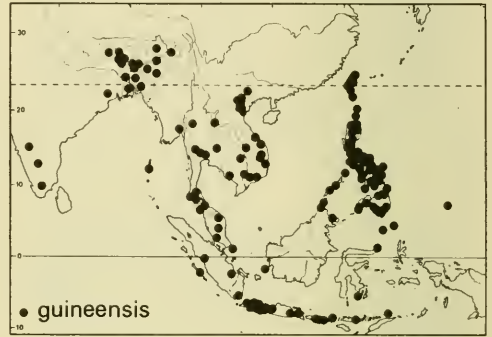


Fig. 22. Range of *Leea guineensis* G. DON in Indo-Malesia; the localities in Africa and the Malagasian area are omitted.

Distr. Tropical Africa; Madagascar, Bourbon, Mauritius; Asia: India (Madras to Assam), Burma, Thailand, Cambodia, Laos, Andaman Is., southwards becoming very rare; in *Malesia*: Malaya, Sumatra, Java, Lesser Sunda Is. (apparently absent from Borneo), Philippines (common), N. Celebes (rare); further in Taiwan and Micronesia (Palau). Fig. 22.

Ecol. In the Philippines, Taiwan and Micronesia replacing *L. indica* as the wide-spread component of secondary regrowth vegetation, but also found in primary forest; throughout the remainder of *Malesia*, a rather rare shrub of primary forest and shaded localities, in the area India to Vietnam and also in Africa it is once more a common component of secondary vegetation. From sea-level up to 1500 m, in the Himalayas ascending to 2250 m.

Notes. In the present circumscription the species shows a wide range of variability, both geographically and ecologically. It is undoubtedly a complex species composed of overlapping entities which cannot be satisfactorily delimited from each other, these entities sometimes having different ecological preferences. Previous workers, particularly in the Philippines, have created many small segregate species, which can no longer be maintained as with increased material available all degrees of intermediates are found to exist. Most of these taxa were separated only by minor vegetative differences. The conclusion that there is but one variable species in Asia and *Malesia* independently concurs with that reached by GAGNEPAIN (1910) in his essay on the classification of the Asiatic species of *Leea* and that of BANERJEE

& BABU (1971) on the conspecificity of *L. aurantia*-ca and *L. acuminata*. Comparison of the African and Asiatic material of '*L. guineensis*' and '*L. manillensis sensu lato*' showed that no clear cut differences could be found in herbarium material other than vague suggestions from the field notes that the colour of the staminodial tube might be different in living material; morphological characters of the leaves and flowers completely overlap.

Within the Asiatic perimeters of the variability there are clearly two ecological forms, one of shaded forest occurring in Malaya, Sumatra and Java, the other of secondary vegetation occurring in mainland Asia and in the Philippines. Within the latter area a vast range of forms is encountered and here the taxon appears to replace *L. indica* as a member of secondary vegetation.

Several morphological trends are apparent but none is clearly demarcated from the parent stock. Of these the entity '*L. manillensis*' commonly occurs from Taiwan to the Philippines. It is characterized by small leaf dimensions and usually by the presence of hairy domatia. However, all degrees of intermediates are to be found between this entity and '*L. negrosense*' with leaflets which are larger and somewhat coriaceous, or glabrous or sparsely pubescent. The most distinctive entity has woolly hairy stems and setaceous to hispid hairs on the upper leaf surface, this may be a semi-stable form within the Philippines, but again intermediates exist with the parent population. Previously this entity was given specific rank as '*L. cunningii*'. There is a parallel form from the Solomon Islands in the *L. indica* complex. The Indian material shows a less wide range of variation, but in the area Thailand to Vietnam a further morphological leaf form occurs which may well be an expression of an edge of range effect. The interrelationships of these different leaf forms can only be further resolved by ecological and population studies.

24. *Leea indica* (BURM. f.) MERR. Philip. J. Sc. 14 (1919) 245; En. Born. (1921) 368; En. Philip. 3 (1923) 11; CRAIB, Fl. Siam. En. 1 (1926) 318; CORNER, Ways. Trees 1 (1940) 97, Atlas pl. 1; MERR. & PERRY, J. Arn. Arb. 22 (1941) 380; SANTAPAU, Rec. Bot. Surv. Ind. 16 (1953) 56; PARHAM, Pl. Fiji Isl. (1964) 154; BANERJEE, Rec. Bot. Surv. Ind. 19 (1965) 33; CORNER & WATANABE, Ill. Guide Trop. Pl. (1969) 454; RIDSDALE, Blumea 22 (1974) 95, f. 4/6-8, 5/1-7, 8/5. — *Staphylea indica* BURM. f. Fl. Ind. (1768) 75, t. 23, f. 2. — *Aquilecia sambucina* L. Mantissa 2 (1771) 211; CAV. Dissert. 7 (1789) 372, t. 218. — *Aquilecia otillis* GAERTN. Fruct. 1 (1788) 275. — *Orellis zeylanica* GAERTN. l.c. t. 57, nomen. — *L. sambucina* WILLD. Sp. Pl. 1 (1789) 1177; ROXB. Hort. Beng. (1814) 18; ROEM. & SCHULTES, Syst. Veg. 4 (1818) 705; DC. Prod. 1 (1824) 635; SPRENG. Syst. Veg. 1 (1824) 670; ROXB. Fl. Ind. ed. 1, 2 (1824) 470; G. DON, Gen. Hist. 1 (1831) 712; ROXB. Fl. Ind. ed. 2, 1 (1832) 657; HASSK. Cat. Hort. Bog. (1844) 168; VOIGT, Hort. Sub. Calc. (1845) 30; HASSK. Pl. Jav. Rar. (1848) 453; A. GRAY, Bot. Wilkes U.S. Expl.

Exp. (1854) 274; GRIFF. Not. Pl. As. 4 (1854) 698; Ic. Pl. As. 4 (1854) t. 644; MIQ. Fl. Ind. Bat. 1, 2 (1859) 611; Sum. (1861) 202; Ann. Mus. Bot. Lugd.-Bat. 1 (1863) 99, incl. var. *sumatrana* (MIQ.) MIQ., var. *biserrata* (MIQ.) MIQ., var. *heterophylla* MIQ., var. *robusta* MIQ. et var. *simplex* MIQ. l.c.; BENTH. Fl. Austr. 1 (1863) 451; SEEM. Fl. Vit. (1865) 44; KURZ, Rep. Veg. And. Isl. (1870) 34; BRANDIS, For. Fl. (1874) 102; LAWS. Fl. Br. Ind. 1 (1875) 666, pro parte; KURZ, J. As. Soc. Beng. 44, ii (1875) 179; SCHEFF. Ann. Jard. Bot. Btzg 1 (1876) 15; F. v. M. Descr. Not. 1 (1876) 36; KURZ, J. As. Soc. Beng. 45, ii (1876) 124; Fl. Burma 1 (1877) 279; F.-VILL. Nov. App. (1880) 50; CLARKE, J. Bot. 19 (1881) 139, incl. var. *occidentalis* CLARKE, l.c. 140; HOME, Year in Fiji (1881) 264; VIDAL, Sinopsis (1883) 21, t. 33, f. 1; Phan. Cuming. (1885) 104; Rev. Pl. Vasc. Filip. (1886) 94; K. SCHINZ, Bot. Jahrb. 9 (1888) 208; WARB. Bot. Jahrb. 13 (1891) 368; TRIM. Fl. Ceyl. 1 (1893) 297; K. SCHINZ, Notizbl. Berl.-Dahl. 1 (1895) 53; HEMSL. Kew Bull. (1895) 134; KING, J. As. Soc. Beng. 44, ii (1896) 414; BAILEY, Queensl. Fl. 1 (1899) 284; K. SCH. & LAUT. Fl. Schutzgeb. (1900) 430; COOKE, Fl. Bomb. 1 (1902) 260; TALBOT, Trees Shrubs Bomb. Pres. ed. 2 (1902) repr. (1949) 154; PRAIN, Beng. Pl. (1903) repr. (1963) 239; K. & V. Bijdr. 9 (1903) 8; DUTHIE, Upper Gangetic Pl. 1 (1903) 176; WILLIAMS, Bull. Herb. Boiss. 11, 5 (1905) 217; BRANDIS, Ind. Trees (1906) 179; MERR. Philip. J. Sc. 1 (1906) Suppl. 89; VAL. Bull. Dép. Agr. Ind. Néerl. 10 (1907) 31; MERR. Philip. J. Sc. 3 (1908) Bot. 80; WINKLER, Bot. Jahrb. 44 (1909) 537; TALBOT, For. Fl. Bomb. Pres. 1 (1909) 327; HAINES, For. Fl. Chota Nagpur (1910) 280; LAUT. Nova Guinea 8 (1910) 302; BACKER, Schoolfl. Java (1911) 256; RIDL. J. Str. Br. R. As. Soc. 59 (1911) 87; *ibid.* 61 (1912) 51; GAGNEP. Fl. Gén. I.-C. 1 (1912) 941; LAUT. Nova Guinea 8 (1912) 831; RECHINGER, Denkschr. Kais. Ak. Wiss. Wien 89 (1914) 574; GIBBS, J. Linn. Soc. Bot. 42 (1914) 65; SCHMIDT, Bot. Tidsskr. 32 (1915) 330; GAMBLE & FISCH. Fl. Pres. Madras 1 (1918) 240; RIDL. Fl. Mal. Pen. 1 (1922) 484, non fig. 48; WHITE, Proc. R. Soc. Queensl. 34 (1923) 43; LAUT. Nova Guinea 14 (1924) 138; Bot. Jahrb. 59 (1925) 531; HAINES, Bot. Bihar & Orissa 1 (1925) 208; WHITE, J. Arn. Arb. 10 (1929) 237; COWAN & COWAN, Trees N. Beng. (1929) 40; KANJILAL & DAS, Fl. Assam 1 (1936) 307; GAGNEP. Fl. Gén. I.-C. Suppl. (1950) 848; CHITTENDEN, Dict. Gard. 3 (1951) 1143, incl. var. *roehrsiana* (SANDERS) CHITTENDEN; SUESSING. in E. & P. Nat. Pfl. Fam. ed. 2, 20d (1953) 384, 385, 387, 388; BACKER & BAKH. f. Fl. Java 2 (1965) 94; BURGER, Seedl. Trop. Tr. Shr. SE. Asia (1972) 381, f. 155. — *L. sambucifolia* SALISB. Prod. (1796) 317. — *L. staphylea* ROXB. [Hort. Beng. (1814) 18, nom. nud.] Fl. Ind. ed. 1, 2 (1824) 471, nom. illeg.; SPRENG. Syst. Veg. 1 (1824) 670; *ibid.* 4, 2 (1827) Cur. post. 70; G. DON, Gen. Hist. 1 (1831) 712; ROXB. Fl. Ind. ed. 2, 1 (1832) 658; W. & A. Prod. (1834) 132; GRAHAM, Cat. Pl. Bomb. Vic. (1839) 33; VOIGT, Hort. Sub. Calc. (1845) 30; THW. En. Pl. Zeyl. (1859) 64; DALZ. & GIBS. Bomb. Fl.

(1861) 41; DRURY, Handb. Ind. Fl. I (1864) 181. — *L. otillis* (GAERTN.) DC. Prod. I (1824) 636; MOON, Cat. Pl. Ceyl. (1824) 18. — *L. robusta* BL. Bijdr. (1825) 198, non ROXB. ex HORNEB. 1813; SPRENG, Syst. Veg. 4, 2 (1827) Cur. post. 70; HASSK. Cat. Hort. Bog. (1844) 168. — *L. gigantea* GRIFF. Not. Pl. As. 4 (1854) 697; Ic. Pl. As. 4 (1854) t. 645, f. 2; KURZ, J. As. Soc. Beng. 42, ii (1873) 65; *ibid.* 44, ii (1875) 178; Fl. Burma I (1877) 280; CLARKE, J. Bot. 19 (1881) 140; KING, J. As. Soc. Beng. 65, ii (1896) 412; BRANDIS, Ind. Trees (1906) 179; RIDL. Fl. Mal. Pen. I (1922) 484, f. 48; CRAIB, Fl. Siam. En. I (1926) 317; SUESSING, in E. & P. Nat. Pfl. Fam. ed. 2, 20d (1953) 384, 385; HUNDLEY & U CHIT KO KO, List Tr. Shr. Herbs & Climb. Burma (1961) 55. — *L. viridiflora* PLANCH. Hort. Donat. (1854) 6; SUESSING, l.c. 384. — *L. sundaica* MIQ. Fl. Ind. Bat. 1, 2 (1859) 610; Ann. Mus. Bot. Lugd.-Bat. I (1863) 96, incl. var. *fuliginosa* (MIQ.) MIQ., var. *subsessilis* MIQ. et. var. *pilosiuscula* MIQ. l.c.; F.v.M. Descr. Not. I (1876) 37; SCHEFF. Ann. Jard. Bot. Btzg I (1876) 15; WARB. Bot. Jahrb. 13 (1891) 369; BACKER, Schoolfl. Java (1911) 256; RIDL. Trans. Linn. Soc. Lond. II, Bot. 9 (1916) 32; MERR. En. Born. (1921) 369; RIDL. Fl. Mal. Pen. I (1922) 485; LAUT. Bot. Jahrb. 59 (1925) 534; SUESSING, in E. & P. Nat. Pfl. Fam. ed. 2, 20d (1953) 385, 388; BACKER & BAKH. f. Fl. Java 2 (1965) 94. — *L. sumatrana* MIQ. Fl. Ind. Bat. 1, 2 (1859) 611; Sum. (1861) repr. (1862) 202. — *L. divaricata* T. & B. Cat. Hort. Bog. (1860) 388, *nom. nud.* — *L. biserrata* MIQ. Sum. (1861) repr. (1862) 518. — *L. fuliginosa* MIQ. l.c. 518. — *L. palembanica* MIQ. l.c. 203, 519. — *L. pubescens* ZIPP. ex MIQ. Ann. Mus. Bot. Lugd.-Bat. I (1863) 97; WARB. Bot. Jahrb. 13 (1891) 369; LAUT. Bot. Jahrb. 59 (1925) 534; SUESSING, l.c. 388. — *L. celebica* CLARKE, J. Bot. 19 (1881) 166; SUESSING, l.c. 384. — *L. umbraculifera* CLARKE, J. Bot. 19 (1881) 141; BRANDIS, Ind. Trees (1906) 179; COWAN & COWAN, Trees N. Beng. (1929) 40; KANJILAL & DAS, Fl. Assam I (1936) 306; SUESSING, l.c. 384; HARA, Fl. E. Himal. (1966) 200; *ibid.* 2nd Rep. (1971) 79. — *L. brunoniana* (non CLARKE) ENGL. Bot. Jahrb. 7 (1886) 460; K. SCH. Bot. Jahrb. 9 (1888) 208; K. SCH. & LAUT. Fl. Schutzgeb. (1900) 430; LAUT. Bot. Jahrb. 59 (1925) 530. — *L. naumannii* ENGL. Bot. Jahrb. 7 (1886) 466; K. SCH. Bot. Jahrb. 9 (1888) 208; Notizbl. Berl.-Dahl. 2 (1898) 130; SUESSING, l.c. 388. — *L. javanica* (non BL.) KING, J. As. Soc. Beng. 65, ii (1896) 418; K. & V. Bijdr. 9 (1903) 12; BACKER, Schoolfl. Java (1911) 255; CRAIB, Aberd. Univ. Stud. 57 (1912) 43; RIDL. Fl. Mal. Pen. I (1922) 486; CRAIB, Fl. Siam. En. I (1926) 318; GAGNEP. Fl. Gén. I.-C. Suppl. (1950) 853; BACKER & BAKH. f. Fl. Java 2 (1965) 94. — *L. roehrsiana* SANDERS [Cat. (1899) 21, *nom. nud.*] ex MASTERS, Gard. Chron. III, 23 (1898) 242, f. 92; BONSTEDT in Parey's Blumengart. (1931) 895. — *L. novo-guineensis* VAL. Bull. Dép. Agr. Ind. Néerl. 10 (1907) 31; LAUT. Bot. Jahrb. 59 (1924) 534; SUESSING, l.c. 388. — *L. ramosii* MERR. Philip. J. Sc. 17 (1920) 282; En. Philip. 3 (1923) 14; SUESSING, l.c. 386. — *L. gracilis* LAUT. Bot. Jahrb.

59 (1925) 532; SUESSING, l.c. 388. — *L. expansa* CRAIB, Kew Bull. (1926) 358; Fl. Siam. En. I (1926) 317; GAGNEP. Fl. Gén. I.-C. Suppl. (1950) 852; SUESSING, l.c. 386, 387. — *L. longifoliola* MERR. Lingn. Sc. J. 14 (1935) 33, f. 11; GAGNEP. Fl. Gén. I.-C. Suppl. (1950) 853; SUESSING, l.c. 387. — Fig. 3, 4e, 23.

Shrub, treelet or small tree, 2–10 (–16) m, multi- or single stemmed, frequently stilt-rooted; stems glabrous to pubescent, rarely woolly or scabrously hairy or papillose or bristly. Leaves (1–) 2- or 3-pinnate, leaflets 7–∞. Petiole (6–) 10–25 (–35) cm long; *stipules* obovate, up to 6 by 4 cm, early caducous, usually glabrous to sparsely pubescent, rarely densely soft or bristly hairy, scar broadly triangular, 2– 3¹/₂ (–5) cm long; rachis (6–) 10–35 (–60) cm, glabrous to pubescent, rarely soft or bristly hairy, or papillose. Leaflets (broadly ovate to ovate) ovate-oblong to ovate-lanceolate or (broadly) elliptic to elliptic-lanceolate, (4–) 10–24 (–45) by (1–) 3–12 (–20) cm, glabrous to hairy, rarely densely so, or woolly, chartaceous to subcoriaceous; pearl glands angular to somewhat globose, small, rapidly caducous; margins (crenate to) serrate to shallowly dentate; apex acute to acuminate; base cuneate to rounded (to subcordate); nerves (5–) 6–16 (–20) pairs; petiolules up to 25 mm, glabrous to hairy. *Inflorescences* (5–) 10–25 (–40) cm long, usually broad and lax,

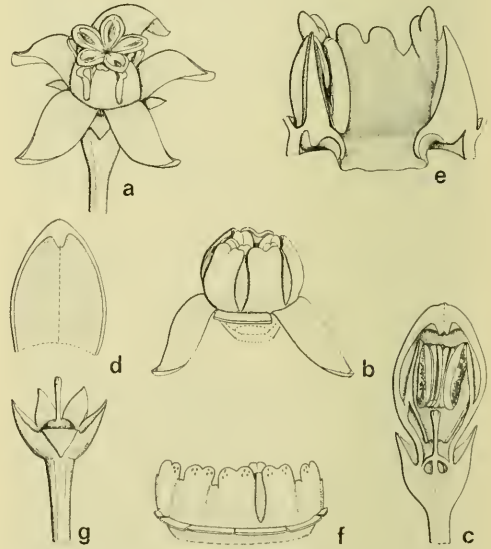


Fig. 23. *Leea indica* (BURM. f.) MERR. a. Flower, with elevated anthers. b. staminodial tube, filaments and apices of anthers, two petals, rest removed. c. flower in LS. d. corolla lobe from inside. e. staminodial tube from inside with one anther. f. *ditto* from outside with one stamen. g. calyx and pistil, all $\times 5$ except e $\times 10$ (a GEESINK 5946, b–g BSIP 14885).

rarely condensed, glabrous to pubescent, rarely soft or bristly hairy or papillose; bracts deltoid to narrowly triangular (to linear), up to 4 (-8) mm long; peduncle up to 15 cm, lateral and ultimate branches numerous and spreading, rarely highly condensed. *Flowers* 5-merous, greenish-white. Calyx ($1\frac{1}{2}$ -) 2-3 by (2-) 3-4 mm, glabrous to pubescent, lobes 1-2 by 1-2 mm. Corolla tube + staminodial lobes $2\frac{1}{2}$ - $3\frac{1}{2}$ mm; corolla lobes $2\frac{1}{2}$ - $3\frac{1}{2}$ by $1\frac{1}{2}$ - $2\frac{1}{2}$ mm. Staminodial tube ($1\frac{1}{2}$ -) $2\frac{1}{2}$ mm long; upper free part $1\frac{1}{4}$ -2 mm; lobes shallowly retuse, notched (or cleft), sinuses shallow to 0.4 mm, rarely deep $\frac{3}{4}$ - $1\frac{1}{4}$ mm; lower free part 0.2-0.5 mm. Filaments $\frac{3}{4}$ - $1\frac{1}{2}$ mm, anthers 1- $1\frac{1}{2}$ mm. Ovary (4-) 6 (-8)-celled, style 1- $2\frac{1}{2}$ mm. *Fruit* 5-10 (-15) mm \varnothing , purple-black; seeds usually 6, c. 5 by 4 mm, rumination outline simple, endosperm simply ruminate.

Distr. Ceylon, India (from Madras and Bombay northwards to Punjab, Sikkim, Assam), Nepal, Bangladesh, Burma, Thailand, Cambodia, Laos, N. & S. Vietnam, China (Yunnan, Kwangsi, Hainan), Andaman and Nicobar Is.; in *Malesia*: Malaya, Singapore, Sumatra, Java, Lesser Sunda Is., Borneo, Philippines, Celebes, Moluccas, New Guinea (incl. Bismarck Archipelago); N. Australia, Solomon Is., Santa Cruz Is., New Hebrides (Espiritu Santo), Fiji (Vanau, Levu, Ovalau, Viti Levu, Kandavu, Moala), ?Tonga Is. Fig. 24.

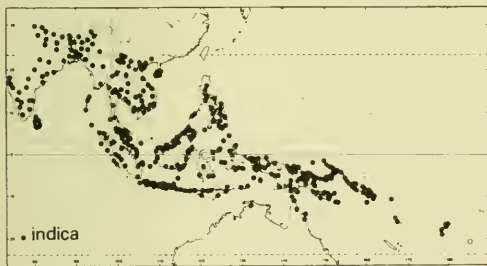


Fig. 24. Range of *Leea indica* (BURM. f.) MERR.; the locality of the Tonga Is. is uncertain.

Ecol. Wide-spread and common throughout the area, secondary forest and villages (often coppiced), primary forest, wet areas to ridges up to 1700 m, in the Himalayas ascending to 2500 m.

Notes. Many attempts have been made to segregate this common wide-spread species into smaller taxonomic units, particularly by MIQUEL who studied plants from the area where the greatest morphological diversity occurs. The majority of these segregates have been established on leaflet characters. One entity, somewhat distinctive in flower by the deep sinuses of the staminodial tube, occurs from Burma to Malaya together with the normal form of *L. indica*, overlapping in vegetative and other characters. It was considered to be specifically distinct by GRIFFITH, who described it as *L. gigantea*. The situation closely parallels that

found in the Madagascan material of *L. guineensis* where the same deep sinuses occur. In *L. guineensis* this character occurs allopatrically in an insularly isolated population whilst in '*L. gigantea*' the character occurs sympatrically within the range of *L. indica*.

The remainder of the material shows rather interesting trends, particularly in leaf vestiture and dimensions. Within the area from India across to China and southward to Java the leaflets tend to be more or less glabrous and apparently have a trend to increase in size, culminating in large leaflet forms in Java. In the herbarium leaflets of all size classes may be found on plants from Java whilst, as far as can be ascertained, large leaflet forms do not occur in India. This trend is particularly apparent in the dimensions of the terminal leaflets. Eastwards across the Lesser Sunda Islands leaf pubescence tends to increase, culminating in very pubescent forms in New Guinea and the Bismarck Archipelago. The Solomon Islands have been very intensively collected and are relatively over-represented in the collections compared to other areas, but here all but two collections are more or less glabrous. Further eastwards to Fiji both pubescent and glabrous forms occur, but there is a decrease in the leaf size so that the glabrous form cannot be separated from the material from India or Ceylon.

The two specimens from the Solomon Is., BSIP 5371 (Rob Roy I.) and NGF 16378 (Bougainville), are unusual in having very large leaflets (c. 25 by 12 cm) which are hairy on the nerves, whilst the remainder of the Solomon Islands material is glabrous. Furthermore the stem, rachises, stipules and inflorescences are covered with bristle-like hairs, a feature somewhat paralleling the condition found in '*L. cumingii*' of the *L. guineensis* complex.

However, although certain general trends in leaf dimension and vestiture can be recognized, random exceptions occur in all areas and no absolute trends can be delimited. So within New Guinea occasional glabrous leaved species occur which cannot be separated from material from normal populations in Malaya. The problem is to obtain uniform comparable samples from the wide-spread populations of a species common in populated areas and frequently subjected to cutting and coppicing.

25. *Leea smithii* KOORD. Minah. (1898) 398, 622; Fl. N.O. Celebes, Suppl. 2 (1922) pl. 59; *ibid.* Suppl. 3 (1922) 29; KOORD.-SCHUM. Syst. Verz. 3 (1914) 79; SUESSENG. in E. & P. Nat. Pl. Fam. ed. 2, 20d (1953) 386; RIDSDALE, Blumea 22 (1974) 96, f. 4/9. — *L. boerlageana* KOORD. Minah. (1898) 68, *nomen*. — Fig. 3.

Small tree up to 3 m. *Leaves* 1- or 2-pinnate. Petiole over 30 cm (c. 40 cm in plate); *stipules* 6 by 3 cm, scar 4 cm; *rachis* 60-?120 cm. Petiole, rachis and costa with crisped fluted emergences. Leaflets elliptic-oblong, (13-) 30-40 by (7-) 10-17 cm, glabrous, chartaceous; pearl glands subglobose, black; margins shallowly denticulate; apex acuminate; base rounded; nerves 10-18 pairs, slightly pubescent and with small emergences;

petiolules 5–15 mm. *Inflorescences* c. 5 cm overall. *Flowers* unknown. *Fruit* c. 10 mm \varnothing ; seeds 6.

Distr. *Malesia*: NE. Celebes (Minahassa). Fig. 16.

Ecol. Understorey treelet of primary forest, 650 m.

Note. In absence of flowers the taxonomic status and position remains in doubt. The fluted stems and the structure of the epidermis and cuticle are very distinctive. However, there is a possibility that the taxon represents an extreme variation of *L. indica* (BURM. f.) MERR.

Dubious species

Leea erecta VOLL. & BRADE, *Rodroquesia* 1 (1935) 59, *nom. nud.*

An invalid horticultural name entered in a seed list.

Leea humilis HASSK. *Cat. Hort. Bog.* (1844) 169, *descr. in nota*; MIQ. *Fl. Ind. Bat.* 1, 2 (1859) 611 = probably *L. aequata*.

Leea javanica BL. *ex* SPRENG. *Syst. Veg.* 1 (1824) 670; BL. *Bijdr.* (1825) 197; SPRENG. *Syst. Veg.* 4, 2 (1827) *Cur. post.* 70; G. DON, *Gen. Hist.* 1 (1831) 712; STEUD. *Nom. Bot. ed.* 2, 2 (1840) 21; HASSK. *Cat. Hort. Bog.* (1844) 168; MIQ. *Fl. Ind. Bat.* 1, 2 (1859) 610.

BLUME's description reads: 'L: caule tereti punctato-scabro, foliis bipinnatis, foliolis infimis saepe geminis, oblongis acute serrulatis glabris'.

No authentic specimen of this species has been traced, a situation which was also reported by KOORDERS & VALETON (*Bijdr.* 9, 1903, 13). From the description it can be seen that the taxon has bipinnate leaves with glabrous leaflets. Thus, if it is a *Leea*, by elimination of other possibilities, the description must apply to either *L. guineensis* G. DON or *L. indica* (BURM. f.) MERR.

It has variously been interpreted as one or the other by most authors except KOORDERS who, in earlier years, in part identified plants of *L. aculeata* BL. *ex* SPRENG. with this taxon. This clearly is an error as the leaves in this species are always 1-pinnate.

KING, RIDLEY, and BACKER & BAKH. f., interpreted it to have green flowers and thus representing a form of *L. indica*.

On the other hand, MIQUEL, and MERRILL, considered that it represented a red flowering taxon.

This latter view would seem more probable, as BLUME also described two forms of *L. indica* under *L. sambucina* WILLD. and *L. robusta* BL. the remaining possible entity of this species likely to be distinguished would be *L. sundaica* MIQ., but this has pubescent leaves.

If it can be shown conclusively that it represents a red flowered species then clearly this name will take priority over *L. guineensis*.

Excluded species

Leea cordata WALL. *Cat.* (1832) n. 6819; STEUD. *Nom. Bot. ed.* 2, 2 (1840) 21; KURZ, *J. As. Soc. Beng.* 42, ii (1837) 66, *in nota*, all *nom. nud.* = *Vitis* sp. (*Vitaceae*), cf. LAWSON, *Fl. Br. Ind.* 1 (1875) 668.

Leea laevis HEYNE *ex* WALL. *Cat.* (1829) n. 1258, *nom. nud.*; HOOK. & JACKSON, *Ind. Kew.* 2 (1895) 48, *pro syn.* of *Heynea trijuga* ROXB. = *Trichilia connaroides* (W. & A.) BENTV. (*Meliaceae*), cf. BENTV. *Act. Bot. Neerl.* 11 (1962) 13.

Leea odontophylla WALL. *Cat.* (1832) n. 6820, *nom. nud.* = *Ampelopsis latifolius* (WALL.) PLANCH. (*Vitaceae*), cf. LAWSON, *Fl. Br. Ind.* 1 (1875) 668.

Leea spinosa SPRENG. *Syst. Veg.* 1 (1825) 670 = *Aralia chinensis* L. (*Araliaceae*). MERRILL (*Int. Rumph.* 1917, 347) has pointed out that SPRENGEL apparently intended only to transfer to *Leea* the plant depicted by RUMPHIUS (*Herb. Amb.* 4, 1743, t. 44). LINNAEUS (*Syst. Nat. ed.* 10, 1759, 967) included this plate in the synonymy of *Aralia chinensis* following the interpretation of STICKMAN (*Herb. Amb.* 1754, 16; LINNÉ, *Amoen. Acad.* 4, 1759, 127). Unfortunately SPRENGEL's good intentions went astray as he effectively renamed *Aralia chinensis* L. (*Sp. Pl.* 1753, 273) and did not name the plant from Ambon.

BALANOPHORACEAE (B. Hansen, Copenhagen)

Herbaceous, fleshy root parasites, destitute of chlorophyll and roots, with yellowish white to yellow, brown, orange to red or rose pink colours. At point of contact with host root a cylindrical or subspherical, branched or unbranched solid tuber develops. Stem appearing from the tuber endogenously or exogenously, leafless or with scaly leaves. *Inflorescence* spadix-like with unisexual flowers, ♂, ♀, or ♀♂, in the Mal. *ssp.* unbranched. ♂ *Flowers* pedicellate or sessile, supported by bracts or not, 2–6-merous. Tepals 2–6 in one series, free from each other. Stamens 2–4(–?), opposite the tepals, united into a synandrium. ♀ *Flowers* apparently not supported by bracts, with or without a minutely 2-lobed perianth adnate to the ovary. Styles 2 or 1. *Ovary* with 1 embryo, apparently without a cavity. Embryo very small, embedded in a more or less well developed endosperm.

Distribution. About 45 species in 18 genera in the tropics and subtropics of the world. As to our present knowledge 7 genera are exclusively South American, 4 genera are exclusively African, 2 are Asian, 1 is from Madagascar, 1 from New Zealand, and 1 from New Caledonia. Two genera have remarkable distributions, viz *Langsdorffia* with 3 species, 1 in South America, 1 in Madagascar and 1 in New Guinea, and *Balanophora* with 15 species from tropical Africa to Tahiti and Marquesas, one of the species covering almost the entire area (see *B. abbreviata*).

Ecology. Mostly in mountain forests parasitizing trees, rarely herbs. No particular host-affinity could be demonstrated within *Balanophora*, which is known to parasitize at least 74 host species belonging to 35 families. *B. fungosa* parasitizes at least 25 species.

Dispersal. Factual information is very scarce. RIDLEY (Disp. 1930, 39) observed in Christmas I. and P. Aur in Johore that 'in preserving specimens' (of the monoecious *B. abbreviata*) '... the minute fruits drifted away on the high breezes, like the pollen of a conifer. They were produced in great abundance on the little plant and borne on short stalks. The plants, which were very scanty, grew in open woods or between high rocks.' He also observed that this species is widely distributed in Oceanic islands, occurring from Madagascar and the Comores as far east as the Marquesas Is.

Diaspores are indeed very light: the average weight of those of *B. fungosa ssp. indica* are 0.007 mg, that is only four times heavier than the lightest orchid seed.

However, RIDLEY correctly pointed out that 'the other species grow in dense forest in wet spots, their fruits are not so small and are apparently diffused mainly by rain-wash. These are quite absent from other islands.' This is not quite true; they do occur in islands, not only in those of the Malesian archipelago, but *B. fungosa ssp. fungosa* occurs also in the Solomons, New Caledonia, New Hebrides, and Fiji, while *B. wilderi* is confined to Rarotonga and Rapa Is.

For these others, and the species of the genera *Rhopalocnemis*, *Exorhopala*, and *Langsdorffia*, which all grow in the depth of dense everwet rain-forest, dispersal by wind is excluded while dispersal by rain-wash can only be very local and is insufficient to explain the large to almost world-wide ranges of the *Rhopalocnemis* affinity and *Langsdorffia* respectively. They grow on the forest floor and often do emerge only very little from the litter. Their spadices decay gradually and rot away, as was observed in *Rhopalocnemis* (fig. 2).

It has been advanced by KONINGSBERGER (Java, Zool. en Biol. 1915, 425, 614) that in the Javanese mountain forest pigs feed on tubers of *Balanophora*, but this appears obviously to be a loose assumption or a misinterpretation of their digging activity, as DOCTERS VAN LEEUWEN with his immense experience and acute observation denied it (Verh. Kon. Ak. Wet. A'dam, sect. II, 31, 1933, 71).

VAN STEENIS (Mt. Fl. Java, 1972, pl. 5–1) has advanced that dispersal of these forest floor parasites takes place, similarly as in *Rafflesiaceae*, epizooically by game, mainly by ungulates, but possibly also by other animals, large and small.

The dioecism which prevails in several species, makes dispersal over long distances still more problematic, similarly as in *Rafflesiaceae* in which species and genera show large, or even immense disjunctions. It is clear that these disjunct ranges are testimony of the great age of these parasite families and that the range histories reflect extinction and a chequered history going back to a dim past.

About the life-span of viable seed nothing is known unfortunately. Also about the way of infecting the host plant and its first life-stages no factual data are available. In *Rafflesia* it has been shown experimentally that infection can only take place on wounded roots or stems. This may be true for these *Balanophoraceae*. The solving of the secret of Balanophoraceous infection is one of the many goals of future tropical research.

Pollination. Again very few observations have been reported. Various insects have been observed visiting male flowers of *Balanophora fungosa ssp. indica* (HANSEN). In *Balanophora papuana* the male flowers open in being touched (FORMAN). Inflorescences of *Balanophora reflexa* smell from fox in the morning (CORNER) and could possibly thus attract *Diptera* or *Hymenoptera*.

VAN STEENIS (Hand. 6th Ned. Ind. Natuurwet. Congr. 1931, 1932, 470) observed that the supporting hairs of the female flowers in *Rhopalocnemis* excreted nectar, but no insect visitors were observed by him or VAN DER PIJL. GOVINDAPA & SHIVAMURTHY (Ann. Bot. 39, 1975, 977) found bees collecting pollen of *Balanophora abbreviata* and its ♀ flowers producing a sugary liquid.

Pollen morphology. The pollen of the *Balanophora* species has recently been described by me in detail (Dansk Bot. Ark. 28, 1972, 31–36). This genus proved to be eurypalynous with the grains spherical or slightly ellipsoid, equatorial diam. 13–31 μ , polar axis 12–31 μ , non aperturate, triporate or polypan-toporate with up to 12 apertures, exine granular from numerous conical, obtuse or apiculate bodies 0.4–0.8 μ high. In *Langsdorffia* the pollen is (3–) 4 (–5)-porate, exine more or less granular. Tricolpate grains have been found in *Rhopalocnemis* and *Exorhopala*.

Anatomy & morphology. In several species seed setting is by apogamy or parthenogenesis, as has been studied in Java or based on Javanese material by TREUB in *Balanophora elongata* (Ann. Jard. Bot. Btzg 15, 1898, 1–23, pl. 1–8), LOTSY in *B. fungosa* ssp. *indica* var. *globosa* (*ibid.* 16, 1899, 174–185, t. 16–19) and ERNST (Festschr. Eröffn. neuen Inst. f. Allg. Bot. Zürich, 1914, 145–176, 2 tab.). The same has been found in *Rhopalocnemis* by LOTSY (Ann. Jard. Bot. Btzg 17, 1901, 73–101, t. 3–14) and ERNST (Flora 106, 1913, 129–159, 2 Taf.).

FAGERLIND (Svensk Bot. Tidskr. 32, 1938, 139–159; *ibid.* 39, 1945, 65–82) made it clear, however, that these authors were mostly wrong in their interpretation and concluded that normal sexual reproduction occurs in most *Balanophoraceae*. Within the genus *Balanophora* agamospermy was found only in *B. fungosa* ssp. *indica* var. *globosa* and in *B. japonica*.

FAGERLIND's papers have shed doubt on the use of the terms 'ovary cell', 'ovule' and 'pendulous' nature of the latter, as there seems to be no cavity in the ovary. I have consequently abandoned these terms and restricted myself to speak of an embryo consisting of a few cells which is embedded in the tissue of the ovary.

VON GUTTENBERG (Planta 34, 1945, 193–220) studied the anatomy of *Balanophora* material he collected in Sumatra and came to the conclusion that the tubers of *Balanophora* should be interpreted as root tubers. It should be realized, however, that the tuber contains also fused root tissue of the host. Compare fig. 5.

A detailed, comprehensive review of the knowledge concerning the anatomy of *Balanophora* is given by FAGERLIND (Kungl. Svenska Vet. Akad. Handl. 25, 3, 1948, 1–72), where also important original observations are reported. HARMS (in E. & P. Nat. Pfl. Fam. ed. 2, 16b, 1935, 296–339) has summarized the knowledge concerning *Balanophora* as well as of other genera. Further METCALFE & CHALK (Anat. Dic. 2, 1950, 1205) should be consulted and my thesis on *Balanophora* (Dansk Bot. Ark. 28, 1972, 19–30). FAGERLIND has in a series of papers: Svensk Bot. Tidskr. 32 (1938) 139–159 and *ibid.* 39 (1945) 197–210; Ark. Bot. Stockh. 29A, 7 (1938) 1–15; Bot. Not. 4 (1945) 330–350, reviewed and given much new evidence concerning floral morphology and anatomy of several genera. The latest review by KUIJT (The biology of parasitic flowering plants, 1969, 118–135) deals with most aspects of the biology of *Balanophoraceae*.

Chromosomes. Because of their small size countings are very difficult in *Balanophora*. I have surveyed data and added some myself (Dansk Bot. Ark. 28, 1972, 37–38) in which *n* numbers are found to be *c.* 16 or *c.* 18, and 2*n c.* 36 for *Balanophora abbreviata*, 56 and 94–112 for *B. japonica*. DARLINGTON & WYLIE (1955) listed for *Cynomorium* *n* = 12 and for *Helosis* and *Thonningia* both *n* = 18.

Phytochemistry. Candles are prepared from species of *Balanophora* and *Langsdorffia*; their tissues contain large amounts of a wax-like substance called balanophorin. Balanophorin from *Balanophora fungosa* ssp. *indica* var. *globosa* (JUNGH.) HANSEN (err. *B. bulbosa* JUNGH.) and *B. elongata* BL. consists mainly of β -amyrin palmitate which is accompanied by small amounts of rubber. *B. japonica* MAKINO is used to prepare a bird-lime; it contains esters of β -amyrin and taraxasterol and probably appreciable amounts of rubber too. Several observations as well as some medicinal uses indicate that *Balanophoraceae* are rich in phenolic and tannin-like substances. Recent investigations with two species shed some light on the nature of these constituents. Large amounts of coniferin were isolated from a *Balanophora* species used in Thai medicine as an antiasthmatic; at the same time 0.3% of β -amyrin acetate was obtained (V. PODIMUANG *et al.* Chem. Pharm. Bull. Tokyo 19, 1971, 207). From rhizomes of *Lophophytum leandri* EICHL. WEINGES *et al.* isolated polymeric proanthocyanins (= condensed tannins), eriodictyol (a flavanon), taxifolin (a flavanonol), (–)-epicatechin and glycosides of eriodictyol, naringenin, quercetin and epicatechin (Phytochemistry 10, 1971, 829). These recent observations confirm the presence of condensed tannins and their building stones (catechins) in the family. However, trihydroxylated constituents (myricetin, gallic acid, gallo-catechins) were not yet detected in *Balanophoraceae*. Chemical knowledge of the taxon is still too scanty for a balanced chemosystematic evaluation. The patterns of phenolic and triterpenic constituents seem to agree rather well with the often accepted santalalean relationships (see TAKHTAJAN, Flowering plants, origin and dispersal, 1969). It should be remembered, however, that most species have not yet been investigated hitherto and that fatty acids with acetylene linkages seem to be lacking in the family (H. H. HATT *et al.* Austr. J. Chem. 20, 1967, 2285; *Balanophora fungosa* FORST.). For additional references see: HEGNAUER, Chemotaxonomie der Pflanzen 3 (1964). — R. HEGNAUER.

Taxonomy. In his masterly monograph (Trans. Linn. Soc. Lond. 22, 1856, 1–68) HOOKER *f.* treated 12 genera, as delimited today, and 28 species. VAN TIEGHEM, Ann. Sc. Nat. Bot. IX, 6 (1907) 125–260

treated as two families, viz *Balanophoraceae* and *Langsdorffiaceae*, what is now known as *subfam. Balanophoroideae*; he enumerated 51 species. In my recent revision of *Balanophora* (Dansk Bot. Ark. 28, 1972, 1-188) I reduced the number of species to 15. In *Langsdorffia* there seem to be 3 and in *Thonningia* only 1 species, which makes a total of 19 species today within *subfam. Balanophoroideae*.

Uses. *Balanophora elongata* contains large amounts of wax in the tubers and has been used on Java for making torches. Outside the Malasian area there are reports from Thailand and Japan on making bird-lime from the wax of *Balanophora* tubers.

Note. Good material of *Rhopalocnemis* and *Exorhopala* is extremely scarce and it has been necessary to some extent to rely upon observations published by botanists, who studied fresh material (JUNGHUHN, VAN STEENIS, RIDLEY). Regarding *Langsdorffia papuana* nothing can be added to the careful observations made by GEESINK.

KEY TO THE GENERA

1. Stem of inflorescence leafless. Young inflorescences with a closed cover of spirally arranged, polygonate, peltate scales, which are caducous in anthesis. Styles 2.
2. Stem of inflorescence more or less scaly, originating endogenously from a more or less spherical tuber forming a sheath round the base of the stem; perianth of male flowers tubular, lobes 4 or inconspicuous. **1. Rhopalocnemis**
2. Stem of inflorescence without scales, apparently originating exogenously from an elongated tuber, no sheath observed; perianth of male flowers conspicuously 4-lobed. **2. Exorhopala**
1. Stem of inflorescence with leaves, the upper ones covering the young inflorescence; the latter without such scales. Style 1.
3. Leaves (in Mal.) up to 30, wide, rounded, or blunt. Flowers arranged on a globular to elongate axis. Tubers with surface fine granular to coarsely warted, scattered stellate warts mostly present. Female flowers free from each other, intermixed with club-shaped spadices. Tuber with wax. **3. Balanophora**
3. Leaves very many (80-100), linear, very acute. Flowers arranged on the flattish, thickened apex of the stem. Tubers with surface densely pubescent, never granular or warted. Female flowers apparently adnate to each other, spadices absent. Tuber starchy **4. Langsdorffia**

I. RHOPALOCNEMIS

JUNGH. Nov. Act. Ac. Caes. Leop.-Car. 18, Suppl. 1 (1841) 213; GOEPP. *ibid.* 22, 1 (1847) 148, t. 11-15; HOOK. *f.* Trans. Linn. Soc. 22 (1856) 31, 52, t. 12; EICHL. in DC. Prod. 17 (1873) 138; HOOK. *f.* in B. & H. Gen. Pl. 3 (1880) 238; ENGL. in E. & P. Nat. Pfl. Fam. 3, 1 (1889) 259; LOTSY, Ann. Jard. Bot. Btzg 17 (1901) 75; STEEN. Hand. 6th Ned. Ind. Natuurwet. Congr. 1931 (1932) 470; HARMS in E. & P. Nat. Pfl. Fam. ed. 2, 16b (1935) 323, f. 163. — *Phaeocordylis* GRIFF. Trans. Linn. Soc. 20 (1846) 100. — *Lytogomphus* JUNGH. ex GOEPP. Nov. Act. Ac. Caes. Leop.-Car. 22, 1 (1847) 122, *nom. nud.* — **Fig. 1-5.**

Diocious or monoecious plant. A large basal tuber develops at the point of contact with the host root; surface of tuber irregularly corrugated; tuber starchy. *Inflorescence-bearing stem* breaking through the outer tissues of the tuber, which in turn forms a conspicuous, by tearing irregularly lobed sheath around the base of the stem. Stem leafless or with spirally arranged, slightly recurved warty scales. *Inflorescences* spadix-like, unisexual or bisexual, at first covered by the flattened, marginally cohering tops of polygonate, peltate scales (fig. 3); central area of scale often developing a wart or a slightly recurved structure much resembling the scales on lower part of stem; scales caducous in flakes at anthesis. ♂ *Flowers* with a tubular perianth splitting irregularly or apparently in 4 lobes. Stamens forming a columnar synandrium with the anthers united into a head containing 20-30 thecae in 2-3 layers. ♀ *Flowers* with perianth adnate to the ovary and forming 2 low crests at the top of the ovary, one anterior and one posterior, alternating with the caducous styles. Stigma conspicuous, capitate. *Ovary* slightly compressed in anterior-posterior direction.

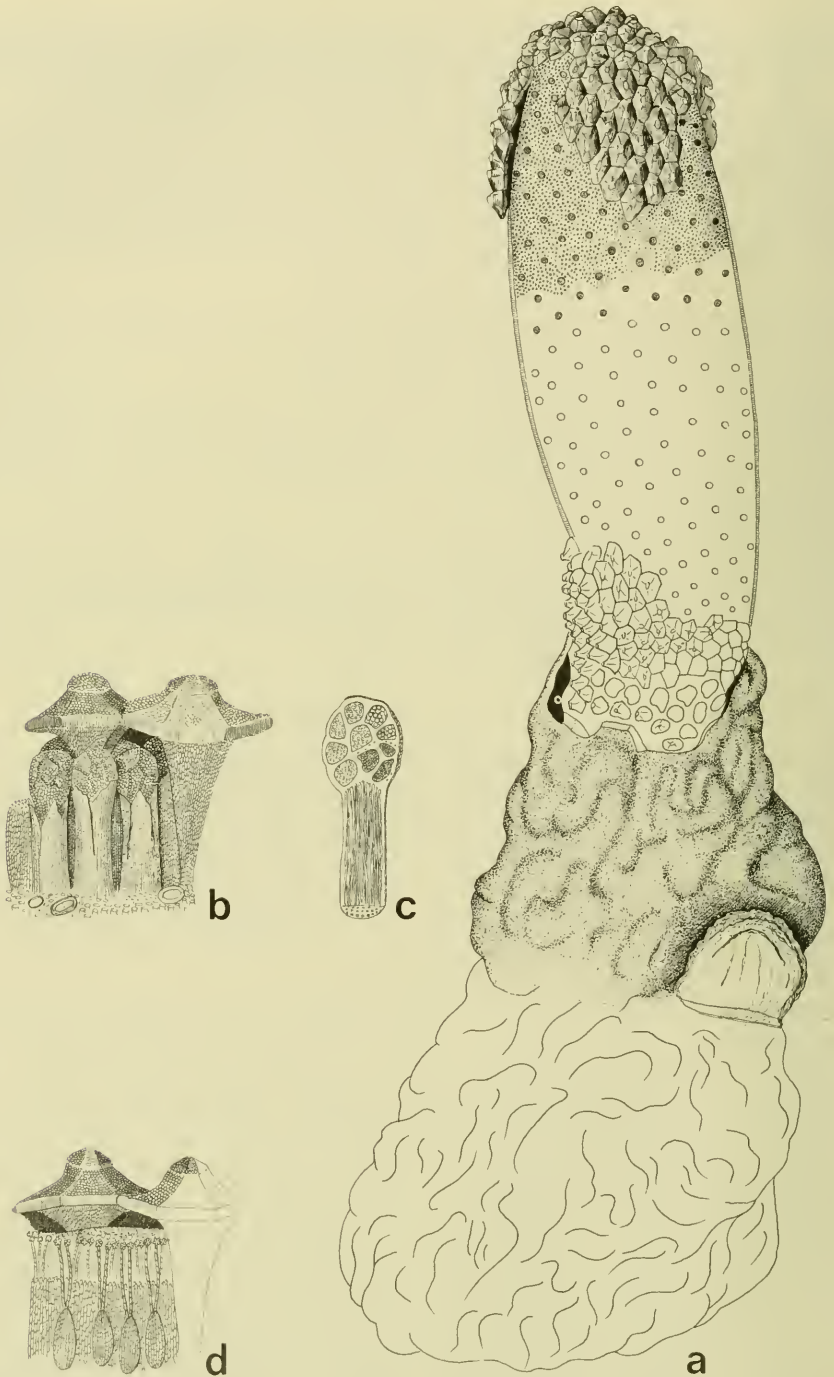


Fig. 1. *Rhopalocnemis phalloides* JUNGH. *a.* Habit, peltate scales shed in major part of ♀ inflorescence, each leaving a circular scar, $\times \frac{2}{3}$, *b.* section of inflorescence showing ♂ flowers covered by peltate scales, $\times 5$, *c.* LS of stamen, $\times 9$, *d.* section of inflorescence showing ♀ flowers surrounded by supporting hairs and still covered by peltate scales, $\times 5$ (after GOEPPERT, 1847).

Distr. Monotypic. E. Himalaya, Indo-China, in *Malesia*: Sumatra, Java, Celebes, and Central Moluccas (Buru). Fig. 6.

Note. The closest taxonomic relatives within *subfam. Helosidoideae* are *Exorhopala* in Malaya and *Ditepalanthus* in Madagascar (*cf.* HANSEN, Bot. Tidsskr. 69, 1974, 58-59).



Fig. 2. *Rhopalocnemis phalloides* JUNGH. in mossy forest on Mt Kemiri, Losir Mts, N. Sumatra, c. 2500 m altitude. Left a spadix in course of throwing off the scales, 2 ♀ spadices in full anthesis, right 3 old ones in decay, all from an enormous tuber (Photogr. VAN STEENIS, 1937).

1. *Rhopalocnemis phalloides* JUNGH. Nov. Act. Ac. Caes. Leop.-Car. 18, Suppl. 1 (1841) 215; GOEPP. *ibid.* 22, 1 (1847) 149, t. 11-15; HOOK. *f.* Trans. Linn. Soc. 22 (1856) 31, 52, t. 12; MIQ. Fl. Ind. Bat. 2 (1859) 1066; EICHL. in DC. Prod. 17 (1873) 138; HOOK. *f.* Fl. Br. Ind. 5 (1886) 239; ENGL. in E. & P. Nat. Pfl. Fam. 3, 1 (1889) 260, f. 165A-E; LOTSY. Ann. Jard. Bot. Btzig 17 (1901) 76-101, t. 3-14; KOORD. Exk. Fl. Java 2 (1912) 173; JACOBSON. Trop. Natuur 6 (1917) 138, f. 10; STEEN. Bull. Jard. Bot. Btzig III, 13 (1934) 176; Trop. Natuur 23 (1934) 49, f. 7; HARMS in E. & P. Nat. Pfl. Fam. ed. 2, 16b (1935) 323, f. 163; KANJILAL *et al.* Fl.

Assam 4 (1940) 133; BAKH. & BAKH. *f.* Fl. Java 2 (1965) 79; CORNER & WATAN. Ill. Trop. Pl. (1969) 78; STEEN. Mt. Fl. Java (1972) pl. 5-3; HANSEN, Bot. Tidsskr. 67 (1972) 146, f. 1 (map). — *Phaeocordylis areolata* GRIFF. Trans. Linn. Soc. 20 (1846) 101, t. 8, f. 1-14. — *Lytogomphus stilbiferus* JUNGH. *ex* GOEPP. Nov. Act. Ac. Caes. Leop.-Car. 22, 1 (1847) 121, *nom. nud.* — Fig. 1-5.

Monoecious or dioecious plants (inflorescences bisexual or unisexual respectively) with yellowish to brownish colours. Total length from contact with host root to top of inflorescence 15-25 cm. Tubers 6-21 cm \varnothing and 6-13 cm long with a strong-



Fig. 3. *Rhopalocnemis phalloides* JUNGH. Two rugose tubers producing three young spadices still fully covered with scales, one ♀ mature (white). Mt Tangkuban Prahū, W. Java (Photogr. KUYPERS, coll. ARENS).

ly irregularly corrugated surface. Sheath around stem 1–5 cm long, irregularly lobed. *Inflorescence-bearing stem* 2–10 cm long, 2–5 cm \varnothing , with or without spirally arranged, slightly recurved, warty scales. *Inflorescence* 7–20 cm long, 3–7½ cm \varnothing . Top part of scales ½ cm \varnothing , in central part often developing a recurved structure much resembling the scales on lower part of stem. *Flowers* sessile, surrounded by numerous supporting hairs, which produce nectar. ♀ Specimens always with ♂ flowers in lower part of inflorescence.

Distr. E. Himalaya, Indo-China, in *Malesia*: Sumatra, Java, Celebes, and Moluccas (Buru). Fig. 6.

Ecol. Mountain forests, 1000–2700 m. Parasitizing roots of various woody plants: *Ficus fistulosa* REINW. ex BL. (*Morac.*), *Quercus pruinosa* BL., *Quercus* sp. (*Fagac.*) *Macaranga tanarius* (L.) M.A. (*Euph.*), *Albizia lophantha* (WILLD.) BTH. (*Leg.*), rarely supraterranean stems: unknown liana (JUNGHUHN), *Ficus* sp. (*Morac.*), *Schinus molle* (DC.) KORTH. ssp. *noronhae* (REINW. ex BL.) BLOEMB. (*Theac.*).

Note. Readily distinguished from *Exorhopala* by its yellowish to brownish colours, large, thick tubers, and endogenously originating stems.



Fig. 4. *Rhopalocnemis phalloides* JUNGH. from above. ♂ Spadices showing cream stamens, partly dropped; scales at apex are not yet shed all; 3 mature ♀ spadices. Telaga Warna near Puntjak, Mt Gedeh, W. Java, 1400 m (Photogr. VAN STEENIS)

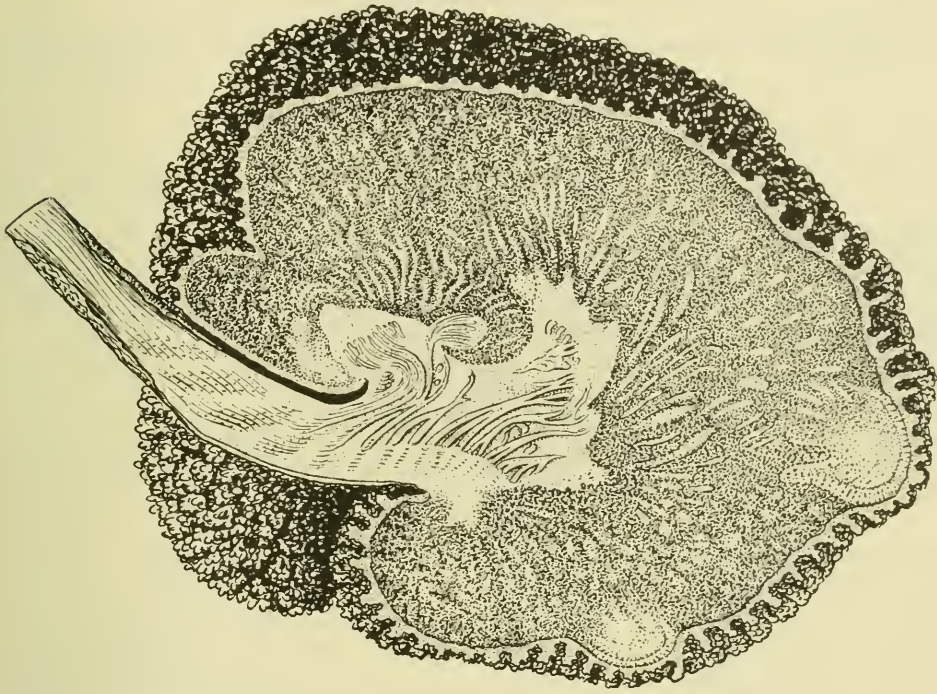


Fig. 5. *Rhopalocnemis phalloides* JUNGH. Cross-section through a tuber and attached root showing fusion of tissues. Mt Papandajan, W. Java (Coll. VAN STEENIS).

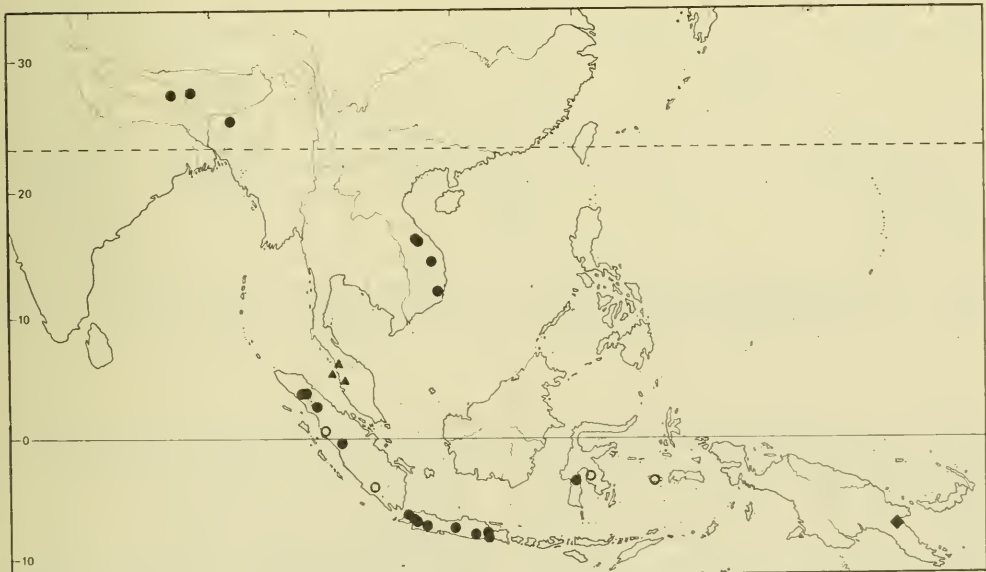


Fig. 6. Range of *Rhopalocnemis phalloides* JUNGH. (● specimens studied, ○ from literature), *Exorhopala ruficeps* (RIDL.) STEEN. (▲), and *Langsdorffia papuana* GEESINK (■).

2. EXORHOPALA

STEEN. Hand. 6th Ned. Ind. Natuurwet. Congr. 1931 (1932) 470; HARMS in E. & P. Nat. Pfl. Fam. ed. 2, 16b (1935) 324. — **Fig. 7.**

Point of contact with host plant (roots?) not known. *Inflorescence-bearing stem* leafless, appearing exogenously from elongated, horizontal tubers; no sheath observed. *Inflorescences* spadix-like, unisexual, at first covered by the conical top parts of marginally cohering peltate bracts. Bracts caducous on anthesis. Flowers mixed with numerous hairs. ♂ *Flowers* with a 4-lobed, short-tubular perianth. Stamens forming a columnar syndandrium with the 4 anthers united into an elongated, ellipsoid head, which thus contains 8 linear cells (thecae). ♀ *Flowers* with compressed ovaries bearing 2 styles with very small capitate stigmas.

Distr. Monotypic. *Malesia*: Penang and Malay Peninsula. Fig. 6.
Note. Undoubtedly belonging in *Balanophoraceae-Helosidoideae*.

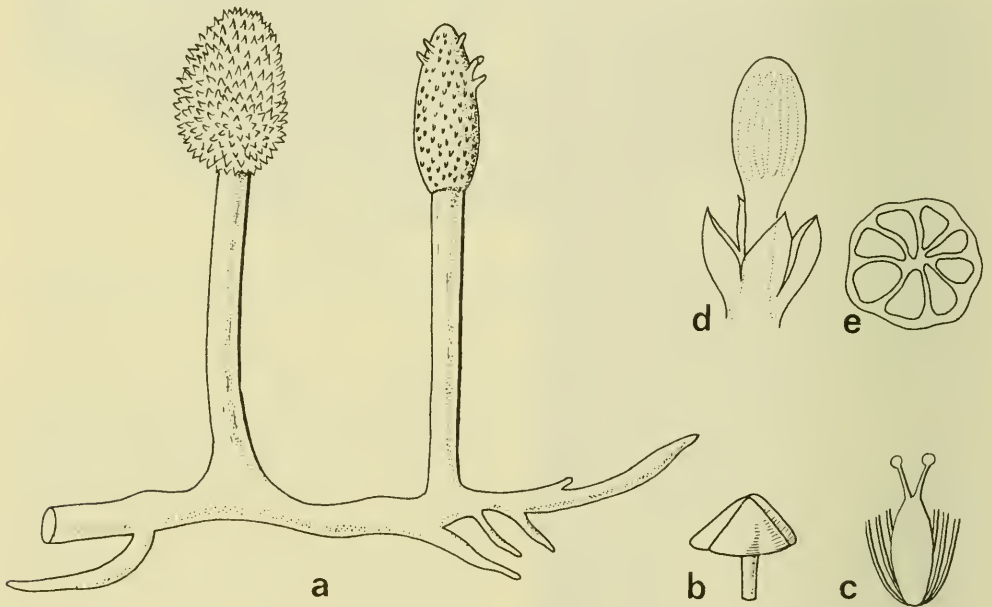


Fig. 7. *Exorhopala ruficeps* (RIDL.) STEEN. *a.* Habit, the inflorescence to the left still with peltate scales present, nat. size, *b.* peltate scale, $\times 5$, *c.* ♀ flower with supporting hairs, $\times 7$, *d.* ♂ flower, $\times 15$, *e.* CS of syndandrium, $\times 25$ (*a-c* after RIDLEY, 1924, *d-e* after FAGERLIND, 1938).

1. *Exorhopala ruficeps* (RIDL.) STEEN. Hand. 6th Ned. Ind. Natuurwet. Congr. 1931 (1932) 470; HARMS in E. & P. Nat. Pfl. Fam. ed. 2, 16b (1935) 324; HANSEN, Bot. Tidsskr. 67 (1972) 147, f. 1 (map). — *Rhopalocnemis ruficeps* RIDL. Kew Bull. (1914) 188; Fl. Mal. Pen. 3 (1924) 176, f. 150. — **Fig. 7.**

Dioecious plant (inflorescences unisexual) with yellow to orange brown or rose colours. Basal organs not sufficiently known. *Inflorescence-*

-bearing stem appearing from an elongated, horizontal tuber at least 15 cm long and $\frac{1}{2}$ cm wide. Stem naked, 4–10 cm long, $\frac{3}{4}$ cm \varnothing , yellow. *Inflorescence* 3–5 (–10) cm long, 2–3 cm \varnothing incl. of bracts, rose pink, covered by the conical top parts of marginally cohering, peltate bracts. Bracts bright red, with top part $\frac{1}{2}$ cm long and 0.4 cm wide at base, caducous on anthesis. ♂ *Flowers* 2 mm long. ♀ *Flowers*: stigmas very small, head-like.

Distr. *Malesia*: Penang (Penara Bukit) and Malay Peninsula (Perak: Thaiping Hills), very rarely collected. Fig. 6.

Ecol. Dense forest, 100–1200 m. Contact with host plant not known.

Note. Distinguished from *Rhopalocnemis* by its yellowish-reddish colours, horizontally spreading tubers, and exogenous origin of the spadices.

3. BALANOPHORA

J. R. & G. FORST. Char. Gen. Pl. (1776) 99; BL. En. Pl. Jav. (1827) 86; JUNGH. Nov. Act. Ac. Caes. Leop.-Car. 18, Suppl. 1 (1841) 201–228, t. 1–2; GOEPP. *ibid.* 18, 1 (1842) 231–272, t. 1–3; MIQ. Fl. Ind. Bat. 2 (1859) 1064; EICHL. in DC. Prod. 17 (1873) 143; HOOK. *f.* in B. & H. Gen. Pl. 3 (1880) 235; BOERL. Handl. 3, 1 (1900) 183; TIEGH. Ann. Sc. Nat. Bot. IX, 6 (1907) 144; HARMS in E. & P. Nat. Pfl. Fam. ed. 2, 16b (1935) 329, f. 166–168; HANSEN, Dansk Bot. Ark. 28 (1972) 84, a complete monograph, 188 pp. — *Cyniopsale* ENDL. Gen. Pl. (1836) 74. — *Acroblastum* SOLAND. [*Primitiae florum insularum oceani pacifici 310, 311 in sched.*] *ex* SEEM. Fl. Vit. (1866) 100. — *Balaniella* TIEGH. Ann. Sc. Nat. Bot. IX, 6 (1907) 144. — Fig. 8–24.

Stems emitted from basal tubers. Total length of parasite incl. of tuber 2–30 cm. *Tubers* mostly in a mass 1–25 cm \varnothing , branching from the base, containing wax (balanophorine) in varying amounts. Single tubers 1–6 cm long and 1–6 cm wide, ovoid, ellipsoid, or obovoid, sometimes almost cylindrical or spherical. In a few species the tubers are repeatedly branched with elongated, cylindrical branches, thus forming an entangled mass 10–30 cm \varnothing . Surface of tubers fine-granular to coarsely tessellate, with or without stellate warts. *Stem* appearing from a greater or smaller pit at the apical part of each single tuber. *Leaves* 2–40, broad-based, whorled, opposite, distichous or spirally arranged. *Inflorescence* spadix-like, terminating the stem. *Flowers* unisexual, pedicellate or not. δ *Inflorescences* racemose or spicate, 1–18 cm long and $1/2$ –7 cm wide in anthesis. φ *Inflorescences* spicate, ovoid, ellipsoid, obovoid, or spherical, $1/2$ –7 by $1/2$ –8 $1/2$ cm, number of flowers estimated in one inflorescence 10^5 – 10^7 according to size. δ *Flowers* mostly subtended by short, truncate bracts. In φ inflorescences the bracts are transformed to more or less club-shaped spadices $1/2$ –2 $1/2$ mm long, surrounded by φ flowers; in some species φ flowers are also situated on the lower, narrow part of each spadicle. Species monoecious as well as dioecious. Monoecious species have bisexual inflorescences with the δ flowers intermixed with the φ flowers or in a zone below and/or above the φ part. δ *Flowers* with a perianth of 3, 4–5 or 6, in exceptional cases up to 14, tepals, actinomorphic or bisymmetric to zygomorphic on account of lateral elongation. Tepals ovate to lanceolate, acute or almost square and truncate. Stamens forming a more or less elongated synandrium. Anthers 4–5 or numbers indeterminable, cells longitudinally dehiscing, sometimes transversally divided into smaller locelli. Anthers opposite to tepals when few in number. φ *Flowers* without a perianth. Ovary 0.2–0.7 mm long and 0.15–0.4 mm wide. Style $1/2$ –1 $1/2$ mm long, apparently stigmatoid at and near apex, where pollen grains are often found attached. *Fruit* indehiscent, nut-like. Embryo few-celled, embedded in a small endosperm. Diaspore: fruit with or without parts of pedicel and style attached.

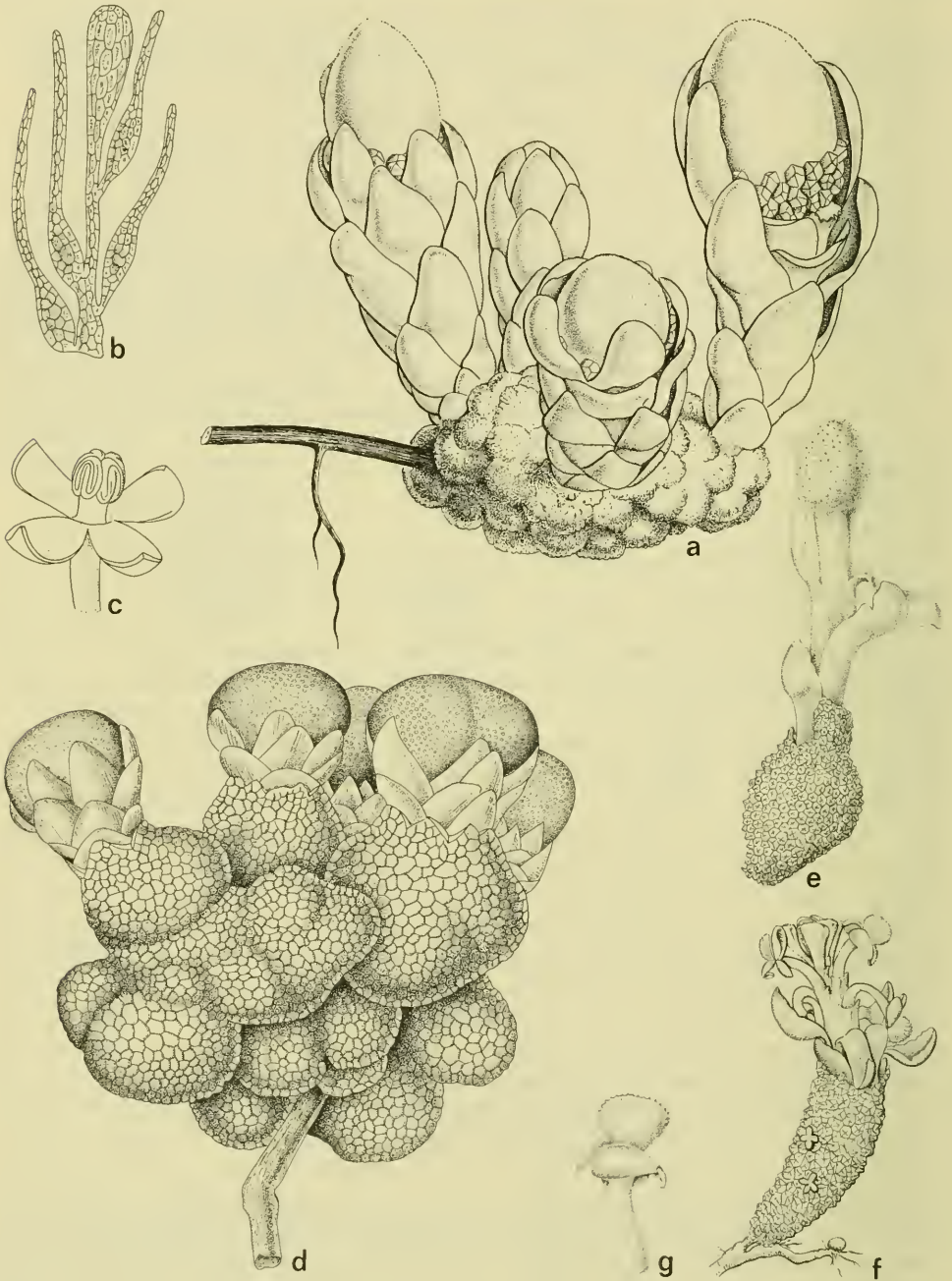


Fig. 8. *Balanophora fungosa* J. R. & G. FORST. *ssp. fungosa*. a. Habit, $\times \frac{2}{3}$, b. spadice with 4 ♀ flowers, $\times 33$, c. ♂ flowers, $\times 3$. — *B. fungosa ssp. indica* (ARN.) HANSEN var. *globosa* (JUNGH.) HANSEN. d. Habit, $\times \frac{2}{3}$. — *B. reflexa* BECC. e. ♀ Specimen, habit, $\times \frac{2}{3}$, f. ♂ specimen, habit, $\times \frac{2}{3}$, g. ♂ flower, $\times 1\frac{1}{3}$ (a-c after HOOKER f., 1856, d after JUNGHUHN, 1841, e-g after BECCARI, 1869).

Distr. About 15 species in temperate to tropical Asia, throughout *Malesia*, Pacific islands, tropical Australia, Comores, Madagascar, and tropical Africa (Congo).

Ecol. Parasitizing roots, rarely supraterraneous stems, of woody, rarely herbaceous, dicotyledonous species, in exceptional cases *Bambusa* and even *Pinus*.

Vern. *Prut*, S, a generic name, followed by the name of the host, e.g. *prut tjantigi*, *Balanophora* on *Vaccinium*, etc.

Notes. In no case have unisexual inflorescences of both sexes been observed to appear from one tuber. However, careful examination is necessary, when two seeds have germinated close to each other on the same root-tip, one producing a male plant, the other a female plant: such a case was observed in *B. fungosa* ssp. *indica*.

Dwarf specimens parasitizing extremely tiny roots were observed in *B. fungosa* ssp. *indica*. They probably occur in other species too, but are easily overlooked.

KEY TO THE SPECIES, SUBSPECIES, AND VARIETIES

1. Female and male flowers in the same inflorescence.
 2. Leaves distichous. Male flowers sessile, bisymmetric or zygomorphic 6. *B. abbreviata*
 2. Leaves spirally arranged, rarely subopposite. Male flowers pedicellate, actinomorphic. 1. *B. fungosa*
1. Female and male flowers in different inflorescences.
 3. Male specimens only. (Note: flowers at proximal and distal parts of inflorescence often not typically developed.)
 4. Male flowers actinomorphic, 4- or 5-merous, rarely 3- or 6-merous. Tepals all lanceolate, acute.
 1. *B. fungosa* ssp. *indica*
 4. Male flowers bisymmetric or zygomorphic, 4-merous, rarely 5- or 7-14-merous. Lateral tepals narrow, acute, median tepals wide, truncate.
 5. Pedicels 14-18 mm, during anthesis much reflexed. Lateral tepals extremely narrow and acute, median tepals very wide, square, truncate. Synandrium completely compressed in anterior-posterior direction (Borneo, Malaya). 5. *B. reflexa*
 5. Pedicels absent or at most up to 6 mm.
 6. Leaves always distichous 7. *B. latisejala*
 6. Leaves spirally arranged or opposite, decussate.
 7. Leaves spirally arranged, gradually increasing in size upwards on the stem, the upper ones elliptic, concealing inflorescence during anthesis. Tuber elongated and regularly branched.
 2. *B. elongata*
 7. Leaves opposite, decussate.
 8. Leaves 6-8 pairs, gradually increasing in size upwards on the stem, the uppermost ones almost orbicular in outline, cucullate, completely concealing the inflorescence during anthesis. Tuber spherical, not branched (Borneo) 4. *B. lowii*
 8. Leaves 2-4 (-5) pairs, all of nearly the same size; in case of 4 leaves only, the two pairs often very close to each other, apparently whorled, patent during anthesis. Tubers branched (3-12 branches) with slightly elongated parts 3. *B. papuana*
 3. Female specimens only. (Note: in some cases difficult to key out properly.)
 9. Leaves whorled or opposite and decussate.
 10. Leaves 4, distinct, apparently whorled at the upper part of the stem 3. *B. papuana*
 10. Leaves opposite and decussate.
 11. Leaves gradually increasing in size upwards on the stem; the uppermost leaves almost orbicular, cucullate, concealing the flowering inflorescence 4. *B. lowii*
 11. Leaves almost equal in size except for the lowermost 1-3 pairs 3. *B. papuana*
 9. Leaves distichous or spirally arranged.
 12. Leaves distichous 7. *B. latisejala*
 12. Leaves spirally arranged.
 13. Spadicles without flowers in lower part. (Note: easily observed with handlens on cross-section of inflorescence.) (Borneo and Malaya only) 5. *B. reflexa*
 13. Spadicles with flowers in lower part.
 14. Upper leaves not covering the flowering inflorescence. 1. *B. fungosa* ssp. *indica* var. *indica*
 14. Upper leaves totally or partially covering the flowering inflorescence.
 15. Stem elongated, slender. Female inflorescence ellipsoid. Tubers elongated and repeatedly branched 2. *B. elongata* var. *elongata*
 15. Stem very short and stout. Tubers not elongated.
 16. Female inflorescence subspherical-ellipsoid. Leaves coarsely longitudinally striate (Java only). 2. *B. elongata* var. *ungeriana*
 16. Female inflorescence subspherical, markedly depressed. Leaves smooth (Java only).
 1. *B. fungosa* ssp. *indica* var. *globosa*

1. *Balanophora fungosa* J. R. & G. FORST. Char. Gen. Pl. (1776) 99, t. 50; MERR. En. Philip. 2 (1923) 118; HANSEN, Dansk Bot. Ark. 28 (1972) 93, f. 19. — *B. micholitzii* RIDL. J. Str. Br. R. As. Soc. 39 (1903) 207; *ibid.* 45 (1906) 219. — Fig. 8–11.

ssp. fungosa. — Fig. 8a–c.

Monoecious plant (inflorescences bisexual), pale yellow, yellow to orange yellow or yellowish brown, sometimes with pinkish tinges. Length from fusion with host root to top of inflorescence 6–12 cm. Tubers single or in a mass 10–15 cm wide, branching from the base. Single tuber subspherical or depressed, c. $1\frac{1}{2}$ by $2\frac{1}{2}$ cm. Surface granular with stellate warts. Stem $2\frac{1}{2}$ –11 cm. Leaves 15–30, spirally arranged, rarely subopposite, imbricate, 2–3 by $1\frac{1}{2}$ –2 cm, obtuse, slightly cucullate. ♂ Flowers 2–20, in a zone $\frac{1}{2}$ –1 cm high just below ♀ part of inflorescence, 4–5-merous, actinomorphic, subtended by short (1–2 mm), truncate, rudimentary bracts. Pedicels 3–7 mm. Tepals ovate-elliptic, acute. Synandrium ovoid-ellipsoid, slightly compressed in anterior-posterior direction. Anthers 4–5, horseshoe-shaped. ♀ Part of inflorescence (1–) $1\frac{3}{4}$ – $2\frac{1}{4}$ (– $3\frac{1}{2}$) cm long and ($1\frac{1}{4}$ –) $1\frac{1}{2}$ – $2\frac{1}{4}$ (– $3\frac{1}{2}$) cm wide, subspherical to short ovoid. Spadicles (1110–) 1130 (–1150) μ long, long-obconical or with a lower, cylindrical part about 100 μ wide and an upper, obconical part 170–240 μ wide. ♀ Flowers on main axis of inflorescence and a few also in lower part of the spadicles. Largest ♀ flowers with pistils c. 1250 μ long, ovary about 400 μ long.

Distr. Upper Burma (Manipur), Ryu Kyu Is. (Iriomote), Micronesia (Marianas); in *Malesia*: Philippines (Luzon, Palawan), E. Java, Celebes, E. New Guinea; also in the Solomon Is., N. Queensland (Cape York Peninsula), New Caledonia, New Hebrides, and Fiji. Fig. 9.

Ecol. From about sea-level to 1000 m, in dense primary forest or rain-forest regrowth. Flowering all year round, but 52 % of all dated specimens are from June–July. Parasitizing various forest trees; hosts recorded: *Diospyros maritima* BL. (*Eben.*), *Macaranga tanarius* (L.) M.A. (*Euph.*), *Hibiscus tiliaceus* L. (*Malv.*), *Ficus austrocaledonica* BUR., *F. prolixa* FORST., *F. schlechteri* WARB. (*Morac.*), *Eucalyptus* sp. (*Myrt.*), *Linociera* sp. (*Oleac.*), *Citrus* sp. (*Rutac.*), *Vitex cofassus* REINW. ex BL. (*Verb.*).

Note. Distinguished from *B. abbreviata* by its leaves never being distichous and by its longer pedicels of the male flowers.

ssp. indica (ARN.) HANSEN, Dansk Bot. Ark. 28 (1972) 100, f. 20, 21. — *Langsdorffia indica* ARN. Ann. Nat. Hist. 2 (1838) 37. — *B. indica* (ARN.) GRIFF. Trans. Linn. Soc. 20 (1846) 95. — *B. elongata* (non BL.) HOOK. f. Trans. Linn. Soc. 22 (1856) 30, 45 p.p. *quoad specimina* WIGHT, GARDNER & THWAITES. — *B. decurrens* FAWC. Trans. Linn. Soc. Bot. II, 2 (1886) 243, t. 33, f. 1–4; ELMER, Leaf. Philip. Bot. 5 (1913) 1659; MERR. En. Philip. 2 (1923) 118. — *B. dioica* (non R.Br. ex ROYLE) RIDL. J. Str. Br. R. As. Soc. 59 (1911) 165. — Fig. 10.

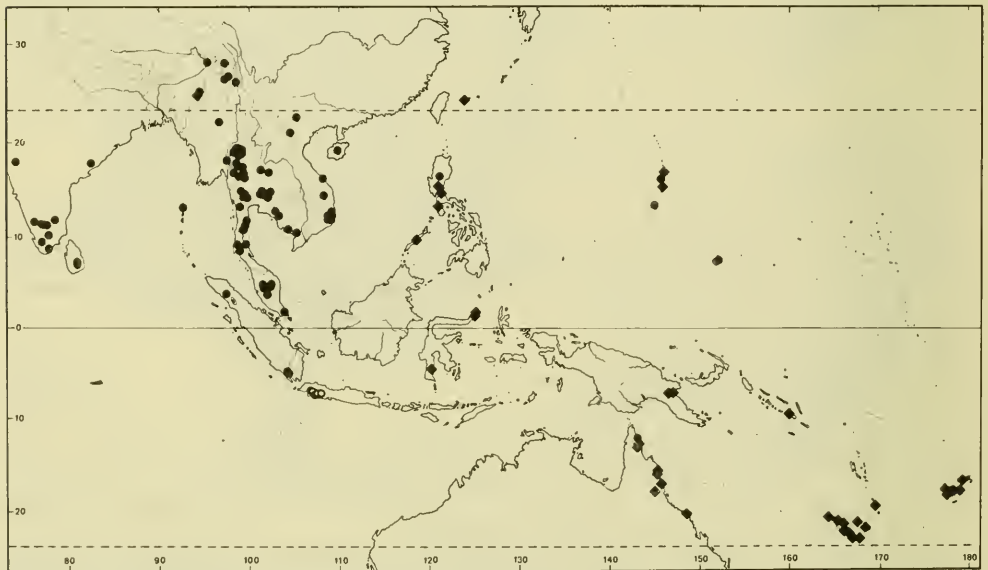


Fig. 9. Range of *Balanophora fungosa* J. R. & G. FORST. *ssp. fungosa* (■); add. E. Java), *ssp. indica* (ARN.) HANSEN var. *indica* (●), and *ssp. indica* (ARN.) HANSEN var. *globosa* (JUNGH.) HANSEN (○).

var. indica. — Fig. 10.

Dioecious plant, yellow to orange-yellow or pink. Length from fusion with host root to top of inflorescence $1\frac{1}{4}$ –22 cm. Tubers single or in a mass more or less branched from the base. Single tuber subspherical, $\frac{1}{2}$ – $5\frac{1}{2}$ cm wide and slightly shorter. Surface coarsely tessellate to fine granular, with stellate warts. Stem more or less elongated. Leaves 10–20, spirally arranged, imbricate, up to 3 by 2 cm, obtuse, slightly cucullate. ♂ Inflorescence ($\frac{3}{4}$ –) 2–7 (–12) cm long and ($1\frac{1}{4}$ –) 2–6 (–7) cm wide with expanded flowers, ovoid to ellipsoid.



Fig. 10. *Balanophora fungosa* ssp. *indica* var. *indica* in N. Thailand, Doi Inthanon, 1750 m (Photogr. H. P. NOOTEBOOM).

Pedicels 7–10 mm. ♂ Flowers subtended by truncate bracts 5 mm long and 4 mm wide, (3–) 4–5 (–6)-merous, actinomorphic. Tepals 3–7 by $1\frac{1}{2}$ –2 mm, elliptic-lanceolate, acute. Synandrium with fertile part slightly compressed, $2\frac{1}{2}$ –5 mm long, anterior-posterior width 2 mm, lateral width $3\frac{1}{2}$ mm, often slightly obconical. Anthers (3–) 4–5 (–6), horseshoe-shaped. ♀ Inflorescence ($\frac{1}{2}$ –) 1–6 (– $7\frac{1}{4}$) cm long and ($\frac{1}{2}$ –) 1–4 (– $8\frac{1}{2}$) cm wide, depressed-ellipsoid, subspherical or obovoid. Spadicles (1270–) 1770 (–1960) μ long with a cylindrical lower part about 200–300 μ wide and an obovoid, obtuse or truncate top part about 600–900 μ long and 400–600 μ wide. ♀ Flowers on main axis of inflorescence as well as on cylindrical part of spadicles. Largest ♀ flowers with pistils (1380–) 1700 (–1920) μ long, ovaries (240–) 340 (–500) μ long and 150–350 μ wide.

Distr. Indian and Indo-Chinese subcontinents, Yunnan, Hainan; in Malesia: Malaya, Sumatra, Philippines (Luzon, once), also in Micronesia

(Carolines, Marianas), N. Queensland (Cape York Peninsula, once). Fig. 9.

Ecol. Evergreen forest, (150–) 500–2600 m. Flowering all year round; in Malesia, the Pacific islands, and Australia 85% of all collections are from June–Nov. Parasitizing various trees and climbers. Hosts recorded: *Carissa carandas* L. (*Apoc.*), *Ilex wightiana* WALL. ex WIGHT (*Aquif.*), *Euonymus crenulatus* WALL. (*Celastr.*), *Acacia melanoxylon* R.BR., *Albizia lophantha* (WILLD.) BTH., *Milletia* sp., *Pithecellobium* sp. (*Leg.*), *Ficus* sp. (*Morac.*), *Barringtonia asiatica* (L.) KURZ (*Lecyth.*), *Syzygium cumini* (L.) SKEELS (*Myrt.*), *Cissus* sp., *Tetrastigma* sp. (*Vitac.*).

var. globosa (JUNGH.) HANSEN, Dansk Bot. Ark. 28 (1972) 109, f. 24; STEEN. Mt. Fl. Java (1972) pl. 5–2. — *B. globosa* JUNGH. Nov. Act. Ac. Caes. Leop.-Car. 18, Suppl. 1 (1841) 210, t. 2; MIQ. Fl. Ind. Bat. 2 (1859) 1065; EICHL. in DC. Prod. 17 (1873) 146; KOORD. Exk. Fl. Java 2 (1912) 177, f. 39; STEEN. Trop. Natuur 23 (1934) 49; BACK. & BAKH. f. Fl. Java 2 (1965) 79; CORNER & WATAN. Ill. Trop. Pl. (1969) 74. — *B. gigantea* WALL. [Cat. (1832) n. 7249] ex FAWC. Trans. Linn. Soc. Bot. II, 2 (1886) 235, t. 33; RIDL. Fl. Mal. Pen. 3 (1924) 174. — *B. ramosa* FAWC. Trans. Linn. Soc. Bot. II, 2 (1886) 236, t. 34. — *Balaniella globosa* (JUNGH.) TIEGH. Ann. Sc. Nat. Bot. IX, 6 (1907) 181. — *Balaniella ramosa* (FAWC.) TIEGH. l.c. 181. — *Balaniella junghuehni* TIEGH. l.c. 185. — Fig. 8d, 11.

Dioecious plant; only ♀ inflorescences observed. Length 8–10 cm from fusion with host root to top of inflorescence. Mass of tubers 8–10 cm \varnothing ; single tuber about 3 cm \varnothing , but often indistinct. Surface



Fig. 11. *Balanophora fungosa* ssp. *indica* var. *globosa* in Tjibodas, Mt Gedeh, W. Java, 1500 m, Aug. 1913 (Photogr. KOORDERS).

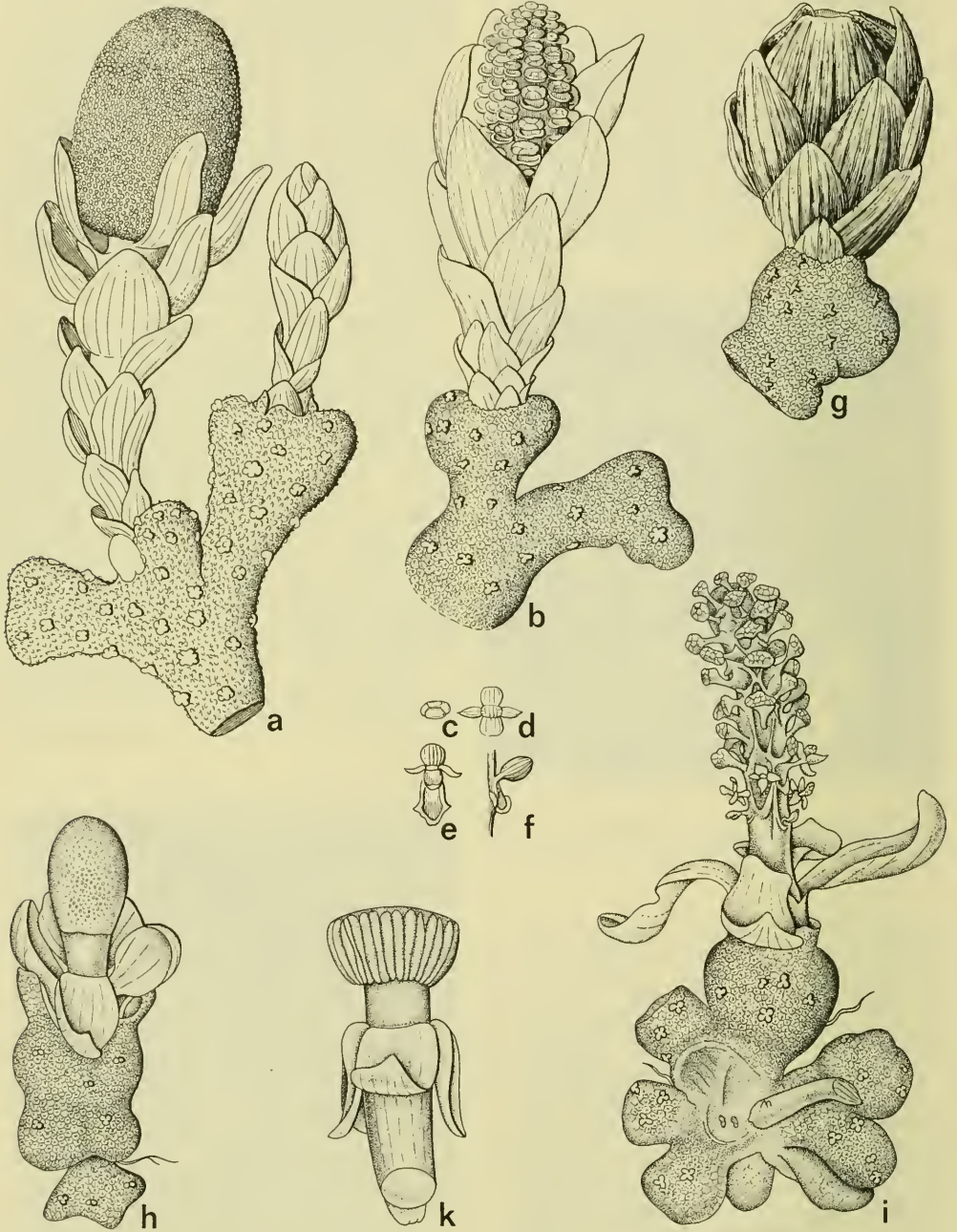


Fig. 12. *Balanophora elongata* BL. var. *elongata*. a. ♀ Specimen, habit, b. ♂ specimen, habit, c. ♂ flower in bud, d. ♂ flower fully open, seen from above, e. ditto, anterior view, f. ditto, lateral view, tepals removed. — *B. elongata* var. *ungeriana* (VAL.) HANSEN. g. Habit. — *B. papuana* SCHLTR. h. ♀ Specimen, habit, i. ♂ specimen, habit, k. ♂ flower, anterior view; a-i $\times \frac{2}{3}$, k $\times 3$ (a-f after JUNGHUHN, 1841, g after VALETON, 1912, h-k after VALETON, 1913).

coarsely tessellate with polygonate 'fields' 5–7 mm \varnothing . Stellate warts not distinct. Stem short and stout, 1–2 cm long only. *Leaves* 10–12, spirally arranged, imbricate, closely appressed to the stem and lower part of inflorescence, partly covering up to $\frac{2}{3}$ of flowering inflorescence. ♀ *Inflorescence* $2\frac{1}{2}$ – $2\frac{3}{4}$ by $3\frac{1}{2}$ –4 cm, depressed, flat-ellipsoid. Spadicles up to 2100–2500 μ long with a cylindrical lower part 200–450 μ wide and an ovoid-obovoid, obtuse or truncate top part up to 600–900 μ wide. ♀ *Flowers* on main axis of inflorescence as well as on lower part of spadicles. Largest flowers with pistils 1700–1800 μ long, ovaries 300–350 μ long and 260–280 μ wide. ♂ Inflorescences not observed. Plant apomictic.

Distr. *Malesia*: West Java only (Mt Salak east to Priangan Mts). Fig. 9.

Ecol. Evergreen forests at 1500–2000 m. Parasitizing forest trees; *Schima wallichii* (DC.) KORTH. *ssp. noronhae* (REINW. ex BL.) BLOEMB. (*Theac.*) has been recorded as host plant.

2. *Balanophora elongata* BL. En. Pl. Jav. 1 (1827) 87; MIQ. Fl. Ind. Bat. 2 (1859) 1065; Illustr. (1871) 105; EICHL. in DC. Prod. 17 (1873) 147; KOORD. Exk. Fl. Java 2 (1912) 176, f. 38; Atlas 4 (1925) t. 869, 870; Fl. Tjibodas 2 (1923) 52, *incl. var. macropanictis* VAL. ms. ex KOORD. l.c. 55; STEEN. Trop. Natuur 23 (1934) 49, f. 1, 2, 8; BAKH. & BAKH. f. Fl. Java 2 (1965) 79; CORNER & WATAN. Ill. Trop. Pl. (1969) 72; STEEN. Mt. Fl. Java (1972) pl. 5–1a/b; HANSEN, Dansk Bot. Ark. 28 (1972) 114, f. 26, 27. — *B. dioica* (non R. BR. ex ROYLE) UNGER, Ann. Wien. Mus. Naturgesch. 2 (1837) 26, t. 2, f. 1, 2. — *B. maxima* JUNGH. Nov. Act. Ac. Caes. Leop.-Car. 18, Suppl. 1 (1841) 209, t. 1; MIQ. Fl. Ind. Bat. 2 (1859) 1065. — *B. elongata* var. *maxima* (JUNGH.) HOOK. f. Trans. Linn. Soc. 22 (1856) 45. — *B. forbesii* FAWC. Trans. Linn. Soc. Bot. II, 2 (1886) 236, t. 33, f. 8–10. — *B. multibrachiata* FAWC. l.c. 236, t. 34. — *Cynopsale elongata* (BL.) ENDL. ex JACKS. Ind. Kew. 1, 1 (1895) 688. — *Balaniella elongata* (BL.) TIEGH. Ann. Sc. Nat. Bot. IX, 6 (1907) 181. — *Balaniella maxima* (JUNGH.) TIEGH. l.c. — *Balaniella forbesii* (FAWC.) TIEGH. l.c. — *Balaniella multibrachiata* (FAWC.) TIEGH. l.c. — Fig. 12–16.

var. elongata. — Fig. 12a–f, 13–16.

Dioecious plant, red-yellow to coral-red or red-brown. *Tubers* repeatedly branched, single branches elongated, cylindrical, c. 3–8 by 1.2–1.4 cm, those producing an inflorescence slightly obconical, c. $1\frac{1}{2}$ –2 cm wide in distal part. Surface granular to fine tessellate, with scattered stellate warts. Stem various, in ♂ specimens 1–20 cm long, shorter in ♀ specimens, $\frac{1}{2}$ – $\frac{3}{4}$ cm \varnothing . *Leaves* 7–20, spirally arranged, imbricate, gradually increasing in size upwards, elliptic, obtuse, 1 – $4\frac{1}{2}$ by $\frac{3}{4}$ – $2\frac{1}{4}$ cm, colour red-yellow to red or dark red-brown, rarely butter yellow. In wet, translucent material 6–12 longitudinal nerves are seen, in dry material the leaves are faintly longitudinally striate. Upper leaves appressed to and partly concealing the

flowering inflorescences or slightly reflexed in advanced stages. ♂ *Inflorescence* 3–5 cm long, rarely longer. Bracts 1–5 mm long, 5–6 mm wide, truncate. Pedicels 3–7 mm long. ♂ *Flowers* 4 (–5)-merous, bisymmetric or zygomorphic. Lateral tepals narrow, acute, 4 – $4\frac{1}{2}$ by $1\frac{1}{2}$ –2 mm, median tepals wide, truncate, 4 – $4\frac{1}{2}$ by 3 mm. Synandrium with fertile part 2 mm long, slightly compressed, lateral width $2\frac{1}{2}$ –4 mm, anterior-posterior width $1\frac{1}{2}$ –2 mm. Anthers apparently straight, locules running from base to top of synandrium, longitudinally opening. Number of locules various, 20–30. ♀ *Inflorescence* ellipsoid-subsppherical, 3–4 cm by $1\frac{3}{4}$ –3 cm. Spadicles (880–) 985 (–1190) μ long, with a lower, cylindrical part 100–130 μ wide and an upper, ellipsoid, ovoid or obovoid part about 350–500 μ long and 270–340 μ wide. ♀ *Flowers* on main axis of inflorescence as well as on lower part of spadicles. Largest flowers with pistils (1250–) 1270 (–1300) μ long. Ovaries ellipsoid 270–300 μ by 160–180 μ .



Fig. 13 & 14. *Balanophora elongata* BL. *var. elongata*. Young ♂ spadices (above), after two weeks just coming into anthesis (below), showing slow development. Tjibodas, Mt Gedeh, W. Java, 1500 m (Photogr. VAN STEENIS).

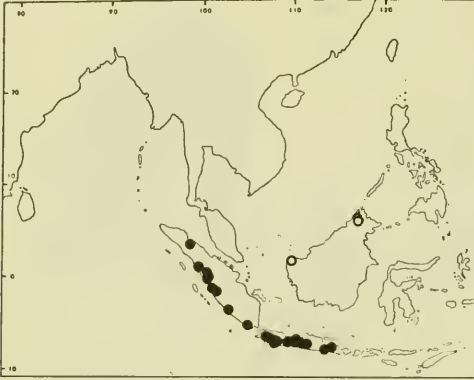


Fig. 15. Range of *Balanophora elongata* BL. (●) and *B. lowii* Hook. f. (○).



Fig. 16. *Balanophora elongata* BL. var. *elongata*. Two ♀ spadices (left upper corner and lower down) and four ♂ ones. Kandang Badak, Mt Gedeh, W. Java, 2400 m (Photogr. VAN STEENIS).

Distr. *Malesia*: Sumatra and Java (most abundant in West Java). Fig. 15.

Ecol. Evergreen forest at 1000–3000 m. Parasitizing various trees and shrubs; hosts recorded: *Strobilanthes* sp. (*Acanth.*), *Macropanax dispernum* (BL.) O.K., *Schefflera aromatica* (BL.) HARMS (*Aral.*), *Rhododendron retusum* (BL.) BENN., *Vaccinium laurifolium* (BL.) MIQ., *V. lucidum* (BL.)

MIQ. (*Eric.*), *Albizia lophantha* (WILLD.) BTH. (*Leg.*), *Ficus lepicaarpa* BL., *F. ribes* REINW. ex BL., *F. septica* BURM. f., *F. villosa* BL., and *Ficus* sp. (*Morac.*), *Girardinia heterophylla* (VAHL) DECNE (*Urtic.*). Flowering all year round, but 80% of all dated specimens studied were collected in March to September.

Uses. The tubers contain wax, often in great quantity, and are used in West Java (notably Tjibodas and on Mt Gedeh) for making torches, cf. ULTÉE (Hand. 3rd Ned. Ind. Natuurwet. Congr. 1924, 1925, 275–276).

Note. Easily distinguished from *B. papuana* in the leaves being spirally arranged.

var. *ungeriiana* (VAL.) HANSEN, Dansk Bot. Ark. 28 (1972) 120, f. 28. — *B. ungeriana* VAL. Ic. Bog. 4 (1912) 95, t. 330; STEEN. Trop. Natuur 23 (1934) 49; BACK. & BAKH. f. Fl. Java 2 (1965) 80. — Fig. 12g.

Tubers not elongated, branches short obconical. Leaves coarsely longitudinally striate.

Distr. *Malesia*: West Java (Mts Salak and Gedeh), 1400–1600 m.

Note. Male plants never seen. The tubers contain but little wax. Parasitizing various species of *Ficus*, e.g. *F. lepicaarpa* BL., *F. septica* BURM. f., *F. ribes* REINW. ex BL., and *F. villosa* BL. (*Morac.*).

3. *Balanophora papuana* SCHLTR, Bot. Jahrb. 50 (15 April 1913) 68, f. 1; MERR. & PERRY, J. Arn. Arb. 23 (1942) 383; HANSEN, Dansk Bot. Ark. 28 (1972) 121, f. 29, 30. — *B. elongata* (non BL.) STAFF, Trans. Linn. Soc. Bot. II, 4 (1894) 223. — *B. incarnata* ELMER, Leaf. Philip. Bot. 5 (13 June 1913) 1661; MERR. En. Philip. 2 (1923) 118. — *B. oosterzeeana* VAL. Nova Guinea 8 (Sept. 1913) 919, t. 161; RIDL. Trans. Linn. Soc. Bot. II, 9 (1916) 147; H. J. LAM, Nat. Tijds. N. I. 88 (1928) 277, 294; *ibid.* 89 (1929) 131; MERR. & PERRY, J. Arn. Arb. 29 (1948) 152. — *B. celebica* WARB. Die Pflanzenwelt 1 (1913) 517, f. 168B, *nom. nud.*; CORNER & WATAN. Ill. Trop. Pl. (1969) 71. — *B. decurrens* (non FAWC.) MERR. Philip. J. Sc. 1 (1906) Suppl. 51. — *B. multibrachiata* (non FAWC.) BURK. & HOLT. Gard. Bull. S. S. 3 (1923) 72; RIDL. Fl. Mal. Pen. 3 (1924) 174; BURK. & HEND. Gard. Bull. S. S. 4 (1928) 315; MERR. Contr. Arn. Arb. 8 (1934) 54, *p.p.*; HEND. Mal. Nat. J. 6 (1951) 458, f. 413. — *Balaniella papuana* (SCHLTR) HOSOKAWA, J. Jap. Bot. 13 (1937) 202. — Fig. 12h–j, 17.

Diocious plant, yellow to orange-yellow or red. Length from fusion with host root to top of inflorescences 3–15 cm. Tubers in a mass, 14–24 cm \varnothing , branching from the base into 3–12 single tubers; single tubers (1–) 2–5 (–6) cm by (1–) 1½–3 (–4) cm; surface tessellate being covered by polygonate 'fields' 1–2 mm across, with scattered stellate warts. Stem with 2–4 (–5) pairs of opposite, decussate, obovate yellow to red leaves, which are patent during anthesis. In a New Guinea specimen preserved in alcohol the leaves are 3¼ by 2½ cm with 7–11 longitudinal nerves. New Guinea and



Fig. 17. *Balanophora papuana* SCHLTR at upper Lai River, Wabag, E. New Guinea (HOOGLAND & SCHODDE 7712).

Celebes material has 4, rarely 5 leaves inserted at nearly the same level, thus appearing verticillate. In Philippine material 2-3 leaf pairs are observed, and in Borneo, Malaya, and Sumatra material 2-4 (-5) pairs. If more than 2 pairs of leaves present, the pairs are usually somewhat spaced on the stem. The leaves are always nearly of the same size. ♂ *Inflorescence* $2\frac{1}{2}$ -5 by $1\frac{1}{2}$ -3 cm with expanded flowers. Bracts rudimentary, at most 1 mm long. Pedicels 2-7 mm long. *Flowers* often in conspicuous vertical rows, bisymmetric or zygomorphic on account of lateral elongation, 4 (-5)-merous. Median tepals wide and truncate, $4\frac{1}{2}$ by $3\frac{1}{2}$ mm. Lateral tepals narrow and acute, $4\frac{1}{2}$ by 1 mm. Synandrium with fertile part often slightly obconical, laterally elongated, e.g. length 3 mm, anterior-posterior width 3 mm and lateral width 7 mm. Anther cells parallel, running from base to top of synandrium, longitudinally opening. ♀ *Inflorescence* obovoid, ($\frac{3}{4}$ -) $1\frac{1}{2}$ -3 (-4) by ($\frac{1}{2}$ -) $1-2\frac{1}{2}$ (-3) cm. Spadices (900-) 1000 (-1200) μ long with a cylindrical lower part about 600 μ long and 100 μ wide and an obconical upper part about 400 μ long and 200-300 μ wide. ♀ *Flowers* chiefly on main axis of inflorescence but always a few also on lower part of spadices. Largest flowers with pistils c. 1150 μ , ovaries c. 180 μ long and 140 μ wide.

Distr. *Malesia*: Malaya, NW. Borneo (Mts Murud, Kinabalu), Celebes, Philippines (Luzon, Mindoro, Mindanao), and New Guinea. Fig. 18.

Ecol. Evergreen mountain forests at (300-) 1000-2000 m. Parasitizing roots of forest trees. Hosts recorded: *Macaranga* sp. (*Euph.*), *Ficus* sp. (*Morac.*). Flowering all the year round, 66% of dated collections from June-Nov.

Note. Distinguished from *B. lowii* by the fewer leaves which are nearly equal in size and not concealing the flowering inflorescence, from *B. elongata* by the leaves being opposite and almost equal.

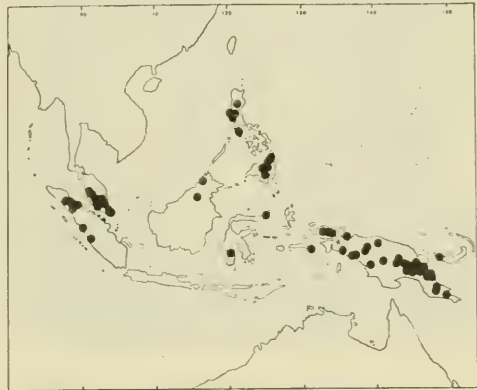


Fig. 18. Range of *Balanophora papuana* SCHLTR.



Fig. 19. *Balanophora lowii* HOOK. f. at Mesilau River, Mt Kinabalu, N. Borneo (Photogr. CORNER).

4. *Balanophora lowii* HOOK. f. Trans. Linn. Soc. 22 (1859) 426, t. 75; EICHL. in DC. Prod. 17 (1873) 148; HANSEN, Dansk Bot. Ark. 28 (1972) 127, f. 31, 32. — *Balaniella lowii* (HOOK. f.) TIEGH. Ann. Sc. Nat. Bot. IX, 6 (1907) 181. — Fig. 19.

Diocious plant, yellow to red. Length from fusion with host root to top of upper leaves about 9 cm. *Tubers* always single in the material studied, spherical, $1\frac{1}{2}$ – $2\frac{1}{2}$ cm \varnothing , surface granular with scattered to numerous stellate warts. *Leaves* 12–16, deep pink, opposite, decussate, gradually increasing in size upwards, the basal ones being small and bract-like, while the upper 2–3 pairs are ovate to almost orbicular, $2\frac{1}{2}$ – $4\frac{1}{4}$ by $2\frac{1}{2}$ –4 cm. In wet material 8–14 longitudinal nerves are easily observed; the nerves are forking in the middle part of the lamina. The upper 2–3 pairs of leaves conceal the flowering inflorescence completely. σ *Inflorescence* subspherical-ellipsoid, $2\frac{1}{2}$ – $2\frac{3}{4}$ by $2\frac{1}{2}$ cm. Bracts 2 mm long and 5 mm wide, truncate or almost rudimentary. Pedicels 6–7 mm long. σ *Flowers* bisymmetric or zygomorphic through lateral elongation, 4 (–5)-merous. Median tepals 5 mm by 4 mm, truncate. Lateral tepals 5 by $2\frac{1}{2}$ –3 mm, acute. Synandrium with fertile part slightly laterally elongated, 3 mm long, anterior-posterior width $3\frac{1}{2}$ mm, lateral width 5 mm. Anther cells parallel, running from base to top of synandrium, longitudinally opening. η *Inflorescence* ellipsoid, $3\frac{1}{4}$ by $2\frac{1}{4}$ cm. Spadicles 1100–1500 μ long, with a cylindrical lower part c. 180–230 μ wide and an obovoid to truncate upper part, 320–380 μ wide. Largest flowers with pistils 1450–1750 μ long, ovaries 240–320 μ long, ellipsoid.

Distr. *Malesia*: Borneo (Mt Kinabalu; Sarawak: Poi Range, G. Berumput). Fig. 15.

Ecol. Collected in evergreen forests at 1000–3000 m. Parasitizing roots as well as supraterranean stem parts. Host(s) not yet recorded. Season probably all year round, but more records are needed.

Note. Distinguished from *B. papuana* by its higher number of leaves and by the leaves being gradually increasing in size upwards on the stem, from *B. elongata* by its opposite leaves.

5. *Balanophora reflexa* BECC. Att. Soc. Ital. Sc. Nat. 11 (1868) 198; NUOV. Giorn. Bot. Ital. 1 (1869) 65, t. 2–4; EICHL. in DC. Prod. 17 (1873) 148; BECC. Wanderings (1904) 128, 164; VAL. Nova Guinea 8 (1913) 920; HANSEN, Dansk Bot. Ark. 28 (1972) 130, f. 33, 34. — *Balaniella reflexa* (BECC.) TIEGH. Ann. Sc. Nat. Bot. IX, 6 (1907) 182. — *B. fasciculigera* SUESSENG. & HEINE, Mitt. Bot. Staatssamml. Münch. 2 (1950) 57; HEINE in Fedde, Rep. 54 (1951) 226. — Fig. 8e–g, 20.

Diocious plants, rich orange to red or dark red. Length from fusion with host root to top of inflorescence in σ plants (4–) 5–10 (–11) cm, in η plants (6–) 7–10 (–23) cm. *Tubers* several together in a mass branching from the base into single tubers. Single tubers elongated, cylindrical or ovoid-ellipsoid-obovoid, (2–) 3–6 (–14) cm long and



Fig. 20. *Balanophora reflexa* BECC. at Balleh River, Bt Tikang, Sarawak (Photogr. J. A. R. ANDERSON).

($1\frac{1}{2}$ -) 2-4 (- $4\frac{1}{2}$) cm wide. Surface coarsely tessellate. Leaves 3-8, spirally arranged, length 2- $3\frac{1}{2}$ cm, width $1\frac{1}{2}$ - $2\frac{1}{4}$ cm. ♂ Inflorescence $1\frac{3}{4}$ - $2\frac{1}{2}$ cm long. Bracts various: upper bracts entire, truncate, 3-4 mm long, lower bracts divided to the base into 4-6 (-7) teeth, each about 1-2 by $\frac{1}{2}$ mm. Pedicels of lowermost flowers (1-) $1\frac{1}{2}$ - $1\frac{3}{4}$ (-2) cm, compressed, 3 by 2 mm in cross-section, before anthesis pointing upwards and closely appressed to the axis of the inflorescence, during and after anthesis strongly reflexed. Flowers 7-9 or more. Buds much compressed, length ($\frac{3}{4}$ -) 5-6 (-7) mm, lateral width ($\frac{4}{2}$ -) 6-8 (-9) mm, anterior-posterior width ($\frac{2}{2}$ -) 3 (- $\frac{3}{2}$) mm. ♂ Flowers 4-merous, bisymmetric or zygomorphic on account of lateral elongation. Median tepals 2, wide, almost square, truncate. Lateral tepals 2, narrow, lanceolate, acute. Synandrium with fertile part much compressed, almost fan-shaped. Anther cells parallel, running from base to top of synandrium. ♀ Inflorescence spherical or ellipsoid-obovoid, (1-) $1\frac{1}{2}$ -3 (-5) by ($\frac{3}{4}$ -) 1-2 (-3) cm. Spadicles (800-) 1000 (-1200) μ long, long-obconical with top part rounded, about 100 μ wide at base and 250-270 μ wide at top. ♀ Flowers on main axis of inflorescence only. Largest flowers about 1150 μ long, ovaries about 270 μ long.

Distr. *Malesia*: Borneo (Sarawak, W. Borneo, Mt Kinabalu) and Malaya (Pahang, one collection). Fig. 24.

Ecol. In evergreen forest on roots of trees at altitudes from 300-3000 m. Host recorded: *Elatostema* sp. (*Urtic.*), parasite appearing on supraterraneous stem parts of host. Flowering all year round.

Note. Distinguished from all other species by the long, reflexed pedicels and the extremely compressed, almost sharp-edged, fan-shaped synandria. Flowering specimens sometimes smelling strongly of fox (CORNER on label).

6. *Balanophora abbreviata* BL. En. Pl. Jav. 1 (1827) 87; MIQ. Fl. Ind. Bat. 2 (1859) 1065; EICHL. in DC. Prod. 17 (1873) 148; F.-VILL. & NAVES, Nov. App. Blanco Fl. Filip. ed. 3, 1 (1880) 185; KOORD. Exk. Fl. Java 2 (1912) 176, f. 37; STEEN. Arch. Hydrobiol. Suppl. 11 (1932) 301; Trop. Natuur 23 (1934) 49; BACK. & BAKH. f. Fl. Java 2 (1965) 79; HANSEN. Dansk Bot. Ark. 28 (1972) 134, f. 32. — *B. alutacea* JUNGH. Nov. Act. Ac. Caes. Leop.-Car. 18, Suppl. 1 (1841) 205; MIQ. Fl. Ind. Bat. 2 (1859)



Fig. 21. *Balanophora abbreviata* BL. in limestone cave, Castle Hill, Cape Vogel Peninsula, NE. New Guinea (Photogr. HOOGLAND 4334).

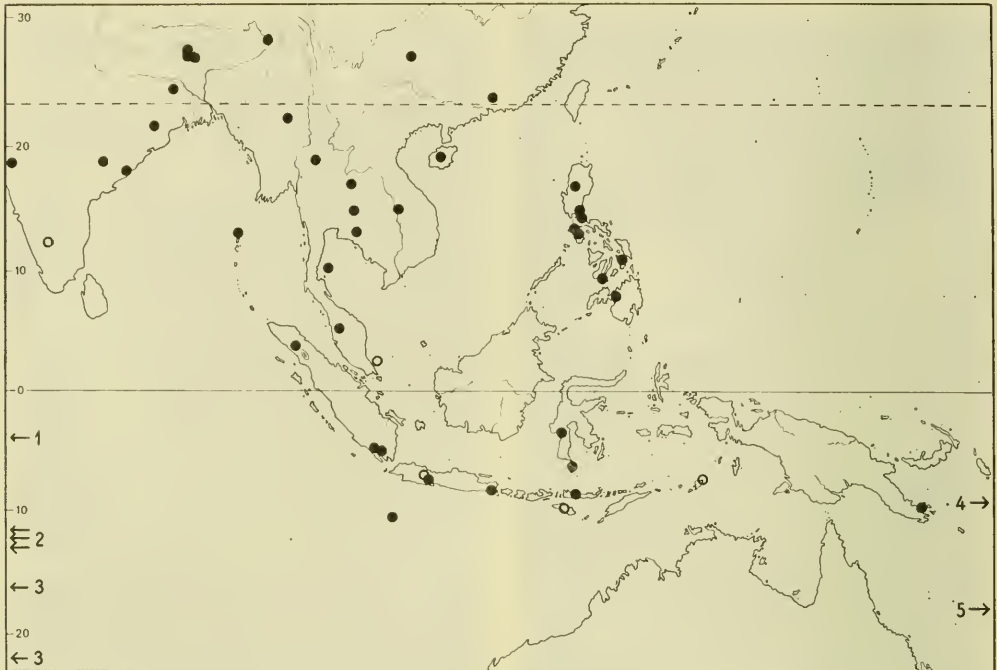


Fig. 22. Range of *Balanophora abbreviata* BL. (● specimens studied, ○ from literature). Occurrence outside map: 1. Africa (Congo), 2. Comores, 3. Madagascar, 4. Marquesas, 5. Tahiti.

1064; ELMER, Leaf. Philip. Bot. 5 (1913) 1659. — *B. zollingeri* FAWC. Trans. Linn. Soc. Bot. II, 2 (1886) 234, t. 34. — *B. micrantha* WARB. in Perkins, Fragm. Fl. Philip. (1905) 169; ELMER, Leaf. Philip. Bot. 5 (1913) 1659; MERR. En. Philip. 2 (1923) 118. — *B. insularis* RIDL. J. Str. Br. R. As. Soc. 45 (1906) 218; Fl. Mal. Pen. 3 (1924) 175. — *B. trimera* TIEGH. Ann. Sc. Nat. Bot. IX, 6 (1907) 148. — *Balaniella abbreviata* (BL.) TIEGH. l.c. 181. — *Balaniella alutacea* (JUNGH.) TIEGH. l.c. 181. — *B. fawcettii* ELMER, Leaf. Philip. Bot. 5 (1913) 1659. — *B. subglobosa* ELMER, l.c. 1660; MERR. En. Philip. 2 (1923) 118. — *Acroblastum fawcettii* (ELMER) SETCH. Un. Cal. Publ. Bot. 19 (1935) 146. — *Acroblastum insulare* (RIDL.) SETCH. l.c. 147. — *Acroblastum subglobosum* (ELMER) SETCH. l.c. 147. — *B. sarasinorum* WARB. ex HARMS in E. & P. Nat. Pfl. Fam. ed. 2, 16b (1935) 333, nom. nud. — Fig. 21.

Monoecious plants (inflorescences bisexual), creamy-white to pale yellow. Length from fusion with host root to top of inflorescence (3–) 5–10 (–15) cm. Tubers single, or several together in a mass, branching from the base. Single tubers obconical, narrow at base, broadening near top to (1–) 1.7 (–2) cm, length (1–) 2¹/₂ (–3¹/₂) cm. Surface fine granular, with or without scattered stellate warts. Leaves 3–7, distichous, evenly spaced, slightly imbricate 1–2 by ³/₄–1¹/₂ cm, ovate, obtuse or emarginate. ♂ Flowers 10–20, in a zone ¹/₂–2 cm high below ♀ part of inflorescence (Hainan material

with a few (3–8) ♂ flowers also at top of the ♀ part). Pedicels extremely short, c. 1 mm, or flowers sessile. ♂ Flower (3–) 4–5 (–8)-merous, bisymmetric or slightly to conspicuously zygomorphic on account of lateral elongation. A 4-merous flower will have 2 narrow, ovate, acute lateral tepals, and 2 wide, truncate, almost square median tepals. Length of tepals 1¹/₂–2 mm. Synandrium with fertile part about 1 mm long, slightly compressed, lateral width 1¹/₂–2 mm, anterior-posterior width ¹/₂–³/₄ mm. Anthers divided into 16–20 parallel loculi, running from base to top of synandrium, or the loculi may be transversally divided into smaller locelli. ♀ Inflorescence ovoid, (1–) 1¹/₂ (–2¹/₂) by (1¹/₂–) 1 (–2¹/₄) cm. Spadicles 850–1000 μ long with a lower cylindrical part 140–180 μ wide, and an upper, obconical, truncate, part 400–500 μ wide. ♀ Flowers on main axis of inflorescence as well as on lower part of spadicles. Largest flowers with pistils 950–1100 μ long, ovaries ovoid to ellipsoid, 300–450 μ by 175–250 μ.

Distr. Africa (Congo), Comores, Madagascar, SW. China, Hainan, Indian and Indo-Chinese subcontinents, Andamans, throughout Malesia (but very scattered and not yet known from Borneo and the Moluccas), and in the Pacific (Tahiti, Marquesas). Fig. 22.

Ecol. From about sea-level to 1000 m, mostly in evergreen forests. Flowering season in Malesia May–Jan. Hosts recorded: *Tetrameles nudiflora* R. BR. (*Datisca*), *Hibiscus tiliaceus* L. (*Malv.*), *Ficus*

baroni BAKER, *F. coccolifolia* BAKER *ssp. sakalavarum* BAKER, *F. tinctoria* L. f. (Morac.).

Note. Distinguished from *B. fungosa* *ssp. fungosa* by its distichous leaves and by the pedicels of ♂ flowers being very short or absent. Flowering specimens may occur 3 m high above the soil in *Ficus* specimens (RANT *in sched.*).

7. *Balanophora latisepala* (TIEGH.) LECOMTE, Fl. Gén. I.-C. 5 (1915) 228; HANSEN, Dansk Bot. Ark. 28 (1972) 140, f. 37, 38. — *Balaniella latisepala* TIEGH; Ann. Sc. Nat. Bot. IX, 6 (1907) 184. — *B. truncata* RIDL. J. Linn. Soc. Bot. 41 (1913) 296; Fl. Mal. Pen. 3 (1924) 174; BURK. & HEND. Gard. Bull. S. S. 3 (1925) 419; CALDER *et al.* Rec. Bot. Surv. India 11 (1926) 16; HEND. Gard. Bull. S. S. 4 (1927) 102. — *B. multibrachiata* (non FAWC.) HEND. J. Mal. Br. R. As. Soc. 5 (1927) 266; MERR. Contr. Arn. Arb. 8 (1934) 54 p.p. — Fig. 23.

Diocious plants (inflorescences unisexual), yellowish white to yellow or grey. Length from fusion with host root to top of inflorescence 10–25 cm. Tubers in a mass, branching from the base. Single tuber subspherical-ellipsoid, 2–4¹/₄ by 1³/₄–2¹/₂ cm. Surface of tubers fine granular with few to numerous stellate warts. Stem mostly long and slender, ³/₄–1¹/₄ cm ∅ below inflorescence.



Fig. 23. *Balanophora latisepala* (TIEGH.) LEC. left, ♂ right (after HANSEN, 1972, 141–142, fig. 37–38), both × ³/₄.

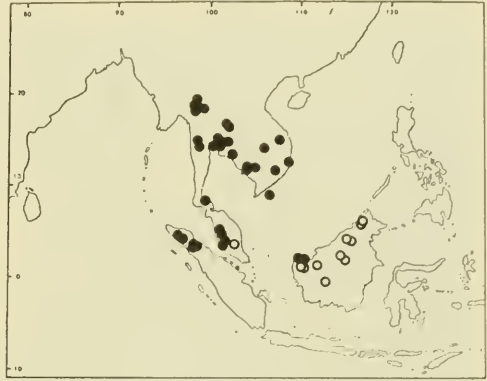


Fig. 24. Range of *Balanophora reflexa* BECC. (○) and *B. latisepala* (TIEGH.) LEC. (●).

Leaves 3–4 (–6), well spaced, distichous, patent. ♂ Inflorescence long-ellipsoid, 5–9 cm long and 1¹/₂–2¹/₂ cm wide with flowers expanded. Bracts truncate, c. 3 mm long and 5 mm wide, sometimes with the middle part reduced and thus appearing like two teeth. Pedicels (1¹/₂–) 2–3 (–6) mm long. ♂ Flowers bisymmetric or zygomorphic on account of lateral elongation and correspondingly compressed in anterior-posterior direction, 4–5 (–9–14)-merous. A normally developed 4-merous flower will have two narrow, ovate, acute lateral tepals 3–3¹/₂ by 1¹/₂–2 mm and two wide, nearly square, truncate median tepals 3–3¹/₂ by 3–4 mm. In a 5-merous flower the upper median tepal is normally split into two. Higher numbers of tepals may be caused by further splitting up of median tepals or simply by fusion of neighbouring flowers. Synandrium with fertile part laterally elongated, somewhat compressed in anterior-posterior direction. Anther cells 16–20 or more, parallel, always running from base to top of synandrium, opening longitudinally. ♀ Inflorescence (1–) 4–6 (–7) cm long and (1¹/₂–) 1–1¹/₂ (–2) cm wide, long-ellipsoid or almost cylindrical with obtuse top part. Spadicles (730–) 1050 (–1270) μ long, lower part cylindrical, c. 100 μ wide, upper part obovoid, 300–600 μ wide, about ¹/₃ of total length of spadicle. ♀ Flowers on main axis of inflorescence as well as on spadicles, the largest flowers being those on the main axis. Largest flowers with pistils (845–) 1070 (–1300) μ long. Ovaries ovoid, (300–) 360 (–400) μ long.

Distr. Indo-China, Thailand, in Malesia: Malaya, N. Sumatra, Borneo (Sarawak, twice). Fig. 24.

Ecol. In various kinds of forest, from 1200–1700 m. Flowering season in Malaya, Sumatra, and Borneo probably all year round, but more records are necessary. Parasitizing various trees and climbers. Hosts recorded: *Gymnema* sp. (Ascl.), *Bambusa* sp. (?) (Gram.), *Ficus religiosa* L. (Morac.), *Sterculia* sp. (Sterc.), *Tetrastigma* sp. (Vitac.).

Note. Distinguished from *B. polyandra* in the anther cells not being transversally divided into smaller locelli.

4. LANGSDORFFIA

MART. in Eschw. J. Bras. 2 (1818) 179; Nov. Gen. Sp. Pl. 3 (1832) 182; ENDL. Gen. Pl. (1836) 74; KLOTZSCH, Linnaea 20 (1847) 460; HOOK. f. Trans. Linn. Soc. 22 (1856) 29; EICHL. in Mart. Fl. Bras. 4, 2 (1869) 9; in DC. Prod. 17 (1873) 140; HOOK. f. in B. & H. Gen. Pl. 3 (1880) 236; ENGL. in E. & P. Nat. Pfl. Fam. 3, 1 (1889) 262; HARMS in E. & P. Nat. Pfl. Fam. ed. 2, 16b (1935) 335, f. 169. — Fig. 25, 26.

Herbaceous, fleshy parasites. *Tubers* elongated, cylindrical, somewhat swollen at point of contact with the host root, more or less hairy. *Inflorescences* appearing endogenously from the cylindrical parts of tubers, basally surrounded by an irregularly lobed sheath. *Stem* in lower part with numerous spirally arranged, triangular to narrowly triangular, pergamentaceous, acute scales, exceeding the flowers; flower-bearing apex of stem flattish or slightly convex. *Inflorescences* unisexual with trimerous, pedicellate δ flowers or with very numerous f flowers apparently laterally connate in their lower parts, having a short tubular perianth and one style.

Distr. 3 spp., one in Madagascar (*L. malagastica* (FAWC.) HANSEN, Bot. Tidsskr. 69, 1974, 59), one in Malaysia (New Guinea), and one in Central and tropical South America (*L. hypogaea* MART.). Fig. 6.

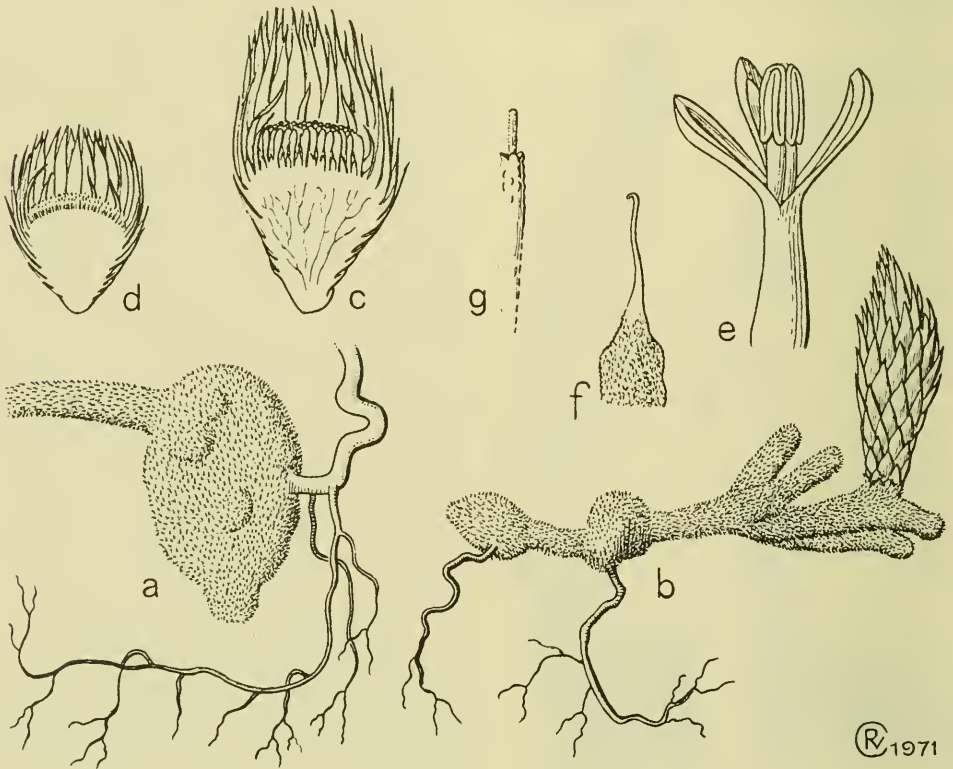


Fig. 25. *Langsdorffia papuana* GEESINK. a. Swollen part of tuber with part of root of the host, b. tuber with young inflorescence, c. LS through a nearly full-grown δ capitulum, d. *ditto*, f capitulum, all $\times 1/2$, e. δ flower, f. reduced scale between δ flowers, both $\times 3$, g. f flower, $\times 6$ (after GEESINK, 1972).

1. *Langsdorffia papuana* GEESINK, Acta Bot. Neerl. 21 (1972) 104, f. 1 — *Langsdorffiae* indet.: WOMERSLEY & STREIMANN, Proc. Papua & New Guinea Sci. Soc. 22 (1970) 31-34. — Fig. 25, 26.

Yellowish to reddish parasites with unisexual inflorescences. *Tuber* cylindrical, c. 1 cm \varnothing , swollen up to 3 cm \varnothing at the point of contact with host root, densely patently hairy, less so at swollen parts. *Inflorescences* surrounded at base by a 5-8-lobed sheath. Inflorescence-bearing stem obconical, $2\frac{1}{2}$ -5 cm long, in upper part 3-5 cm \varnothing , in lower part c. 1 cm \varnothing , with numerous adpressed, pergamentaceous, imbricate, scaly leaves. *Leaves* creamy stramineous to reddish with brown tips, lower ones triangular $\frac{1}{2}$ by $\frac{1}{2}$ cm, upper ones narrowly triangular, up to 5 by 1 cm. σ *Inflorescence* carrying among the flowers reduced, reddish scales with a papillose base. σ *Flowers* 1 cm by 3 mm when not expanded, creamy yellow. Pedicels $\frac{3}{4}$ cm. Tepals (2-) 3, elliptic, boat-shaped, valvate, c. $\frac{3}{4}$ cm by 3 mm. Stamens (2-) 3, epitepalous, filaments united into a tube c. $2\frac{1}{2}$ mm long. Anthers with their connectives united up to $\frac{1}{3}$ of their length, ovate-elliptic, emarginate at the base, rounded at apex, c. 4 by 2 mm, 2-celled and horseshoe-shaped with the bend upwards. \mp *Flowers* inserted very close to each other, apparently laterally connate in lower parts. Style up to halfway surrounded by a tubular, apically shortly 4-6-lobed perianth up to 1.3 by 0.4 mm; exerted part of the style c. 1.3 by 0.2 mm, surface cells somewhat swollen. Ovary apparently without cavity. The diaspore consists of embryo + endosperm surrounded by 2-3 layers of sclereid cells and is dispersed upon the decay of the infructescence.

Distr. *Malesia*: E. New Guinea. Fig. 6.

Ecol. Parasitizing roots of *Vaccinium* sp. (*Eric.*), *Eugenia* sp., *Metrosideros eugenioides* (SCHLTR) STEEN. (*Myrt.*) and *Meliosma pinnata* (ROXB.) WALP. (*Sab.*). Upper part of flowering heads appears above humus layer in *Nothofagus* forest at 1500 m.



Fig. 26. *Langsdorffia papuana* GEESINK. New Yamap, Head of Baime Creek, Wau Subdistr., E. New Guinea ($7^{\circ} 08' S$, $146^{\circ} 46' E$), 1500 m, two spadices, one in bud (above, 4 cm wide), one in anthesis (below) (Photogr. STREIMANN, NGF 44461).

Doubtful

Cynomorium philippinense BLANCO, Fl. Filip. (1837) 665; ed. 2 (1845) 464; ed. 3, 3 (1879) 72; MERR. Sp. Blanc. (1918) 134; En. Philip. 2 (1928) 119.

This is a *Balanophora*. According to the description it is a monoecious plant, and might belong to *B. fungosa*, but the imperfect description makes identification uncertain.

TACCACEAE (E. Drenth, Leyden)

The affinity of *Taccaceae* has been subject to diverse opinions, many authors favouring a place near *Dioscoreaceae*, but in my view the unisexual flowers, the branching habit, the racemose inflorescences and the 3-celled ovary in that family make this not very probable. I prefer to share the opinion of those who seek its affinity to *Amaryllidaceae*, because of the habit, the scape-shaped inflorescence, the umbellate flower disposition with an involucre, and the fact that in that family also occasionally a 1-celled ovary is found. Neither the systematic anatomy nor the inadequately known phytochemistry or chromosome number are sufficiently diagnostic to support opinions on affinity.

Before my precursory revision (1972) two genera were distinguished, viz *Tacca* and a monotypic genus, *Schizocapsa* (*S. plantaginea* HANCE) ranging from Thailand to Kweichow, which differs only by having dehiscent capsular fruits instead of the indehiscent ones in *Tacca*. I have seen since that this species has dehiscent fruit indeed, which removes my doubt (*l.c.* 370) on this point. I have tried to see whether there may be a tardy dehiscence in *Tacca* by keeping fruit stalks of *T. chantrieri* in erect position in the Leyden greenhouse, but this had no result. I see no reason to keep *Schizocapsa* as a separate genus or infrageneric taxon.

TACCA

J. R. & G. FORST. Char. Gen. Pl. (1775) 35, *nom. cons.*; PAX in E. & P. Nat. Pfl. Fam. 2, 5 (1887) 127; LIMPR. Inaug. Diss. Breslau (1902) 43; Pfl. R. Heft 92 (1928) 13; DRENTH, Blumea 20 (1972) 367, see there for further synonyms. — *Leontopetaloides* BOEHMER in Ludwig, Def. Gen. Pl. (1760) 512, *nom. rejic.* — *Ataccia* PRESL, Reliq. Haenk. 1, 3 (1828) 149. — **Fig. 1-11.**

Terrestrial, erect, perennial, mostly rosulate, scapose herbs. *Rhizome* tuberous, solid, starchy, globose or elongate, either with apical growth or with spaced growing points. *Leaves* up to 13, appearing together with the inflorescence, either spaced or crowded on the rhizome, petioled, entire, pinnatifid, palmatifid or palmatisect and palmatisect with pinnately divided segments; herbaceous to chartaceous; nervation palmate or pinnate; venation reticulate; petioles erect, ribbed, canaliculate distally, glabrous, with a sheathing base, solid, rarely hollow. *Inflorescences* umbellate, involucre, sometimes bracteate; peduncle(s) (scape) simple, solid, very rarely hollow, erect, ribbed, distally canaliculate. *Involucral bracts* mostly 4 in 2 whorls (in *T. leontopetaloides* 4-12, in *T. bibracteata* 2), herbaceous, mostly erect, the outer ones mostly longer persisting after anthesis than the inner ones which are likewise originating later in the young stage of growing, always flattened, entire, parallel- or curvined, sometimes also pinnately nerved. *Floral bracts*, if present, filiform, never flattened, of the same number as the flowers, caducous after anthesis. *Flowers* actinomorphic, bisexual, epigynous, gamophyllous, with 6 lobes in 2 whorls, imbricate in bud, mostly very dark coloured, parallel- or curvined; pedicels 6-ribbed, elongated and thickened in fruit. *Stamens* 6, inserted on the corolla tube, epitepalous, outer ones slightly larger than inner ones; filaments short and flattened, at the base — except for the margins, which are inflexed — adnate to the perianth tube, this portion rhomboid in outline; the free portion helmet-shaped; thecae placed at the inner side of the helmet, introrse, lengthwise dehiscent. *Ovary* 1-celled, 3-carpellate, obpyramidal, 6-ribbed;

placentas 3, parietal, each with ∞ pendulous, apotropous-anatropous ovules; disk sometimes present; style 1, provided with 3 — sometimes deeply — incised wings, its apex with 3 obcordate lobes, each provided with a clear stigmatic canal. *Fruits* berry-like, with a fleshy pericarp, 6-ribbed, irregularly desintegrating, rarely (in one extra-Mal. *sp.*) dehiscent. *Seeds* completely filling the fruit, 10- ∞ , with a strongly ribbed, mostly glabrous testa and a mostly distinct raphe.

Distribution. Ten species, pantropical, within the tropics of Cancer and Capricorn, mainly developed in *Malesia*, where 8 out of 9 Old World species occur; 1 species in tropical South America. Fig. 1.

Ecology. Mostly on the floor of moist evergreen primary and secondary forests, but *T. palmata* also under seasonal climatic conditions for example in teak forest, and possibly *T. chantrieri* also in seasonal or dry evergreen forest in SE. Asia, not bound to special soil types. *T. leontopetaloides* has a far wider distribution and deviates from the other species in rarely occurring in primary forest but preferring secondary forest and thickets, and many open situations, clearings, grassland, savannah, coconut groves, and beach vegetation (*Barringtonia* formation), not shunning seasonally dry areas, such as teak and eucalypt woodland; its originally native habitat is probably the beach forest, but because of the food value of its tubers it is likely that it has been dispersed by man since time immemorial and though this can no longer be traced and proved it is likely that a great part of its range has been effected by man.

As to altitude, most species are restricted to the lowlands ascending to c. 1000 m; *T. palmata*, however, has been found up to 1200 (-1500) m.

Flower biology. The syndrome of sapromyophily as described by FAEGRI & VAN DER PIJL (Principles of pollination ecology, 1966, 87-90) is clearly apparent in *Taccaceae*. There is an ecological group of *Diptera* attracted to blossoms by the 'impression of decaying substance', no adaptation of the flies for flower visits is present: 'the basis for the visit is deceit'. The adaptations of the plant are found in the inflorescence or in the flowers. Generally, the colours are dull, dark, brown-purple-greenish, these colours having under ordinary circumstances no attraction for this class of pollinators, viz the carrion and dung flies, but the same colours do possess a positive attraction value in the presence of the odour of decaying protein. These characters are present in *Taccaceae* (colours) or possible (odour) as we see in the flowers a large number of glandular epidermal cells. The flies find in the flowers openings through which they can crawl inside. An attraction point is here the light inner side of the flowers, which functions as a kind of window, towards which the insects crawl. As, however, the *Tacca* flowers have nothing to offer to the visitors, the latter will soon try to leave the flower. The structure of the flowers makes this difficult,

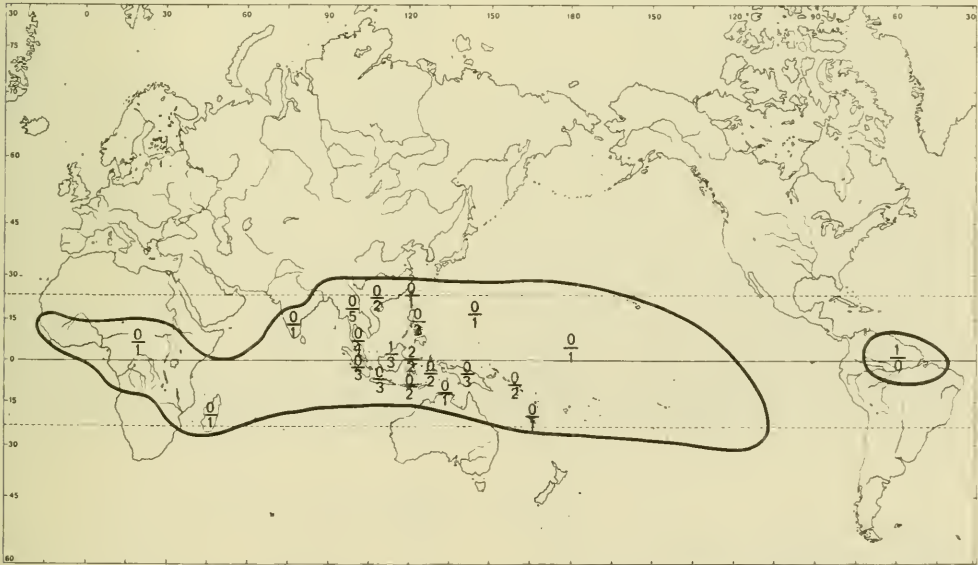


Fig. 1. Range of the genus *Tacca*; figures above the hyphen denote the number of endemic species, those below the hyphen the non-endemic species for each area or island group.

for the pollination units are built as traps—the helmet-like stamens, the obcordate lobes of the stigma—so that the insects cannot leave the flowers without efforts by which they effect pollination. It is not known whether the glandular cells secrete nectar in the flowers.

Besides these points, the filiform floral bracts and the large bracts around the inflorescence also may be attraction points for the insects.

Obviously, the flower biology of *Tacca* may yield interesting points and invites a critical study of observation and experiment yet to be made.

Dispersal. The ovoid or reniform, albuminous, ribbed or papillate seeds are smallish (c. 4–8 mm), with a fairly hard testa; they are freed in that the limping, decumbent, fruiting peduncle sags and deposits the fruit on the soil where it disintegrates; only in the continental SE. Asian species *T. plantaginea* the scape remains obvious erect and seeds are shed from a capsular fruit. How these seeds are dispersed over larger distances is unknown, but the more or less fleshy fruits will probably be eaten by ground animals; the raphe of the seed is distinct and fleshy. Some seeds must lead to new specimens at close range as *Taccas* are mostly found in groups of specimens.

In *T. leontopetaloides* the tuber emits from the growth apex thickish runners which grow downward and form a new tuber at apex, replacing the original tuber.

Seedlings. In the entire-leaved species young leaves are not different in shape from the mature ones. In *T. leontopetaloides* the first leaves are palmately incised, alike those of *T. palmatifida*; only later the mature leaves gain the 3-lobed pinnatifid structure.

It is observed that *T. leontopetaloides* may set flower after three years from seeding.

After flowering for the first time *Tacca* plants gain in dimension and differences in size have hence no systematical value.

In *T. leontopetaloides* leaves die off between December and March.

Morphology. The starchy, roundish or elongate, tuberous rhizomes are all naked and cauligenous. There are three types, viz a vertical elongate rhizome with apical growth in *T. integrifolia*, *T. plantaginea* (continental SE. Asia), and *T. chantrieri* (in *T. bibracteata* still unknown), a roundish rhizome with an apical cavity in *T. leontopetaloides*, *T. palmata*, and *T. ebeltajae*, and a horizontal elongate rhizome from the upper part of which leaves and inflorescences are emitted in a spaced way, hence without apical growth, in *T. palmatifida*, *T. celebica*, and *T. parkeri* (South America).

The erect peduncle (scape) terminates in an involucre consisting of leafy, herbaceous, mostly erect bracts, between which the umbellately arranged flowers are situated. EICHLER's assumption that the flowers are placed in cincinni must be checked anatomically. Except in the palmately-leaved species and in *T. parkeri* long, filiform, drooping bracts are found between the flowers.

The epitepalous stamens have a characteristic structure: the short flattened filaments are adnate to the perianth tube except for the inflexed margins and a short free apical part which is like a helmet at the inside of which the anther cells are placed.

At the base of the style an annular zone or disk is sometimes present; in this zone glandular cells are present together with short or long emergences. Only in *T. leontopetaloides* the disk is clearly developed and provided with glandular hairs.

Phytochemistry. Starch is (or was) produced from the tuberous rhizomes of several species of *Tacca*. The underground parts are reported to be bitter and toxic; special treatments are used to make edible the starch or whole tubers. Unfortunately the chemical nature of the constituents of *Taccaceae* is still completely unknown. Alkaloids are said to be present in *T. integrifolia* KER-GAWL. (syn. *T. cristata* JACK) and *T. leontopetaloides* (L.) O.K. The tubers of the latter species were investigated by J. SCHEUER *et al.* (Lloydia 26, 1963, 133). Besides ubiquitous substances like sucrose, β -sitosterol and cerylic alcohol, a bitter principle and a yellow ester were isolated by these authors. Preliminary investigations of the bitter principle, named taccalin, indicate that it represents a rather unusual plant constituent. No structures of the systematically more relevant constituents of *Taccaceae* being known at present, chemotaxonomy cannot yet give any help to plant systematics in this instance.—R. HEGNAUER.

Taxonomy. PAX (1887) and LIMPRICHT (1928) subdivided the genus into two and three sections respectively, mainly based on the degree of dissection of the leaves and presence *q.* absence of the filiform bracts. These sections are in my opinion unsatisfactory from the affinity point of view; there are four or five groups of species, three of which monospecific, and I find it undesirable to give these formal sectional rank. The only New World species, *T. parkeri* SEEM., occupies a rather isolated position, in that it does not fit into any of the Old World groups but shares certain characteristic characters with all of them.

Uses. The only species that is a useful plant for its edible tubers is *T. leontopetaloides*; see there.

KEY TO THE SPECIES

1. Leaves entire, elliptic, oblong to lanceolate.
2. Involucral bracts 2 4. *T. bibracteata*
2. Involucral bracts 4.
3. Seeds ovate to ovate-oblong in outline, convex-concave, dorsoventrally flattened, more or less shell-

shaped. Fig. 5a-b. Involucral bracts not decussate, 2 outer ones opposite, 2 inner ones more or less in the axils of one of the outer ones 2. *T. integrifolia*

3. Seeds reniform, laterally flattened. Fig. 5c-d. Involucral bracts more or less decussate.

3. *T. chantrieri*

1. Leaves distinctly shallowly or deeply lobed.

4. Leaves palmately divided into 3 lobes, each lobe pinnately divided into numerous smaller ones. Filiform bracts present 1. *T. leontopetaloides*

4. Leaves palmately incised and/or divided into 3-13 lobes, each lobe simple or only palmately divided into few \pm similar lobes. Filiform bracts absent.

5. Leaves and inflorescence(s) crowded in a hollowed portion of a tuberous, roundish rhizome. Flowers inserted on the end of the scape between the bracts.

6. Outer involucral bracts oblong-ovate, 1-2.5 by 0.4-1 cm, inner ones cordate, 3-4.5 by 1.5-2 cm. Inner perianth lobes obovate, 5-6 by 3-4 mm, with rounded apex. Fruit obpyramidal, 1.3-1.5 by 0.8-1.2 cm 6. *T. ebelatae*

6. Outer involucral bracts broadly-ovate to ovate, 2.5-9.5 by 2-9 cm, inner ones broadly-ovate to cordate, 4.5-10 by 2.5-6 cm. Inner perianth lobes constricted halfway, 3-5 by 2-4 mm, the apex acuminate. Fruit globose, up to 1 cm in \varnothing 5. *T. palmata*

5. Leaves and inflorescence(s) all spaced on an elongated, horizontal, cylindrical, tuberous rhizome. Flowers inserted on the basal portion of the inner two bracts.

7. Leaves simple, palmately incised for almost $\frac{1}{3}$ of their length. Fruit ellipsoid to obovoid, 2.2-3 by 1 by 1 cm. 7. *T. palmatifida*

7. Leaves palmately compound, with 5 stalked leaflets of which the outer 2 may be connected at the base. Fruit obpyramidal, 1.8 by 1 by 0.8 cm 8. *T. celebica*

1. *Tacca leontopetaloides* (L.) O.K. Rev. Gen. Pl. 2 (1891) 704; BAILL. Hist. Pl. 13 (1894) 165, f. 107-110; BACK. Handb. Fl. Java 3 (1924) 107; HEYNE, Nutt. Pl. (1927) 452; LAM, Nieuw Guinee 1 (1935) 189, f. 37; MERR. J. Arn. Arb. 26 (1945) 85-92, pl. 1-2; HAYWARD, Baileya 5 (1957) 85; MANSFELD, Die Kult. Pfl. Beih. 2 (1959) 568; PARHAM, Pl. Fiji Is. (1964) 283; BACK. & BAKH. f. Fl. Java 3 (1968) 212; DRENTH, Blumea 20 (1972) 375, pl. 1, f. 1-7, with full synonymy and references. — *T. sativa* RUMPH. Herb. Amb. 5 (1747) 324, t. 112, p.p., is partly *Amorphophallus*. — *T. phallifera* RUMPH. l.c. 326, t. 113, p.p., is partly *Amorphophallus*. — *T. littorea* RUMPH. l.c. 328, t. 114. — *Leontice leontopetaloides* L. Sp. Pl. 1 (1753) 313; BURM. f. Fl. Ind. (1768) 82. — *T. pinnatifida* J. R. & G. FORST. Char. Gen. Pl. (1775) 35, t. 35; ROXB. Fl. Ind. ed. Carey 2 (1832) 172; DECNE, Nouv. Ann. Mus. Hist. Nat. Paris 3 (1834) 368; GRIFF. Ic. Pl. As. 3 (1851) t. 272a, 1, 2; FILET, Pl. Bot. Tuin Weltevr. (1855) 13; MIQ. Fl. Ind. Bat. 3 (1859) 577; BENTH. Fl. Austr. 6 (1873) 458, *cum var.*; BAKER f. Fl. Maur. (1877) 370; HOOK. f. Fl. Br. Ind. 6 (1892) 287; Bot. Mag. III, 49 (1893) t. 7299, 7300; KAERNB. Bot. Jahrb. 16 (1893) Beibl. n. 37, 13; BAKER f. Fl. Trop. Afr. 7 (1898) 413; BAILEY, Queensl. Fl. 5 (1898) 1613; TRIM. Fl. Ceyl. 4 (1898) 273; LIMPR. Inaug. Diss. Breslau (1902) 50, *incl. ssp. involucrata* LIMPR. *etc.*; RIDL. Mat. Fl. Mal. Pen. 2 (1907) 76; MERR. Fl. Manila (1912) 150; BAILEY, Compr. Cat. Queensl. Pl. (1913) 548, t. 533, *incl. var. brownii* (SEEM.) BAILEY, l.c. t. 534; MERR. Int. Rumph. (1917) 144; RIDL. Fl. Mal. Pen. 4 (1924) 309; LIMPR. Pfl. R. Heft 92 (1928) 27; GAGNEP. Fl. Gén. 1-C. 6 (1934) 697; BURK. Dict. (1935) 2118; PERRIER DE LA BATHIE, Fl. Madag. fam. 43 (1950) with plate; QUIS. Medic. Pl. Philip. (1951) 177. — *T. pinnatifolia* GAERTN. Fruct. (1788) 43, t. 14. — *T. involucrata* (LIMPR.) SCHUM.

& THONN. Beskr. Guin. Pl. (1827) 197; DARLINGTON & WYLIE, Chrom. Atlas ed. 2 (1955) 403. — *T. dubia* SCHULT. Syst. Veg. 7 (1829) 167. — *T. gaogao* BLANCO, Fl. Filip. (1837) 262. — [*T. maculata* ZIPP. ex SPAN. Linnæa 15 (1841) 480, *nom. nud.*] — *T. brownii* SEEM. Fl. Vit. (1866) 100; LIMPR. Pfl. R. Heft 92 (1928) 30. — *T. artocarpifolia* SEEM. Fl. Vit. (1866) 101. — *T. maculata* SEEM. l.c. 103. — *T. samoensis* REINECKE, Bot. Jahrb. 25 (1898) 595, t. 9. — *T. viridis* HEMSL. in Hook. Ic. Pl. IV, 6 (1899) t. 2515, 2516; LIMPR. Inaug. Diss. Breslau (1902) 50; RIDL. Mat. Fl. Mal. Pen. 2 (1907) 78; LIMPR. Pfl. R. Heft 92 (1928) 26; GAGNEP. Fl. Gén. 1-C. 6 (1934) 697. — *T. hawaiiensis* LIMPR. Pfl. R. Heft 92 (1928) 30.

Tuber depressed-globose or broadly ellipsoid, thin-skinned, smooth, 1.5-5 cm high by 1-8 by 0.5-4 cm, white when young, older dark grey to brown, white within, somewhat juicy, growing near the surface to up to 50 cm deep, provided with an apical cavity emitting the leaves and inflorescences: the tuber is replaced during the year by a new main tuber which arises from a downward-growing runner-like thick rhizome at a lower level and remains dormant after yearly death of aerial parts of the original plant. Base of the leaves and the inflorescence in young plants (mostly?) surrounded by a linear-lanceolate, special leaf (cataphyll) 8-21 by 1.2-3 cm. *Leaves* 1-3, broadly obovate, ovate, or oblong-ovate in outline, palmately 3-sect, each of the 3 segments pinnately lobed to dissected, up to 70 by 120 cm; lobes orbicular to linear; petiole hollow, 17-150 by 0.3-2.5 cm, sheath 2-25 by 0.6-3.5 cm. *Inflorescences* 1 or 2, 20-40-flowered; scape hollow, green, 20-170 by 0.2-2.5 cm. *Involucral bracts* of different size, large ones 4-9 (-12), mostly surrounding the scape, sometimes only on the ribbed side of the scape (in that case with up to 10 small bracts in the

canaliculate zone), light to dark green, sometimes with fine purplish margin, 2 (-4) outer ones sessile, (ob)ovate, oblong, or lanceolate, 2.5-10 by 1.2-3.5 cm, with attenuate or cuneate base, acuminate at the apex, acumen entire or 2-3 dentate; 2-7 (-10) inner bracts more or less similar in shape to the outer ones, acuminate at the apex, curvined with pinnate side nerves, 2.5-10 by 0.7-5 cm; the small bracts linear lanceolate, sessile, with acute apex, 5-7 by 1-1.5 mm. *Filiform bracts* 20-40, up to 25 cm, (dark) purple or dark blackish-brown. *Flowers* 6-17 by 6-13 mm, drooping, light yellow, yellowish green or blackish purplish green; pedicel up to 6 cm by 1 mm (in fruit up to 8 cm by 2 mm); perianth tube 1.5-5 by 4-11 mm. *Perianth lobes* mostly fleshy with membranous margins, persistent, 3 outer ones elliptic or ovate (lanceolate), (1.5-) 4-7 by 2-3 mm, 3 inner ones (broadly) ovate or oblong ovate, 5-7.5 by 2.5-5 mm; apices obtuse or retuse, rarely truncate. *Stamens* white or dull yellow to brown or purple; adnate portion of the filaments 1-5 by 2-2.5 mm, free apical portion 1.5-2 by 1.5-2 mm, thecae up to 2 mm long. *Ovary* 2-5 by 2-4 mm; disk annular, ribbed, (always?) with numerous pellucid glandular hairs, 1.5-3 mm \varnothing ; style 1.5-3 by 0.5-1.5 mm, whitish to green; stigmatic lobes whitish to purple, 1.5-2 by 2-3 mm, sometimes their 2 apices emarginate. *Fruit* mostly globose, 1.5-2.5 cm \varnothing , but sometimes ellipsoid or ovoid, up

to 3.5 by 1.5-2.5 cm, pendulous, pale to darker green, finally pale orange; pericarp up to 1.5 mm thick. *Seeds* many, ovoid to ellipsoid, flattened, 5-8 by 3-5 by 1.5-3 mm glabrous, yellowish brown, with a spongy white testa, 15-19-ribbed.

Distr. Widely distributed in the Old and New World from W. Africa through SE. Asia, throughout *Malesia*, N. Australia to Polynesia (as far as the Tuamotus, Marquesas, and Hawaii). Fig. 2.

Ecol. Very indifferent to climatic, soil, and vegetation conditions, more rarely in heavy shade and in primary forest, frequently in coastal vegetation, usually below 200 m, occasionally up to 1100 m, the superterranean parts mostly dying off between December and March. *Fl. fr.* Jan.-Dec.

Seeds might be dispersible by seawater, and might possess buoyancy by their spongy testa. It is said also that some birds eat the fruit (RIDL. *Disp.* 1930, 470). Dispersal by man, however, is the most effective agency, as the plant has been and still is generally used for food.

Uses. Starch is extracted for making bread, paste, and puddings mixed with other ingredients. Good washing is essential because of the presence of the bitter substance (taccalin) which is said to be poisonous. Tubers are dug when the aerial parts have died off. In India and Polynesia tubers are also used as a medicine against diarrhoea. In Polynesia the fibres of the peduncle are used for making hats and for fishing. Especially in the

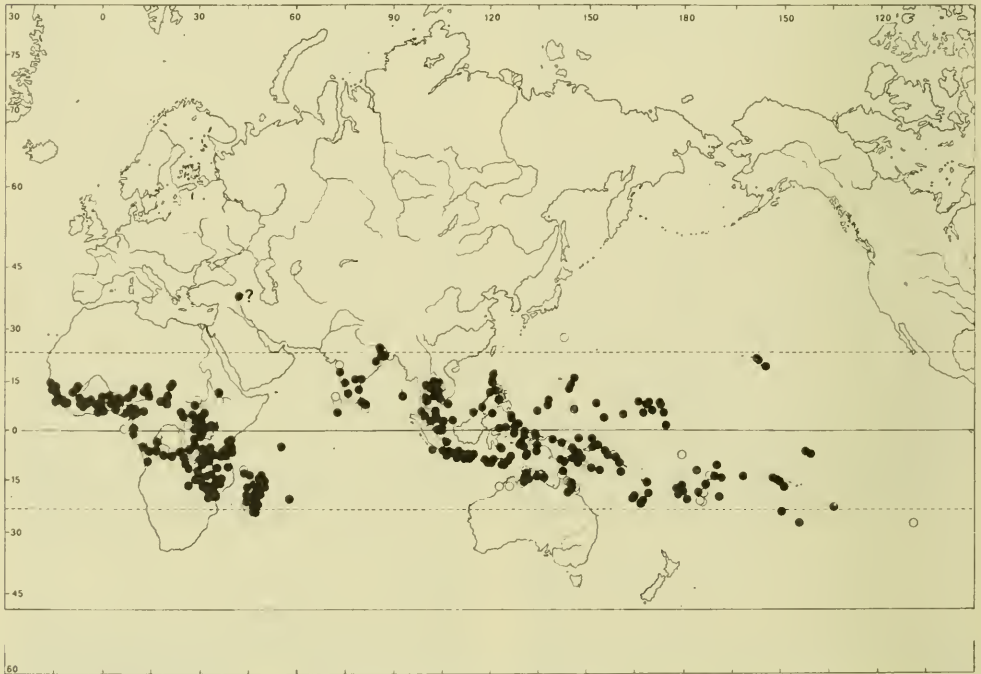


Fig. 2. Range of *Tacca leontopetaloides* (L.) O.K. Circles are localities derived from literature.

Pacific islands the plant has been cultivated on an extensive scale (see HEYNE, 1927). In cultivated plants the tuber is 5–10 cm long, but whether it may reach the size of a coconut, as is sometimes cited in literature, is doubtful to me.

Vern. Malaya: (*poko*) *lukeh*, (? *lekeh*). Sumatra: *lêki*, Atjeh, *lago leké*, Riau, *krubut*, Enggano. Java: *katjondang*, *tjondang*, S., *katjunda*, *taka laut*, M., *labing*, Md., *kêjtondang*, *tjondang*, J., *totoan*, Kangean. Timor: *têlo*, *tiloh*. Celebes: *kalopale*, Buton, *katjodo*, *katjuuda*, Makassar, Saleyer, *katéo*, E. Cel., *têrong i lawanan*, Alf., t.t., Minah. Philippines: *gau-gáu*, *yabyában*, Tag., *kanábong*, *tayóbong*, Bis., *panarién*, Ilk., *tambóbou*, Sbl. Moluccas: *lêkër*, *lîkir*, M., *anuwal*, Taruna, *huda korano*, *huda na raka*, *ncpu*, Ternate, *taá*, Buru. New Guinea: *tavulipum*, Tami.

Notes. In the vegetative state the plant is sometimes confused with equally tuberous species of the Araceous *Amorphophallus*, but it can immediately be recognized by the ribbed, hollow petiole, which is in *Amorphophallus* solid, smooth, and mostly flecked. As a matter of fact it was RUMPHIUS, from whom the name *Tacca* stems, who made this confusion, as MERRILL has revealed in his Interpretation of Rumphian plants (1917).

The species has a formidable synonymy as local forms have been described in many parts of its very large range. LIMPRICHT (1928) has distinguished some of them as subspecies or varieties and even seven forms he maintained as species. These forms and variations were largely based on leaf characters. In my opinion none of them deserves taxonomical distinction.

minor RIDL., *p.p. typ. excl.*; LIMPR. Pfl. R. Heft 92 (1928) 17, *incl. var. latibracteata* LIMPR. *l.c. et var. angustibracteata* LIMPR. *l.c.* 18; GAGNEP. Fl. Gén. 1.-C. 6 (1934) 695; MITRA, Fl. Pl. East. Ind. 1 (1958) 55; SMITINAND, Nat. Hist. Bull. Siam Soc. 20 (1961) 60. — *T. lancaefolia* ZOLL. & MOR. in Mor. Syst. Verz. (1846) 91; MIQ. Fl. Ind. Bat. 3 (1859) 578; LIMPR. Inaug. Diss. Breslau (1902) 48; BEUMÉE, Trop. Natuur 8 (1919) 47, f. 7; BACK. Handb. Fl. Java 3 (1924) 106; LIMPR. Pfl. R. Heft 92 (1928) 19, *incl. var. laevifloris* LIMPR.; BACK. & BAKH. f. Fl. Java 3 (1968) 212. — *Ataccia aspera* KUNTH, Enum. 5 (1850) 464. — *Ataccia laevis* KUNTH, *l.c.* 466. — *Ataccia lancaefolia* KUNTH, *l.c.* 465; ZOLL. Syst. Verz. 1 (1854) 69 (as *Atacca*). — *Ataccia cristata* KUNTH, Enum. 5 (1850) 466; Bot. Mag. 57 (1851) t. 4589; LEMAIRE, Jard. Fleur. 2 (1852) t. 186, 187; KUNTH, Fl. Serres 1, 9 (1853) t. 860–861; OUDEMANS, Neerl. Pl. Tuin 2 (1866) t. 32; LE MAOUT & DECNE, Traité Gén. Bot. (1868) 573; Garden 5 (1874) 219; Gartenflora 30 (1881) 346. — *T. borneensis* RIDL. J. Str. Br. R. As. Soc. 49 (1907) 45; LIMPR. Pfl. R. Heft 92 (1928) 21. — *T. charrieri* (non ANDRÉ) RIDL. Fl. Mal. Pen. 4 (1924) 309. — *T. sumatrana* LIMPR. Pfl. R. Heft 92 (1928) 18, *incl. var. ovalifolia* LIMPR. *l.c.* 19 — *T. chauluriana* DEB, Ind. For. 90 (1964) 241, t. 1, 2. — Fig. 5a–b.

Rhizome cylindrical, growing vertically, up to 12 cm long by up to 3 cm \varnothing . Leaves 2–13, rosulate, very variable, usually oblong(-ovate) or lanceolate, more rarely elliptic, oblong-obovate or linear-lanceolate, greyish green, 7.5–65 by 3–24 cm, base attenuate, rarely cuneate or rounded, apex acuminate; nerves pinnate; petiole 4.5–41 cm by 2–6 mm, sheath 2.5–17 by 0.5–1.5 cm. *Inflorescences* 1–4 (–5), up to 30-flowered; scape 9–65 (–100) cm by 2–7 mm, dark violet, blackish purple, red, or rarely brown. *Involveral bracts* 4, very variable, 2 outer bracts opposite, 2 inner ones implanted together more or less in the axil of one of the outer bracts; outer ones sessile, elliptic, oblong, (narrowly) triangular, or (ovate) lanceolate, 1.5–14 by 0.5–7 cm, green to purple, veined black, apex acute, acuminate, rarely cuspidate; inner bracts thinner than the outer ones, sessile or with attenuate to cuneate base, (ob)ovate, oblong-(ob)ovate, (ob)-lanceolate, or spatulate, rarely orbicular, 2.5–22 by 1–11 cm, white, shaded purple, veined black, apex acuminate or cuspidate. *Filiform bracts* 5–27, up to 25 cm by 0.2–1 mm, white or bright yellow green, on base darker. *Flowers* 1.4–2.7 by 0.6–3.2 cm; buds pale greenish, flowers green, greenish-violet, brownish-purple, or blackish-violet, the colour becomes steadily darker; pedicel 0.5–4 cm by 1–2 mm, dark red or blackish-purple; perianth tube 3–8 by 9–15 mm. *Perianth lobes* mostly reflexed during anthesis and caducous; 3 outer ones elliptic, triangular or oblong, 6–15 (–20) by 4–9 mm, inner ones broadly obovate or broadly ovate, 5–15 by 5–16 mm; at apex emarginate, retuse, rounded, acute, acuminate, or mucronate. *Stamens*: adnate portion of the filaments 2–3 by 0.5–1 mm, free apical portion up to 3 by 1.5 mm, thecae up to

2. *Tacca integrifolia* KER-GAWL. Bot. Mag. 35 (1912) t. 1488; LAMK, Enc. Suppl. 5 (1817) 278; ROXB. Pl. Corom. 3 (1820) 53, t. 257; SPRENG. Syst. Veg. 2 (1825) 118; BL. En. Pl. Jav. 1 (1827) 83; PRESL, Rel. Haenk. 1, 3 (1828) 149; SCHNIZL. Icon. 1 (1843) 58; HOOK. f. Fl. Br. Ind. 6 (1892) 287; LIMPR. Inaug. Diss. Breslau (1902) 44; Pfl. R. Heft 92 (1928) 16, *incl. var. pseudolaevis* LIMPR. *l.c.* 17; MITRA, Fl. Pl. East. Ind. 1 (1958) 55; DRENTH, Blumea 20 (1972) 388, pl. 3, f. 19–21. — *T. cristata* JACK, Mal. Misc. 1, 5 (1821) 23; MIQ. Fl. Ind. Bat. 3 (1859) 578; HOOK. f. Fl. Br. Ind. 6 (1892) 287; BAILL. Hist. Pl. 13 (1895) 167, f. 111–113; LIMPR. Inaug. Diss. Breslau (1902) 44; RIDL. Mat. Fl. Mal. Pen. 2 (1907) 77; J. Str. Br. R. As. Soc. 49 (1907) 45; Fl. Mal. Pen. 4 (1924) 310; LIMPR. Pfl. R. Heft 92 (1928) 20; MERR. Pl. Elm. Born. (1929) 28; BURK. Dict. (1935) 2118; MERR. J. Arn. Arb. 33 (1952) 247; HEND. Mal. Wild Fl. (1954) 187. — *Ataccia integrifolia* PRESL, Rel. Haenk. 1, 3 (1828) 149; MIQ. Fl. Ind. Bat. 3 (1859) 578. — [*T. rafflesiana* JACK ex WALL. Cat. (1831–32) 5172A, B, *nom. nud.*] — *T. aspera* ROXB. Fl. Ind. ed. Carey 2 (1832) 169; LIMPR. Pfl. R. Heft 92 (1928) 20. — *T. laevis* ROXB. Fl. Ind. ed. Carey 2 (1832) 171; GRAHAM, Cat. Bomb. (1839) 730; HOOK. f. Fl. Br. Ind. 6 (1892) 288; HALLIER, Bull. Herb. Boiss. 6 (1898) 613; LIMPR. Inaug. Diss. Breslau (1902) 47; RIDL. J. Str. Br. R. As. Soc. 49 (1907) 45, *incl. var.*



Fig. 3. *Tacca integrifolia* KER-GAWL. In damp forest among rocks, along Ketambe R. (tributary of Alas R.), c. 35 km NW. of Kotatjane, Gajolands, N. Sumatra. Peduncle and bracts are dirty black-purple (Photogr. DE WILDE & DE WILDE-DUYFJES, 14354, 18-8-1972).

2 mm long. *Ovary* 3–15 by 2–7 mm, yellowish green with sepia-purple ribs; disk absent; style 1–3 by 1–3 mm; stigma lobes 1 by 1.5 mm. *Fruit* triangular to circular in cross-section, 2.5–5 by 1–2.5 cm, green to black, tinged with purple, pericarp up to 2 mm thick. *Seeds* ovoid convex-concave, 3.5–6 by 1–3.5 by 1–2 mm, glabrous to strongly papillose, 6–16-ribbed.

Distr. Continental SE. Asia (Bhotan, Assam, Bangla Desh, Burma, Thailand), in *Malesia*: Sumatra (throughout, incl. Banka, Lingga), West Java, Borneo (incl. Nunukan and Anambas & Natuna Is.). Fig. 4.

Ecol. Most primary and secondary forests, on various soils, from sea-level up to 1200 (–1500) m. *Fl. fr.* Febr.-Aug.

Vern. Malaya: *bunganbatong*, *pako bunga subeak*, *pako iangot baoo*, *poko subiak*, *subiak*, Malacca: *jangut bawo*, *kěladi murai*, *lěbak tikus*, *sebiak*, Negri Sembilan, *kělēmoyang ayěr*, *yanggut baung*, *yanggut kěli*. Sumatra: *puar lilipan*, *sa-lipit*, *si dalimbat*, Toba-Batak, Asahan, *djangat baung*, Indragiri, *daun patjam*, *pura gunung*, Djambi, *tambun tambun*, S. Sumatra, *gumba itan*, Banka. Java: *kumis utjing*, *tjurug lukur*. Borneo: *gědang gědang*.

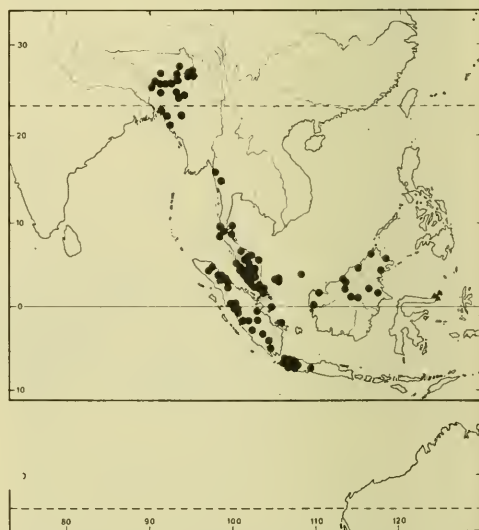


Fig. 4. Range of *Tacca integrifolia* KER-GAWL. (●) and *T. celebica* KOORD. (▲).

3. *Tacca chantrieri* ANDRÉ, Rev. Hort. 73 (1901) 541, with plate; LIMPR. Inaug. Diss. Breslau (1902) 45; non RIDL. Fl. Mal. Pen. 4 (1924) 309 (= *T. integrifolia*); LIMPR. Pfl. R. Heft 92 (1928) 14, incl. *f. garrettii* (CRAIB) LIMPR. l.c., *f. macrantha* (LIMPR.) LIMPR. l.c. et var. *vespertilio* (RIDL.) LIMPR. l.c. 16; GAGNEP. Fl. Gén. 1.-C. 6 (1934) 694; HAYWARD, Baileya 5, 2 (1957) 85; DRENTH, Blumea 20 (1972) 393, f. 1e, pl. 3, f. 22-24. — *T. macrantha* LIMPR. Inaug. Diss. Breslau (1902) 45; BACK. & BAKH. f. FL. Java 3 (1968) 212. — *T. lancifolia* var. *breviscapa* OSTENFELD, Bot. Tidsskr. 26 (1904) 165. — *T. vespertilio* RIDL. J. Str. Br. R. As. Soc. 49 (1907) 46; Mat. Fl. Mal. Pen. 2 (1907) 77. — *T. minor* RIDL. Mat. Fl. Mal. Pen. 2 (1907) 78; Fl. Mal. Pen. 4 (1924) 311; LIMPR. Pfl. R. Heft 92 (1928) 18. — *T. garrettii* CRAIB, Kew Bull. (1912) 10, 406. — *Clerodendron* ('*Cherodendron*') *esquirolii* LÉVL.

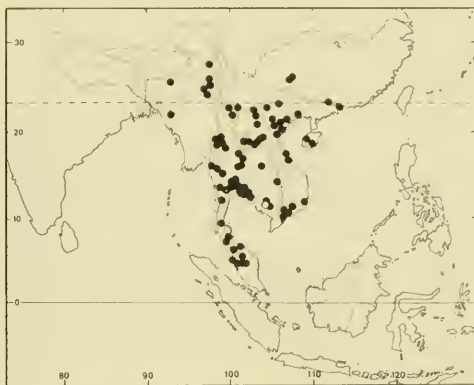


Fig. 6. Range of *Tacca chantrieri* ANDRÉ. The two circles are localities derived from literature.

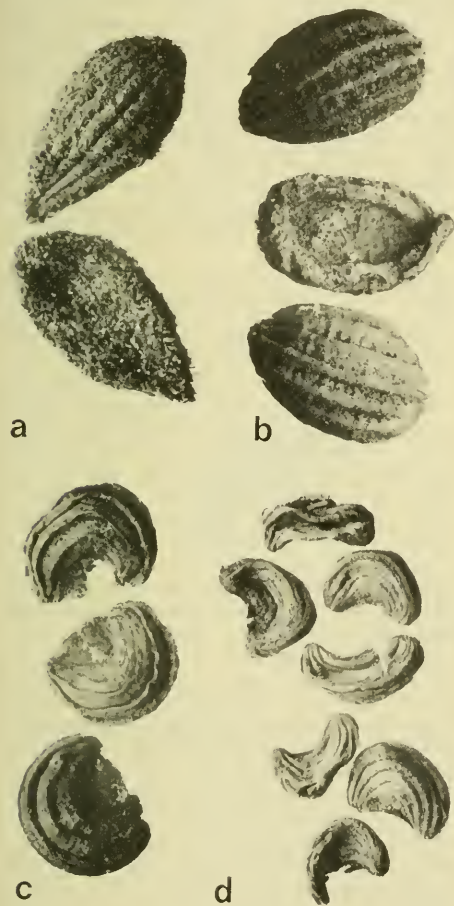


Fig. 5. *Tacca integrifolia* KER-GAWL. a-b. Seeds. — *T. chantrieri* ANDRÉ. c-d. Seeds. All $\times 5$ (a BACKER 23920, b AWANG YACUB 6546, c RIDLEY s.n., SING sheet 41640, d J. SCHMIDT 641).

Fedde Rep. 11 (1912) 298; cf. P'EI, Mem. Sc. Soc. China 1, 3 (1932) 162. — *T. cristate* (non JACK) VELENOVSKY, Vergl. Morph. Pfl. 4, Suppl. (1913) 52, f. 19. — *Schizocapsa breviscapa* LIMPR. Pfl. R. Heft 92 (1928) 11; GAGNEP. Fl. Gén. 1.-C. 6 (1934) 693. — *T. paxiana* LIMPR. Pfl. R. Heft 92 (1928) 16; GAGNEP. Fl. Gén. 1.-C. 6 (1934) 694. — *T. roxburghii* LIMPR. Pfl. R. Heft 92 (1928) 18; SMITINAND, Nat. Hist. Bull. Siam Soc. 20 (1961) 61. — *T. wilsonii* LIMPR. Fedde Rep. 38 (1935) 218. — *T. esquirolii* (LÉVL.) REHDER, J. Arn. Arb. 17 (1936) 64; METCALF, J. Arn. Arb. 26 (1945) 198. — Fig. 5c-d, 7e.

Rhizome cylindric, growing vertically, up to 10 cm long by 1.5 cm \varnothing . Leaves 3-12, rosulate, variable, elliptic, ovate, oblong-(ob)ovate, or (ovate-)lanceolate, 17-55 by 4.4-22 cm, deep green, paler beneath, base cuneately attenuate but not decurrent, sometimes unequal, apex acuminate; nerves pinnate; petiole 11-43 cm by 2-5 mm, sheath 3-15 by 0.3-2 cm. Inflorescences 1-2, up to 25-flowered; scape 6-63 by 0.1-0.7 cm. Involucral bracts 4, (sub)decussate, variable, green to almost black; 2 outer bracts ovate or triangular to ovate-lanceolate, sessile, 2-9 by 0.8-4 cm, apex acute or acuminate, 2 inner bracts thinner, (broadly) ovate to oblong, sometimes unaequilateral, 2.5-10 by 1.5-9 cm, sessile or with attenuate base, apex acute or acuminate. Filiform bracts 6-26, up to 20 cm by 0.2-1 mm, pale green or violet green. Flowers 1-2.5 by 0.6-2 cm, buds green, flowers greenish white when young, when older red, violet, purple, or blackish; pedicel 1.2-4 cm by 0.5-2 mm \varnothing ; perianth tube 3-7 by 6-15 mm. Perianth lobes mostly reflexed during anthesis and persistent as a small remnant; 3 outer ones (oblong-)ovate or (narrowly) triangular, 5-12 by 3-8 mm, apex acute, acuminate, or mucronate; 3 inner ones (broadly) ovate, or triangular, 4-11 by 4-12 mm; apex acuminate or mucronate, veins prominent at inside. Stamens: adnate portion of the filaments 2-3 by 0.5-1 mm, free apical portion 3 by 1.5 mm; thecae up to 2 mm long, greenish yellow. Ovary

2-7 by 3-5 mm; disk absent; style 2-3 by 2-3 mm; stigmatic lobes 1 by 1.5 mm. *Fruit* triangular to round on cross-section, 2-4 by 1-2 cm, (lustrous) green, deep orange-red, or purple. *Seeds* reniform, 3-4 by 2-3 by 1-1.5 mm, glabrous, brown, 9-14-ribbed.

Distr. Continental SE. Asia: Assam, Bangla Desh, Burma, Thailand, China (Yunnan, Kweichow, Kwangsi, Kwantung, Hainan), Indo-China, in *Malesia*: Malay Peninsula (Perlis, Penang, Perak). Fig. 6.

Ecol. Primary and secondary forests, in Malaya at low altitude and on hills, elsewhere ascending to 1400 (-2100) m. *Fl. fr.* Febr.-Oct.

Uses. Tender leaves and inflorescences eaten in curries; in Thailand the bitter rhizome is used for medicinal purpose.

Note. From *T. integrifolia* distinguished by the nearly always decussate involucre bracts and the reniform seeds.

4. *Tacca bibracteata* DRENTH, *Blumea* 20 (1972) 395, f. 1a-c. — Fig. 7a-c.

Rhizome unknown. *Leaves* 6 or 7, oblong, 25-27 by 9.5-10.5 cm, with attenuate base and acuminate apex; nerves pinnate; petiole 12-19 by 0.2 cm, sheath 3.5-5.5 by 0.8-1.2 cm. *Inflorescence* as far as known solitary, up to 10-flowered; scape 20-31 by 0.2-0.5 cm, tinged with violet. *Involucral bracts* 2, opposite, ovate, 2-2.8 by 1.3-2.2 cm, sessile, apex acuminate. *Filiform bracts* 12-15, up to 10 (-14) cm by 0.4 (-2) mm \varnothing (see note). *Flowers* 1-2 by 0.8-1.6 cm, green, tinged violet or very dark purple; pedicel 1-3.5 cm by 1-1.5 mm \varnothing ; perianth tube 2-5 by 4-12 mm. *Perianth lobes*: 3 outer ones (broadly) ovate, 7-12 by 5-14 mm, with a long acuminate apex; 3 inner ones transversally broad-elliptic, 4-6 by 5-8 mm, with a mucronate or acuminate apex. *Stamens*: adnate portion of filaments 2 by 4 mm, free apical portion 2 by 2 mm; thecae up to 2 mm long. *Ovary* 7 by 7 mm; disk absent; style 2 by 3 mm; stigma lobes 1 by 2 mm. *Fruit* (unripe) obpyramidal, 1.5 by 0.8 by 0.8 cm. *Mature seeds* unknown.

Distr. *Malesia*: Borneo (Sarawak), 3 collections. Fig. 9.

Ecol. Mixed lowland Dipterocarp forest and in secondary forest, below 300 m.

Note. The measurements of the filiform bracts given in brackets were taken from 2 bracts which as an exception are neither ribbed, nor round, but flattened, and are facing each other and alternating with the involucre bracts. In my opinion they are actually involucre bracts, but for convenience sake I have called them filiform bracts.

5. *Tacca palmata* BL. En. Pl. Jav. 1 (1827) 83; SCHAUER, Nov. Act. Nat. Cur. 19 (1843) Suppl. 1, 444; ZOLL. Syst. Verz. 1 (1854) 69; MIQ. Fl. Ind. Bat. 3 (1859) 577; LIMPR. Inaug. Diss. Breslau (1902) 49; RIDL. Mat. Fl. Mal. Pen. 2 (1907) 76; MERR. Fl. Manila (1912) 150; Int. Rumph. (1917) 145; Sp. Blanc. (1918) 100; BEUMÉE, Trop. Natuur 8 (1919) 48; M.E.J. Trop. Natuur 9 (1920) 70, f.

1; BACK. Handb. Fl. Java 3 (1924) 107; RIDL. Fl. Mal. Pen. 4 (1924) 309; MERR. Philip. J. Sc. 29 (1926) 357; HEYNE, Nutt. Pl. (1927) 454; BACK. Onkr. Suiker. 1 (1928) 190; LIMPR. Pfl. R. Heft 92 (1928) 24, incl. var. *borneensis* LIMPR. l.c. 25; GAGNEP. Fl. Gén. 1.-C. 6 (1934) 696; HOLTHUIS & LAM, *Blumea* 5 (1942) 168; STEEN. Fl. Scholen Indon. (1949) 144; QUIS. Medic. Pl. Philip. (1951) 177; SMITINAND, Nat. Hist. Bull. Siam Soc. 20 (1961) 61; BACK. & BAKH, f. Fl. Java 3 (1968) 212; DRENTH, *Blumea* 20 (1972) 397, pl. 2, f. 10-15. — *Pentaphyllum indicum* CLUSIUS, *Exoticorum* 4 (1605) 89 & fig. — *T. montana* RUMPH. [Herb. Amb. 5 (1747) 329, t. 115] ex SCHULTES, *Syst. Veg.* 7, 1 (1829) 168; HASSK. Cat. Hort. Bog. 2 (1844) 34. — *T. integrifolia* (non KER-GAWL.) SCHRANK, Syll. Pl. Ratisb. 1 (1824) 203. — *T. vesicaria* BLANCO, Fl. Filip. (1837) 261. — *T. rumphii* SCHAUER, Nov. Act. Nat. Cur. 19 (1843) Suppl. 1, 442; MIQ. Fl. Ind. Bat. 3 (1859) 577; SCHEFFER, Nat. Tijd. N. I. 31 (1870) 375; LIMPR. Inaug. Diss. Breslau (1902) 49; ELMER, Leaf. Philip. Bot. 6 (1914) 2284; MERR. Sp. Blanc. (1918) 100; LIMPR. Pfl. R. Heft 92 (1928) 24; HOSOKAWA, J. Jap. Bot. 13 (1937) 197. — *T. elmeri* KRAUSE, Leaf. Philip. Bot. 6 (1914) 2283; LIMPR. Pfl. R. Heft 92 (1928) 25; ELMER, Leaf. Philip. Bot. 10 (1939) 3795. — *T. angustilobata* MERR. Philip. J. Sc. 29 (1926) 356. — *T. fassifolia* WARB. ex LIMPR. Pfl. R. Heft 92 (1928) 23. — *T. weberi* ELMER, Leaf. Philip. Bot. 10 (1939) 3794, nom. inval.

Tuber globose to broadly ellipsoid, 1-2.5 cm high by 1.5-5 (-8 cm, once observed) by 1.3-3 cm, fleshy, sordidly light brown with an apical cavity from which the leaves and inflorescences emerge. *Leaves* 1-3 (-5), broadly reniform or semi-orbicular in outline, 3-13, usually 4-8-palmatipartite, 7-36 by 7.5-40 cm; base attenuate; lobes (narrowly) obovate, elliptic, or (linear) lanceolate, 6-25 by (0.5-) 1-10 cm, with attenuate base and acuminate apex, the outer lobes mostly smaller than the inner ones; petiole (12-) 15-60 (-75) by 0.1-0.4 cm, sheath 2.5-7.5 by 0.3-0.8 cm. *Inflorescences* 1 or 2 (or 3), up to 30-flowered; scape 20-80 by 0.2-0.5 cm. *Involucral bracts* 4, decussate, green tinged with violet; 2 outer ones (broadly) ovate, 2.5-9.5 by 2-9 cm, sessile, apex acuminate; inner ones broadly ovate or cordate, 4.5-10 by 2.5-6 cm, with inflexed margins in the basal part, base attenuate, apex acuminate, sometimes caudate. *Flowers* 6-17 by 5-10 mm, green, tinged violet brown, brown violet, or dark violet; pedicel 10-20 by 0.5-1 mm; perianth tube 2-5 by 4-8 mm. *Perianth lobes*: 3 outer ones (broadly) ovate, rarely elliptic, 2-6 by 2.5-6 mm, obtuse or rounded at the apex; 3 inner ones with an acuminate apex, 3-5 by 2-4 mm, inflexed, each composed of a triangular basal portion of 0.5-1.5 by (2-) 3-4 mm, connected by a narrower part of 1-2 by 1-2 mm to a (sub)circular apical portion of 1.5-2.5 by 2-3 mm, the side lobes of which are reflexed. *Stamens*: adnate portion of the filaments up to 2.5 by 3 mm, free apical portion up to 2 by 2 mm; thecae up to 2 mm long. *Ovary* 2-5 by 1-4 mm;



Fig. 7. *Tacca bibracteata* DRENTH. a. Habit, $\times \frac{1}{2}$, b. fruit, c. flower, both $\times \frac{1}{2}$. — *T. plantaginea* (HANCE) DRENTH. d. Leaf-base, $\times \frac{1}{2}$. — *T. chantrieri* ANDRÉ. e. Leaf-base, $\times \frac{1}{2}$ (a, c ASHTON S 18369, b RICHARDS 1569, d KERR 8891, e KOSTERMANS 1148).

disk absent; style 2 by 2 mm; stigma lobes 1.5–2 by 2 mm. *Fruit* globose, up to 1 cm \varnothing , mostly with 3 distinct and 3 indistinct ribs, bright red, pericarp up to 1 mm thick. *Seeds* up to 11 in each fruit, more or less pyramidal with a rounded base, 3–5 by 2–4 by 2–3 mm, 15–20-ribbed.

Distr. Continental SE. Asia (Indo-China, Thailand), in *Malesia*: Malay Peninsula (Kelantan, Johore, Penang, P. Tioman), Sumatra (throughout, incl. Enggano, Krakatao, Banka, Lingga), throughout Java (incl. Madura, Kangean, Bawean, Karimondjawa), Lesser Sunda Is. (Sumba, Flores, Timor), Borneo (incl. Tambelan Is., Karimata, Anambas & Natuna Is., Banguay), Philippines

(Balabac, Palawan, Calamianes, Mindoro, Luzon, Leyte, Panay, Mindanao, Sulu), Celebes (incl. Saleyer, Muna, Buton), Moluccas (Talaud, Halmaheira, Ceram, Ambon, Saparua, Key, Tenimber Is.), West New Guinea (only Misool I.). Fig. 8.

Ecol. Mostly in secondary vegetation and forest margins, also in teak forest and bamboo groves, indifferent to soil and climate, from sea-level up to c. 1000 m. *Fl. fr.* Nov.-July.

Uses. In Malesia in different places used as a drug, generally in the form of scrapings of the tuberous rhizome, which are of a bitter taste. These scrapings are laid on wounds, e.g. caused by snake bites. Crushed petioles and scrapings are

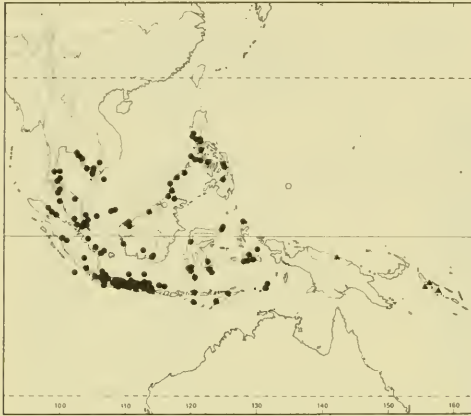


Fig. 8. Range of *Tacca palmata* BL. (● specimens studied, ○ from literature) and *T. ebeltajae* DRENTH (▲).

laid on the stomach to prevent aches. In the Philippines the drug is also taken by women against menstrual disorders.

Vern. Sumatra: *atjang tjangan*, Krakatau, *gagung tēkus, tumbal*, Banka. Java: *djambean*, Bawean I., *gagung tikus*, M. *ilēs-ilēs, kēmëndulan kēmū dulan, tēnggiling mēntik, tjèkèr ajam, trēnggiling mēntik, tringgiling mēntèk*, J, *kotok bongkok, kumis utjing, obat tjekok kuda*, S, *pakis uling*, Djember, *suveg lētik*, Bantam, *tobitoan*, Md. Borneo: *gamah*, Sarawak. Celebes: *karinenga in sowa, mamèrang*, Minahasa, t.t. Lesser Sunda Is. and Moluccas: *mangattah*, Sumba, *tagomatengo*, Halmaheira, *ihun lētek*. Philippines: *corazon de angel*, Spanish, Tag., *kanálong, magsalóro*, Bis., *payung-payúñgan*, Tag., *tungang-basing, unodunod*.

6. *Tacca ebeltajae* DRENTH, Blumea 20 (1972) 401, f. 2, pl. 2, f. 16–17. — Fig. 10.

Tuber globose to subcylindrical, 0.8–1.5 cm high by 1.5–6 by 1–2 cm, provided with an apical cavity from which the leaves and the inflorescences emerge. *Leaves* 1–3, ± reniform to semi-orbicular in outline, 7–c. 10-palmatipartite or pedatipartite, 12–20 by 18–20 cm, base attenuate; lobes oblong lanceolate, 6–15 by 2.5–4.5 cm, with attenuated base and acuminate apex; petiole 20–44 by 0.2–0.4 cm, sheath 3–3.5 by 0.4 cm. *Inflorescences* 1 or 2, up to 9-flowered; scape 15–38 by 0.1–0.3 cm. *Involucral bracts* 4, decussate, 2 outer ones oblong ovate, 1–2.3 by 0.4–1 cm, sessile with cuspidate apex; 2 inner ones cordate, 3–4.5 by 1.5–2 cm, with inflexed margins at the basal part, base attenuate, apex acute. *Flowers* 6–9 by 6–12 mm; pedicel 8–20 by 1–3 mm; perianth tube 2–3 by 6 mm. *Perianth lobes* greenish grey to dark red; 3 outer ones ovate, 4–5 by 3–4 mm, apex acute or acuminate; 3 inner ones broadly obovate, 5–6 by 3–5 mm, apex rounded. *Stamens* pale or greenish: adnate portion of the filaments up to 2.5 by 3 mm,

free apical portion up to 2 by 1 mm; thecae up to 2 mm long. *Ovary* 3 by 2–4 mm; disk absent, style 2 by 2 mm; stigma lobes 1 by 2 mm. *Fruit* obpyramidal; 1.3–1.5 by 0.8–1.2 cm, dark violet to red, pericarp up to 1 mm thick. *Seeds* up to 15, comma-shaped, 4–5 by 2–3 by 2 mm, 12- or 13-ribbed.

Distr. Solomon Is. (Ovau, E. Treasury, New Georgia), 3 collections; in *Malesia*: East New Guinea (W. Sepik Distr.), 1 collection. Fig. 8.

Ecol. Primary and secondary forests at low altitude. *Fl. fr.* Febr.-May.

7. *Tacca palmatifida* BAKER, J. Linn. Soc. Bot. 15 (1876) 100; LIMPR. Inaug. Diss. Breslau (1902) 58; MERR. Philip. J. Sc. 29 (1926) 357; LIMPR. Pfl. R. Heft 92 (1928) 30; DRENTH, Blumea 20 (1972) 403, pl. 3, f. 26–28. — *T. flabellata* J. J. SMITH, Bull. Jard. Bot. Btzg III, 6 (1924) 79. — *T. breviloba* WARB. ex LIMPR. Pfl. R. Heft 92 (1928) 22.

Rhizome cylindric, growing horizontally, 8.5 cm long, 1.5 cm \varnothing , with the leaves and the inflorescences spaced. *Leaves* 1–3 (–4?), roundish-cordate in outline, palmatifid, 12–35 by 18–50 cm, base attenuate; lobes 5–11 (–13?), ovate, 2.5–14 by 1–9.5 cm, acuminate; petiole 36–60 by 0.3–0.5 cm, sheath 2.5–10 by 0.4–0.7 cm. *Inflorescences* (1–) 3–4, up to 25-flowered; scape 26–60 by 0.2–0.4 cm. *Involucral bracts* 4, decussate, 2 outer ones (broadly) ovate, 1–2.2 by 1–1.3 cm, sessile, acute, acuminate, or cuspidate; inner ones ovate or cordate, 6.5–12.5 by 4.5–7 cm, with inflexed margins at the basal part, base attenuate, apex acuminate or cuspidate. *Flowers* 15–17 by 12–15 mm; pedicel 15–30 by 0.5–1.5 mm, inserted on the basal portion of the inner bracts; perianth tube 4–5 by 9–10 mm. *Perianth lobes*: 3 outer ones broadly elliptic, 6–8 by 8–11 mm, with a rounded, reflexed apex; 3 inner ones with an acuminate apex, 5–6 by 4–5 mm, each composed of a triangular basal portion of 0.5–2 by 4–5 mm, connected by a narrower part of 1–1.5 by 1–2 mm to an obtriangular apical portion of 3–4 by 4–5 mm, the sides of which are reflexed. *Stamens*: adnate portion of the filaments up to 2 by 4 mm, free apical portion up to 3 by 1.5 mm; thecae up to 2.5 mm long. *Ovary* 5–6 by 3–4 mm; disk absent; style 2 by 2 mm, stigmatic lobes 2 by 2 mm. *Fruit*



Fig. 9. Range of *Tacca bibracteata* DRENTH (○) and *T. palmatifida* BAKER (▲).



Fig. 10. *Tacca ebeltajae* DRENTH. *a.* Inflorescence, *b.* habit, both $\times \frac{1}{2}$, *c.* flower, $\times 2\frac{1}{2}$ (*a-c* BSIP 14243).

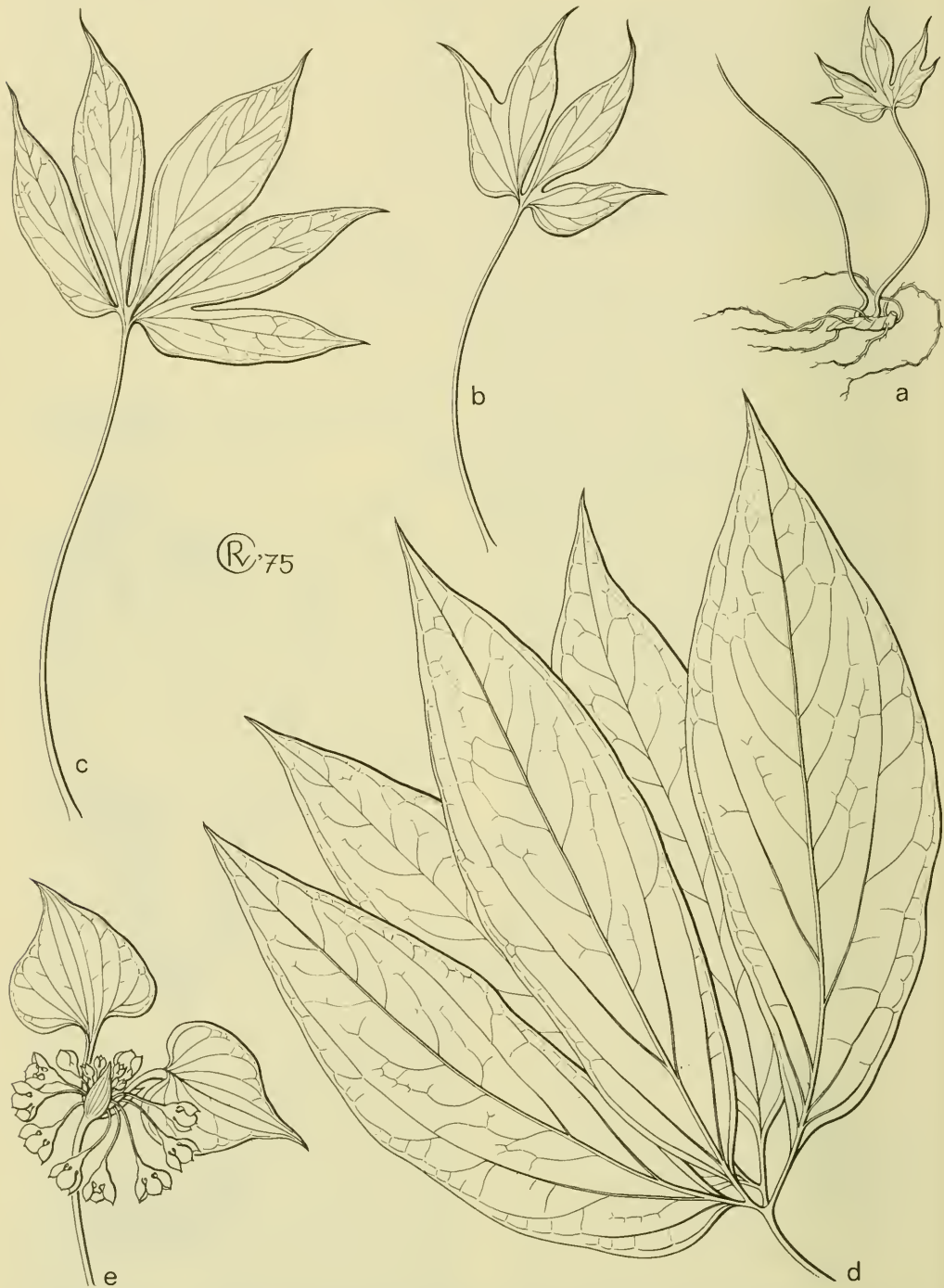


Fig. 11. *Tacca celebica* KOORD. a. Rootstock of young specimen with one leaf and one petiole, b-c. older leaves, d. mature leaf, e. inflorescence, all $\times \frac{2}{5}$ (a-c, e DE VOGEL 2521, d KOORDERS 18919).

ellipsoid to obovoid, 2.2-3 by 1 by 1 cm, pericarp 1 mm thick. *Seeds* ∞, ovoid to ellipsoid, 2-3 by 1-1.5 by 1-1.5 mm, 11-13-ribbed.

Distr. Malesia: throughout Celebes. Fig. 9.

Ecol. Forest borders, thickets, on limestone and clay soils, 200-1000 m. *Fl. fr.* Dec.-July.

Vern. *Tilu-tilu*, Mamudju, *totilu*.

8. *Tacca celebica* KOORD. Med. Lands Pl. Tuin 19 (1898) 641, 311; LIMPR. Inaug. Diss. Breslau (1902) 48; Pfl. R. Heft 92 (1928) 31; DRENTH, Blumea 20 (1972) pl. 2, f. 18. — *T. minahassae* KOORD. Med. Lands Pl. Tuin 19 (1898) 641, 311 (also as *T. minahasae*); LIMPR. Inaug. Diss. Breslau (1902) 48; Pfl. R. Heft 92 (1928) 31. — Fig. 11.

Rhizome cylindric, growing horizontally, up to 18 cm long, 1 cm \varnothing , with the leaves and the inflorescences spaced. *Leaves* 2-6, in outline broadly ovate, palmati-3- or -5-sect, 18-25 by 25-30 cm, lobes entire, or when there are 3 lobes one or two shortly or deeply incised, (ob)lanceolate, 9-31 by 3-8 cm, stalked, stalk of the central lobes 1.5-2.5 cm long, of the other lobes 0.5-1.5 cm, base attenuate, apex acuminate; petiole 25-45 by 0.2-0.4 cm, sheath 1.5-4 by 0.3 cm. *Inflorescences* 1-5, up to 30-flowered; scape 55-65 by 0.3-0.5 cm. *Involucral bracts* 4, decussate,

2 outer ones ovate, 1-1.5 by 1 cm, sessile, with acute apex; 2 inner ones ovate or cordate, 6.5-8 by 3.5-5 cm, with inflexed margins at the basal part, base attenuate, apex acuminate. *Flowers* 14-18 by 9-10 mm; pedicel 10-20 by 0.5 mm, inserted at the basal portion of the inner bracts; perianth tube 3-5 by 8-9 mm. *Perianth lobes*: 3 outer ones elliptic or ovate, 8-10 by 6-8 mm, with acute apex; 3 inner ones with a rounded to truncate apex, 4.5-5 by 4 mm, each composed of a triangular basal portion of 1-1.5 by 4 mm, connected by a narrower part of 1-2 by 1 mm to a broad elliptical portion of 3-4 by 4-5 mm, the sides of which are reflexed. *Stamens*: adnate portion of the filaments up to 1.5 by 2 mm, free apical portion up to 2 by 2 mm; thecae up to 2 mm long. *Ovary* 3 by 2 mm; disk absent; style 2 by 2 mm; stigmatic lobes 2 by 2 mm. *Fruit* pyramidal, 1.8 by 1 cm, triangular in cross-section, pericarp up to 1 mm thick. *Seeds* up to 26, (sub)rhomboid, 3 by 2 by 1.5 mm, 13- or 14-ribbed.

Distr. Malesia: Celebes (northern Peninsula), 3 collections. Fig. 4.

Ecol. Humid, shady places, between bamboo, and in high thickets, at 500-650 m. *Fl. fr.* Dec.-April.

Vern. *Karumenga intalum*, *ruki intjusu*.

ADDENDA, CORRIGENDA ET EMENDANDA

C. G. G. J. VAN STEENIS, c. s.

As was done in the preceding volumes, it seemed useful to correct some errors which have crept into the text of volumes 4-7 as well as to add additional data, new records and references to new species which came to my knowledge and are worth recording. Also there are alternative opinions about generic and specific delimitation on most of which comments are given.

Printing errors have only been corrected if they might give rise to confusion.

Volume and page number are separated by a colon. Page numbers provided with either *a* or *b* denote the left and right columns of a page respectively.

Aceraceae

- 4: 3, In Reinwardtia 7 (1965) 142 KOSTERMANS published a new combination *Acer caesium* (REINW. ex BL.) KOSTERMANS (as typified by *Laurus caesia* REINW. ex BL. Bijdr. (1825) 553) to replace *Acer laurinum* HASSK. (cf. Fl. Mal. I, 4, 1954, 592). The latter (earlier known as *A. niveum* BL.) is the proper name, as the combination *A. caesium* (BL.) KOSTERMANS is illegitimate because of *A. caesium* BRANDIS, For. Fl. (1874) 111, Atlas t. 21.

Unfortunately this was overlooked by WHITMORE, Tree Fl. Malaya 2 (1973) 1.

Amaranthaceae

- 4: 73; *Celosia argentea* L. var. *cristata*.
5: 554a A biosystematical study by Dr T. N. KHOSHOO (Bull. Bot. Surv. India 12, 1970, 67-69, 1 fig., 2 pl., 1972) has shown that *C. argentea* must be the ancestral form from which var. *cristata* must be derived.
4: 86b C. C. TOWNSEND (Kew Bull. 29, 1974, 464) has transferred *Aerva curtisii* OLIV. to a new genus *Psilotrichopsis* to accommodate this species and *A. cochinchinensis* GAGN. The new genus is said to differ from *Psilotrichum* by verrucose seed and structure of the pollen wall, and from *Aerva* besides by opposite leaves and multinerved petals.
4: 93a, For *Alternanthera bettzickiana* (REGEL) 594b; NICHOLS., which in vol. 4 was distinguished as a variety of *A. ficoidea* (L.) R. BR., KANIS (Contr. Herb. Austr. 1, 1972, 6) made a new combination: *A. manillensis* (WALP.) KANIS. As it later appeared that WALPERS' basionym belonged to another species, KANIS (*ibid.* 7, 1974, 7) cancelled this name in favour of the one accepted in Fl. Mal. vol. 6, 1c.

Burmanniaceae

- 4: 17a *Burmannia coelestis* DON.
Add to synonymy: *Cryptonema malaccensis* TURCZ. Bull. Soc. Nat. Moscou 21 (1) (1848) 590, non *Cryptonemia* AGARDH, 1842; Fl. Dahur. 1 (1848); WALP. Ann. 3 (1852) 609. — *Nephrocoelium malaccense* TURCZ. Bull. Soc. Nat. Moscou 26 (1)

(1853) 287; Fl. Dahur. 1 (1853). — *Nephrocodum malaccense* WALP. Ann. 6 (1861) 41, *sphalma*.

These three generic names should also have been added to the synonymy of the genus *Burmannia* L. on p. 15. Cf. JONKER, A monograph of the Burmanniaceae. Thesis, Utrecht (1938) 121.

Burseraceae (LEENHOUTS)

- 5: 213 *Protium* BURM. f.
Correct in Distr.: In continental Asia there is but one species: *P. serratum* (COLEBR.) ENGL., of which *P. yunnanense* (HU) KALKM. is a synonym. The latter should be (nearly) glabrous and have somewhat larger fruits; these characters appear to be grading, however.
5: 214b *Protium macgregorii* (F. M. BAILL.) LEENH.
Add to references: HOOGL. in Walker (ed.), Torres Straits Symp. (1972) 151, f. 8.21 (map).
Add to synonymy: *Dracontomelum papuanum* LAUT. in K. SCH. & LAUT. Nachtr. (1905) 301.
It occurs also in SE. New Guinea: SCHODDE & CRAVEN 4685.
5: 222b *Dacryodes costata* (BENN.) H. J. LAM.
Add to description: Inflorescences apparently sometimes exclusively axillary (SAN 75957).
5: 227a *Dacryodes macrocarpa* (KING) H. J. LAM.
Add to synonymy: *D. expansa* (non H. J. LAM) KALKMAN, Blumea 7 (1954) 510, f. 2 a & b, *typo excl.*; LEENH. Fl. Mal. I, 5 (1956) 228, *ditto*; *ibid.* I, 6 (1972) 919.
5: 227b Replace KEY TO THE VARIETIES by the following:
1. Leaves 4- or 5-jugate. Philippines
var. merrillii
1. Leaves up to 3-jugate.
2. Leaflets widest about the middle, equal-sided at base; nerves at a right angle to the midrib. Sarawak, Brunei
var. patentinervia
2. Leaflets widest in the lower half, oblique at base; angle between midrib and nerves acute.
3. Twigs and axial parts of leaves smooth, blackish when dry; leaflets rather thick and stiff, midrib and nerves not sharply prominent on

lower side. Malay Peninsula, Sumatra, Borneo. var. **macrocarpa**

3. Twigs and axial parts of leaves scaly and brown when dry; leaflets pergamentaceous, midrib and nerves sharply prominent on lower side. N., E., and S. Borneo var. **kostermansii**

5: 228a var. **macrocarpa**.

Add to description: Fruit ellipsoid, nearly straight, $3-3\frac{1}{4}$ by $2-2\frac{1}{4}$ by $1\frac{1}{4}-2$ cm. var. **kostermansii** (KALKM.) KALKMAN. Add to description: Fruit ellipsoid, slightly oblique, to flattened ellipsoid, rounded on the side of the fertile cell, angular on the opposite one, 3-4 by $1\frac{1}{2}-3$ by $1\frac{1}{2}-2\frac{1}{4}$ cm.

var. **merrillii** H. J. LAM.

Fruit unknown.

Insert after var. **merrillii** etc.:

var. **patentinervia** LEENH. nov. var. — *Dacryodes expansa* (non H. J. LAM) KALKMAN, Blumea 7 (1954) 510, f. 2 p.p., typo excl.; LEENH. Fl. Mal. 1, 5 (1956) 228, ditto.

Folia 1- vel 2-jugata. Petiolus (2-) 4-8 cm longus. Foliola 6-18 cm longa, basi equilatera; nervi secundarii utrimque 10-14, a costa subpatentes, subrecti, ante marginem valde curvati. Flores ignoti. Fructus appanato-ellipsoidei vel subglobosi, paullo obliqui, parte loculi fertilis rotundata, parte opposita subangulata, 4-5 cm longi, $3\frac{1}{2}-4$ cm lati, $2\frac{3}{4}-3\frac{1}{2}$ cm crassi, putamine crasso.

Typus: Borneo, Brunei, Bt. Labi F. R., 30 Aug. 1960, fr., J. SINCLAIR & KADIM BIN TASSIM 10492 (L; iso in K, SAR, SING).

Paratypes: KEP 80093; Sarawak For. Dept. 4370, S 16602, S 23655, S 23696.

Distr. **Malesia**: Borneo: Brunei, Sarawak (Miri Distr., Bt. Iju in 3rd Div.).

Ecol. Primary lowland Dipterocarp forest on slopes and ridges; up to c. 250 m.

Uses. The fruits (apparently the fleshy pulp) are said to be eaten.

Notes. This is the fruiting material originally identified as *D. expansa*.

Vegetatively, the present species is nearly indistinguishable from *Santiria laevigata* BL.

5: 228a *Dacryodes expansa*: Replace by the following:

12. *Dacryodes expansa* (RIDL.) H. J. LAM, Ann. Jard. Bot. Btzg 42 (1932) 204; Bull. Jard. Bot. Btzg III, 12 (1932) 366, t. 5 f. 21; KALKMAN, Blumea 7 (1954) 510, f. 2 c, excl. fr. coll.; LEENH. Fl. Mal. 1, 5 (1956) 228, ditto; non (?) SMYTHIES, Common Sarawak Trees (1965) t. 8: non LEENH. Fl. Mal. 1, 6 (1972) 919. — *Canaarium expansum* RIDL. Kew Bull. (1930) 83.

Small tree. *Branchlets* unknown; buds rufous hairy. *Leaves* (incompletely known) 4- or more-jugate, glabrous; internodes of rhachis c. 5 cm long, petiolules $2\frac{1}{2}-3\frac{1}{2}$, terminal one 5 cm long. *Leaflets* oblong to oblong-lanceolate, 17-23 by $6-7\frac{1}{2}$ cm, brownish when dried; base cuneate, slightly oblique; apex subabruptly acuminate, acumen short, slender, \pm acute; nerves 10-12, curved, not joined, prominent beneath; reticulation lax, rather inconspicuous. *Inflorescences* (only σ known) probably lateral on axillary short shoots, up to 24 cm long, lax, glabrous; peduncle up to 6 cm long, branches far apart, the lower up to 10 cm long; pedicels 3-7 mm long, slender. *Flowers* 5 mm long, glabrous. *Calyx* 2 mm, the lobes broadly deltoid. *Petals* ovate-oblong, blunt to \pm rounded and minutely inflexed at apex, 4-4 $\frac{1}{2}$ mm long, very thin. *Stamens* free from the disk. *Disk* thick-annular. *Pistil* in σ flowers rather strongly reduced. *Infructescences* and *fruits* unknown.

Distr. **Malesia**: Borneo (Sarawak, near Kuching, known from the type only).

Notes. The fruiting material, identified with the present species and included in the descriptions published by KALKMAN and LEENHOUTS, turned out to represent *D. macrocarpa*. Consequently, the description had to be reduced to the authentic material. The above description is based upon RIDLEY's and LAM's descriptions and a photograph and a drawing of the type in L.

D. expansa may be allied with *D. laxa* and *D. kingii*, with which two it shares the peculiar type of inflorescence. It differs from the former by being nearly glabrous (rare in *laxa*), by its long petiolules (in *laxa* rarely more than 1 cm), by the position of its inflorescence (*laxa* terminal with often some additional lateral ones), by the free stamens (*laxa* apparently always adnate to the disk). *D. kingii* is primarily different by its greater dimensions; furthermore, it shares most characters involved here with *laxa* but is less hairy and the stamens are free from the disk; on the other hand, the nerves are greater in number and stronger prominent beneath.

6: 919b *Dacryodes nervosa* (H. J. LAM) LEENH.

Add to description: The indument consists of dense hair tufts rather than of stellate hairs. Reticulations sometimes \pm prominent above. Fruits (prob. not fully mature) 2 by 1 cm (SOEPADMO & MAHMUD 1028).

5: 229b, Add after 16. *Dacryodes nervosa* etc.:

6: 920a

17. *Dacryodes multijuga* LEENH. nov. sp. *Arbor 12 m alta, 10 cm diam. Ramuli ad*

15 mm crassi, fulvo-velutini, glabrescentes; medulla probabiliter cylindro ductorum sclerenchymatosorum resiniferorum ligno adpresso suffulta. Folia immatura ca. 70 cm longa, 11–14-jugata, ± sparse puberula; petiolus 18 cm longus, basi canaliculatus, in dimidio inferiore supra applanatus, medulla evanescente; partes rhachis ad basem 6, ad apicem 4½ cm longae, supra nodos teretes, infra nodos marginatae; petioluli laterales ca. ½ cm longi, petiolulus terminalis 2 cm longus, ambo teretes et marginati. Foliola usque ad 14½ cm longa, 3½ cm lata, ovato-lanceolata, in sicco tenuiter permagentacea, olivacea, parte inferiore costae sparse puberula excepta glabra; basis obliqua praesertim in foliis basalibus, parte acroscopica rotundata, basis-copica cuneata, decurrens; apex gradatim acute acuminatus; costa tenuis utrinque modice prominens; nervi secundarii tenues, utrinque 12 vel 13, inter sese 1–1½ cm distantes, a costa angulo 80–85 abeuntes, paullo, ante marginem distincte curvati et commati, utrinque modice prominentes; venae intercalares distinctae; rete venulorum densum, utrinque ± prominens. Flores ignoti. Infructescentiae axillares, probabiliter 50 cm longae vel longiores, sparse puberulae, paullo ramosae, ramis pedicello ca. 2 cm longo incluso 4–5 cm longis, tenuibus apice gradatim incrassatis, toro ad ca. 5 mm diam. dilatato. Fructus ellipsoideo-fusiformes, ad 6½ cm longi, 2¾ cm lati, endocarpio 1 mm crasso lignoso.

Typus. Malay Peninsula, Pahang, Jerantut, confluence of Sg. Tekam and Sg. Balol, alt. 60 m, 25-6-1972, F. S. P. NG & I. BELTRAN KEP/FRI 6394 (KEP; iso in L).

Ecol. Lowland forest.

Note. This species is clearly distinct from all other Malesian species by the combination of a large number of leaflets (shared only by *D. longifolia*) and unusually big fruits. Its relationships are not yet clear; in several respects it resembles more the African *sect. Pachylobus* (comparable fruits in *D. edulis*) than the Asian *sect. Tenuipyrena*. The number of locules in the ovary will be decisive but could not be established from the fruits; *Pachylobus* has 2 locules, *Tenuipyrena* 3.

5: 231a *Santiria tomentosa* BL.

Add to description: Branchlets exceptionally with some large vascular strands in the pith (SOEPADMO & CHAI S 28154).

5: 231b *Santiria mollis* ENGL.

Add to description: Petiole up to 11 cm. Leaflets to 5 cm wide. ♀ Flowers: calyx outside densely rusty stellate-pubescent, inside densely minutely appressed-hairy. Corolla as in ♂ flowers. Disk annular, low, fleshy.

5: 232b: *Santiria laevigata* BL.

Add note: This species is often nearly indistinguishable from *Dacryodes macrocarpa* in the vegetative state.

5: 238 *Haplolobus* H. J. LAM.

A new revision with descriptions and key was published by P. W. LEENHOUTS, *Blumea* 20 (1972) 283–310. The number of species was reduced to 13 (among which 2 new *spp.*); out of these, one is restricted to the Solomon Is., all others are partly or entirely Malesian. Also a description is given of seedlings (*l.c.* 311–314). Though this is the fourth revision in only 40 years time, the taxonomy remains so vague that it seems premature to copy the new treatment.

5: 286a *Canarium pseudosumatranum* LEENH.

Add to description: Trunk sometimes armed with small spines (KERR 18791). Leaves up to 14-jugate, up to 1.30 m long. Leaflets up to 26 cm long and 8½ cm wide; nerves up to c. 25 pairs.

6: 926a

Canarium vitiense A. GRAY.

Add to synonymy: *Haplolobus robustus* (non H. J. LAM) H. J. LAM, *Blumea* 8 (1955) 176; *ibid.* 9 (1958) 267. *typ. excl.* Add to Distr.: W. New Guinea (Number 1.: BW 1060); N. Queensland.

Capparaceae (JACOBS)

(conserved spelling; formerly *Capparidaceae*)

6: 68a Replace the name *Crateva murvala* by:

3. *Crateva magna* (LOUR.) DC. Prod. 1 (1824) 243; MERR. Comm. Lour. (1935) 172; JACOBS, *Blumea* 12 (1964) 206. — *Capparis magna* LOUR. Fl. Cochinch. 1 (1790) 331. — *Triclanthera corymbosa* RAF. Sylv. Tell. (1838) 108. — *C. murvala* HAM. [and then the original text].

var. magna. — *C. magna* (LOUR.) DC. *l.c.* [and then the original text].

Note. In 1964 *C. magna* was listed under 'Doubtful species' because the type had not been found. Shortly after, Mr N. K. B. ROBSON discovered it in the BM Herbarium, and found that it is a rather narrow-leaved specimen of the later described *C. murvala*.

Chenopodiaceae

4: 104a *Tecticornia cinerea* (F. v. M.) BAIL. must

now be called *Tecticornia australasica* (MOQ.) P. G. WILSON, *Nuytsia* 1 (1972) 280. WILSON treated the taxonomy, typification, ecology, and anatomy at length. In this paper he omitted to mention the detailed study by P. VAN ROYEN, *Nova Guinea n.s.* 7 (1956) 180–185, fig. 1–2, 2 phot.

- 4: 105a Lines 2 & 3 from top: omit the synonym *Salicornia australasica* MOQ. ex SCHINZ and transfer this name to the synonymy of *Tecticornia cinerea* on p. 104a.

Combretaceae

- 4: 548; *Terminalia* L.
 5: 564b; A most important revision of the Papuanian *spp.* was published by M. J. E. COODE (Contr. Herb. Austr. 2, 1973, 1-33, 5 fig., 1 map), in which 31 *spp.* are recognized (among which 5 new *spp.*), while some names are reduced and several new infraspecific taxa are proposed. Unfortunately there is no key.
 6: 932b *Terminalia*. In the revised edition of 'Manual of Forest Trees of Papua and New Guinea, Combretaceae' (1969) COODE had included some unpublished new species, 1 from the Bismarcks, 2 from the Solomons, and 1 from New Guinea, which were validated almost simultaneously in Kew Bull. 23 (1969) 299-310, 6 fig.

Connaraceae (LEENHOUTS)

- 5: 509b *Roureopsis acutipetala* (MIQ.) LEENH. *ssp. borneensis* (SCHELLENB.) LEENH. occurs certainly in the Malay Peninsula and also in Peninsular Thailand (S. PHUSOMSAENG 375).
 5: 514a, Replace: *Rourea minor* (GAERTN.) ALSTON, Handb. Fl. Ceyl. 6 (Suppl.) (1931) 178b 67, 'minus', corr. Ind. Kew.: LEENH. Fl. Mal. 1, 5 (1958) 514.
 5: 515b Add to Distr.: Flores.
 5: 523b *Ellipanthus tomentosus* KURZ var. *gibbosus* (KING) LEENH.
 Add to description: Petiole to 2½ cm; leaf to 26 by 10 cm, tomentose on midrib and nerves beneath, clearly peltate at base (SHAH & NOOR MS 1918), then sometimes rounded (S. P. 10).
 5: 526 Second line from bottom: change 3½ into 3½-4½.
 5: 533b *Connarus paniculatus* ROXB.
 Add to description: Petiolules ½-1 cm. Leaflets up to 7 cm wide, base sometimes cuneate, veins nearly invisible to distinct beneath. Fruits up to 4½ by 2 cm, inside sparsely to rather densely pubescent.
 Add to Distr. (bottom line): Kelantan; according to VIDAL, Fl. Thailand 2 (1972) 129 also in Peninsular and SE. Thailand.
 5: 534a Add to Ecol. (top line): on limestone. Fr. Aug.
 Add to Note: A specimen from Kelantan (S. C. CHIN 1424) is slightly deviating and shows the bigger and more woody fruits of var. *hainanensis* VIDAL.

Convolvulaceae

- 4: 446b; Insert before 7. *Merremia quinquefolia*:
 6: 939b
 6b. *Merremia steenii* OOSTSTR. Blumea 20 (1972) 127, fig. 1 a-h.
 Distr. *Malesia*: New Guinea (Sepik Distr.), one collection; in grassland at low altitude.
 Note. This species is closely allied to *M. aniseifolia* OOSTSTR. (see Fl. Mal. 6: 939b), also endemic in New Guinea, but differing in being densely haired, the narrower, thicker leaves, the absence of warts on the sepals, the slightly pilose midpetaline bands, the ± shorter, lower-inserted stamens, and not twisted mature anthers.
 4: 447a *Merremia quinata* (R. BR.) OOSTSTR.:
 6: 939b Blumea 20 (1972) 129.
 Add to Distr.: Also mainland of New Guinea.

Cyperaceae

- 7: 753 Add at the end: 'To be concluded.'
 The treatment of *Carex* and *Uncinia* is to be concluded in a later volume. Unfortunately Dr KERN'S MSS were not finished at the time of his death.

Datiaceae

- 4: 385 *Tetrameles nudiflora* R. BR.
 Add to references: HYLAND, Blumea 20 (1972) 338.
 4: 387b Add to Distr.: Now also found in the Cape York Peninsula, N. Queensland.

Dichapetalaceae (LEENHOUTS)

- 5: 305 *Dichapetalum* THOU.
 Add to generic references: BRETELIER, Meded. Landbouwhogeschool Wagenin- gen 73, 13 (1973) 1-123.
 Add to generic description: Pistil exceptionally 4-merous.
 Taxonomy. W. PUNT (Rev. Palaeobot. Palynol. 19, 1975, 1-97) examined the pollen morphology of the entire genus. In this work the *Malesian spp.*, as far as studied by him, are arranged in the following groups in assumed phylogenetic sequence:
 1. *D. bangii* cluster, to which belong the *papuanum* group (*D. papuanum*, *sessiliflorum*, *tricapsulare*, and *vitiense*) and the *timoriense* group (*timoriense*).
 2. *D. heudelotii* cluster to which belong the *longipetalum* group (*griffithii*, *longipetalum*, *laurocerasus*).
 3. *D. gelonioides* cluster to which belong the *gelonioides* group (*gelonioides*, *hel-*

ferianum) and the *grandifolium* group (*grandifolium*, *setosum*, *steenisi*).

My only criticism regards the position of *D. tricapsulare* that to me seems distinctly allied with *D. gelonioides*, though slightly more primitive than that species.

- 5: 310a *Dichapetalum papuanum* (BECC.) BOERL.
Add to description: Pistil exceptionally 4-merous (G. STOCKER 656, Queensland). Seeds glossy orange-red.
- 5: 315b *Dichapetalum helferianum* (KURZ) PIERRE.
Add the following note: According to pollen-morphological arguments its relationship may be with *D. gelonioides*, as pointed out by PUNT (Rev. Palaeobot. Palynol. 19, 1975, 25).

Dilleniaceae (HOOGLAND)

- 4: 141 *Tetracera* L.
After the treatment in Fl. Mal. I, 4 (1951) two important papers have been published, viz a revision of the genus in the eastern Old World by HOOGLAND (Reinwardtia 2, 1953, 185-224, pl. 1) and a world revision with general observations on chemotaxonomy, evolution, dispersal, etc. by KUBITZKI (Bot. Mitt. München 8, 1970, 1-98, 10 fig.).
- 4: 143b Change 3. *Tetracera asiatica* into:
3. *Tetracera sarmentosa* (L.) VAHL, Symb. Bot. 3 (1794) 70; HOOGL. Blumea 9 (1959) 588; KUBITZKI, Bot. Mitt. Münch. 8 (1970) 52. — *Delima sarmentosa* L. Gen. Pl. ed. 5 (1754) pag. ult. — *Seguieria asiatica* LOUR. Fl. Coch. (1790) 341. — *T. asiatica* (LOUR.) HOOGL. Fl. Mal. I, 4 (1951) 143; Reinwardtia 2 (1953) 193, f. 2 (map).
Notes. HOOGLAND (1951) listed *Delima* and *Tetracera sarmentosa* in the synonymy of 1. *Tetracera scandens* (L.) MERR., from which they should be removed (cf. HOOGLAND, 1959).
The subspecies described by HOOGLAND (1951, l.c.; Reinwardtia 2, 1953, 195-196, f. 2) were transferred by him to *T. sarmentosa* (1959, l.c.). KUBITZKI (l.c. 53) found them well described and distinguished, but of lower status than the infraspecific taxa accepted by him for American and African species.
- 4: 146b *Tetracera indica* (CHRISTM. & PANZ.) MERR.
Add: Note. The recent record from Borneo (HOOGL. Blumea 9, 1959, 589) is based on an incorrectly identified specimen of *T. akara* (BURM. f.) MERR.
- 4: 147a *Tetracera akara* (BURM. f.) MERR.
Add to Distr.: Philippines (Basilan) (HOOGL. Blumea 9, 1959, 589).
- 4: 148a *Tetracera arborescens* JACK.
Distr.: The single locality in Java, with a

question mark, should be deleted. It is one of many errors made in labelling specimens of the KORTHALS collection. The specimen probably came from W. Central Sumatra.

- 4: 150b *Hibbertia scandens*:
The correct authorship of this species is (WILLD.) GILG in E. & P. Nat. Pfl. Fam. 3, 6 (1893) 117.
Add to Distr.: SE. New Guinea (Astrolabe Range).
- 4: 154 *Dillenia* L.
In Fl. Mal. I, 4 (1951) HOOGLAND published a number of taxa of *Dillenia* with English descriptions only. These names were validated with Latin descriptions and the species illustrated in his revision of the genus (Blumea 7, 1952, 1-145). For the new species, the appropriate references are given below.
- 4: 156 In the KEY TO THE SPECIES, replace the first entry of fork 3 by:
2a. Sepals ∞. Flowers not fully opening, the petals coherent in anthesis, cucullate, c. 10 cm long, red
1. **D. pteropoda**
2a. Sepals 5. Flowers fully opening, the petals spreading, flat, c. 5 cm long, white or yellow.
3. All stamens of approximately the same length. Flowers white
- 4: 157 Insert between second entry of fork 15 and first entry of fork 16:
15a. Sepals c. 45-55 by 35 mm; petals c. 55 mm long. Leaves large (up to 45 by 35 cm), c. 10-15-nerved
7a. **D. cycloperensis**
15a. Sepals at most c. 25 by 22 mm; petals up to c. 35 mm long. Leaves smaller.
Amend second entry of fork 7 to read:
7. Innermost stamens longer than the outer ones, usually with the apical part reflexed outward in bud.
Replace second entry of fork 21 by:
21. Petiolar wings narrower. Flowers smaller, with spreading petals, up to 10 cm diam.; or with petals not spreading, cucullate, falling collectively, up to 50 mm long.
Replace fork 22 by:
22. Leaves rather coriaceous, 5-8-nerved, up to c. 12 by 7½ cm
21. **D. diantha**
22. Leaves not coriaceous, 8-20-nerved, usually distinctly larger.
Replace second entry of fork 23 by:
23. Apex rounded to acute. Plant not cauliflorous. Flowers yellow.
23a. Innermost stamens straight or slightly curved; length of stamens gradually decreasing towards the numerous (60 or more) stamino-

des on the outside of the androecium.

23b. Flowers solitary. Sepals to *c.* 30 mm long in flower. Stamnodes *c.* 60. **9a. *D. insularum***

23b. Flowers in 2- or 3-flowered inflorescences. Sepals *c.* 35-45 mm long in flower. Stamnodes over 300. **9b. *D. nalagi***

23a. Stamens in 2 distinct groups: the innermost ones reflexed at apex; the outer ones straight or slightly curved, not very different in length; staminodes few (up to *c.* 25) or absent.

4: 158a *Dillenia pteropoda* (Miq.) HOOGL.

In 1951 this species was known from the Moluccas only from sterile specimens, very similar to leaf material of *D. papyracea* MERR. A recent collection with flowers has shown that two species are involved, as follows:

1. *Dillenia pteropoda* (Miq.) HOOGL. Fl. Mal. I, 4 (1951) 158, *p.p.*; Blumea 7 (1952) 28, *p.p.*; *ibid.* 9 (1959) 577, f. 1. — *Wormia pteropoda* MIQ. Ann. Mus. Bot. Lugd.-Bat. 4 (1868) 77.

Large tree, up to *c.* 30 m tall, up to 50 cm \varnothing . Leaves elliptic, subcoriaceous, *c.* 17-21-nerved, 30-60 (-90) by 16-40 (-60) cm, blade with rounded to obtuse apex, obtuse to acute base and entire to slightly undulate-dentate margin. Petiole *c.* 5-10 cm long, wings up to $2\frac{1}{2}$ cm broad, often caducous. Flowers solitary, terminal, probably never expanding, sepals only slightly diverging in anthesis, petals falling without spreading. Pedicel *c.* 15-20 mm long, 5 mm thick, without bracteoles. Sepals *c.* 18, increasing in size towards centre of flower, from orbicular *c.* 20 by 20 mm to broad-elliptic *c.* 50 by 43 mm, glabrous. Petals 7, red, narrowly obovate, cucullate, *c.* 10 by 4 cm. Stamens *c.* 220, slightly curved in bud, all of approximately the same length, 45 mm long. Carpels 10, *c.* 17 by 6 mm, glabrous, with 23 mm long styles, each with *c.* 15-20 ovules.

Distr. *Malesia*: Moluccas (Halmahera, Batjan) and W. New Guinea (Salawati, Vogelkop).

Ecol. In primary forest of low altitude.

1a. *Dillenia papyracea* MERR. Philip. J. Sc. 9 (1915) Bot. 520; En. Philip. 3 (1923) 60. — *D. megalophylla* MERR. Philip. J. Sc. 14 (1919) 421; En. Philip. 3 (1923) 60. — *Wormia papyracea* GILG & WERDERM. in E. & P. Nat. Pfl. Fam. ed. 2, 21 (1925) 35. — *D. pteropoda* (Miq.) HOOGL. Fl. Mal. I, 4 (1951) 158, *p.p.* (*typ. excl.*); Blumea 7 (1952) 28, *p.p.*

The description of *Dillenia pteropoda* in Fl. Mal. I, 4 (1951) 158a fits this species.

Distr. *Malesia*: Philippines (N. Luzon, Mindanao).

Ecol. In primary forests, often along streams, from sea-level up to 500 m.

Vern. *Tukoran*, Lan., *malaigang*, Sul.

4: 159a *Dillenia celebica* HOOGL.: Blumea 7 (1952) 24, f. 3 c-e.

Dillenia ovalifolia HOOGL.: Blumea 7 (1952) 33, f. 3 a-b; *ibid.* 9 (1959) 579.

4: 159b

Add to Distr.: Waigeco and Sorong.

Add to Notes: Further collections have obscured the differences between *var. ovalifolia* and *var. sericea* HOOGL. so that these entities can no longer be maintained as distinct varieties. The petals in these collections were recorded to be pink or red, whereas previously only white petals were known.

4: 161a Insert after 7. *Dillenia papuana*:

7a. *Dillenia cyclopsensis* HOOGL. Blumea 9 (1959) 585, f. 7.

Tree, up to *c.* 20 m tall, 40 cm \varnothing , with up to 10 m bole, with reddish brown bark peeling off in flakes. Leaves cordate-elliptic or elliptic to ovate, 10-15-nerved, 20-45 by 16-35 cm, with rounded to slightly retuse apex, slightly cordiform or rounded to obtuse base, and undulate margin, glabrous. Petiole 5-10 cm long, the wings oblong up to 25 mm broad. Raceme 3-flowered, up to 6 cm long with tortuous axis. Flowers not expanding, the sepals only slightly diverging, the petals falling off collectively without spreading. Sepals 5, *c.* 45-55 by 35 mm, short hirsute outside. Petals 5, cucullate when falling, *c.* 55 by 18 mm. Stamens *c.* 360, all of approximately same length, 18-20 mm long; a few (*c.* 10) staminodes on the outside. Carpels 8-11, *c.* 17 by 7 mm, with *c.* 20 mm long styles, each with *c.* 24 ovules. Fruit dehiscent. Carpels 28 by 16 mm. Seeds unknown.

Distr. *Malesia*: NW. New Guinea (Cyclops Mts).

Ecol. Locally common in primary and secondary forest, from near sea-level up to *c.* 500 m altitude.

4: 161a

Dillenia montana DIELS.

Add to literature: HOOGL. Blumea 9 (1959) 579.

Change in description: Sepals 5 (or 7), variable in size from 29 by 21 to 35 by 30 mm. Petals 5 or 6, yellow, *c.* 36 by 32 mm. Carpels 8-11, *c.* 14-18 by 3-4 mm with 9-11 mm long, recurved styles. Fruit dehiscent. Carpels *c.* 30 by 15 mm, 1-3-seeded. Seeds 5 by 5 mm, black, with 7 mm long aril split on one side.

4: 161b

Insert after 9. *Dillenia schlechteri*:

9a. *Dillenia insularum* HOOGL. *Blumea* 9 (1959) 583, f. 7.

Tree up to c. 20 m tall, 30 cm \varnothing , with dark brown or brownish grey, somewhat scaly bark. *Leaves* elliptic-oblong or elliptic, c. 10–13-nerved, 10–25 by 5 $\frac{1}{2}$ –15 cm, with rounded apex, obtuse to rounded base, and slightly undulate margin. Petiole 3–7 cm long, with narrow lanceolate to linear, 3–5 mm broad wings wholly caducous or usually leaving a pair of small auricles at base of blade. *Flowers* solitary, just after flowering a globular bud c. 2–2 $\frac{1}{2}$ cm \varnothing . Pedicel 2 $\frac{1}{2}$ –7 $\frac{1}{2}$ cm long, with a single linear-lanceolate 10–30 mm long bracteole. Sepals 5, c. 25–30 by 20–30 mm, densely shortly sericeous outside. Petals unknown. Stamens and staminodes slightly curved in bud; the staminodes (c. 60) on the outside, 2–5 mm long; the stamens (c. 260) 6–10 mm long. Carpels 7–9, c. 10 by 6 mm, with 7 mm long styles, each with 6–8 ovules. *Fruit* dehiscent. Carpels 20 by 16 mm, 1–2-seeded. *Seeds* 4 $\frac{1}{2}$ by 2 $\frac{1}{2}$ mm, dark brown, enclosed by 5 $\frac{1}{2}$ mm long membranous aril.

Distr. Malesia: Islands to the SE. of New Guinea (Sudest, Misima).

Ecol. In lowland forest, up to 350 m alt.

9b. *Dillenia nalagi* HOOGL. *Blumea* 9 (1959) 581, f. 2–6.

Large tree up to 30 m tall, 60 cm \varnothing , with short bole, dull red-brown flaky bark, and reddish wood. *Leaves* ovate or obovate to elliptic-oblong, c. 15–23 (–32)-nerved, (18–) 30–65 (–80) by (10–) 18–30 cm, with rounded, often slightly retuse, apex, obtuse base, and undulate to shallowly dentate margin. Petiole 10–18 (–25) cm long, with linear-lanceolate, up to 18 mm broad, densely sericeo-hirsute, wholly caducous wings. Racemes 2 (–3)-flowered, up to c. 15 cm long, with axis densely sericeo-hirsute and usually curved backward. *Flowers* not expanding, the sepals only slightly diverging in anthesis, the petals falling off collectively without spreading. Sepals 5, c. 35–45 by 28–35 mm. Petals 5, yellow, cucullate when falling, c. 35–50 by 18–23 mm. Androecium with c. 325 10–15 mm long stamens on the inside and c. 365 3–10 mm long staminodes. Carpels 10–11, c. 8 by 3 $\frac{1}{2}$ mm with c. 9 mm long styles, each with c. 6–16 ovules. *Fruit* dehiscent, the sepals enlarged up to c. 65 by 40 mm. Carpels c. 30–35 by 30–34 mm, up to 2-seeded. *Seeds* c. 6 by 4 $\frac{1}{2}$ by 3 mm, enclosed by rather thick fleshy white c. 7–8 mm long aril.

Distr. Malesia: SE. New Guinea, restricted to the Northern District.

Ecol. Common in grasslands, regrowth forest, and in rain-forest at low altitude (below 100 m).

Vern. Nalagi, Robinson Bay area.

4: 161b *Dillenia quercifolia* (LANE POOLE) HOOGL. Add to *Distr.*: SE. New Guinea, including Fergusson I. (HOOGL. *Blumea* 9, 1959, 583).

4: 162a *Dillenia fagifolia* HOOGL.: *Blumea* 7 (1952) 74, f. 9 a–d.

Dillenia marsupialis HOOGL.: *Blumea* 7 (1952) 66, f. 8 e.

4: 162b *Dillenia reifferscheidia* VILLAR. Add to synonymy: *Wormia luzonensis* BAILL. *Hist. Pl.* 1 (1868) 114.

4: 164a *Dillenia talaudensis* HOOGL.: *Blumea* 7 (1952) 59, f. 8 a–d.

4: 165a *Dillenia diantha* HOOGL.: *Blumea* 7 (1952) 57, f. 7.

4: 165b *Dillenia castaneifolia*: The correct authorship is (MIQ.) DIELS, *Bot. Jahrb.* 57 (1922) 438.

The names of a number of *Dillenia* species were incorrectly attributed to MARTELLI by DUR. & JACKS. *Ind. Kew. Suppl.* 1 (1902) 136. As DUR. & JACKS. only excepted these as synonyms of the names under *Wormia*, these binomials were not validly published and must be attributed to later authors.

4: 166a Change 25. *Dillenia eximia* into:

25. *Dillenia grandifolia* WALL. [Cat. (1829) n. 946, *nomen*] ex HOOK. *f. & Th. Fl. Ind.* 1 (1855) 71; HOOK. *f. Fl. Br. Ind.* 1 (1872) 38; RIDL. *Fl. Mal. Pen.* 1 (1922) 11; CORNER, *Ways. Trees* (1940) 203; HOOGL. *Fl. Mal.* 1, 4 (1951) 174; *Blumea* 7 (1952) 134; KOCHUMMEN & WHITMORE, *Gard. Bull. Sing.* 24 (1969) 3; KOCHUMMEN, *Tree Fl. Malaya* 1 (1972) 188, f. 2; HOOGL. *Fl. Thailand* 1, 2 (1972) 100. — *D. eximia* MIQ. *Fl. Ind. Bat. Suppl.* (1861) 620; HOOGL. *Fl. Mal.* 1, 4 (1951) 166, with further synonymy.

Note. KOCHUMMEN & WHITMORE were able to show that the type of *D. grandifolia*, which consists of sapling leaves only, fits in with the species previously described under the name *Dillenia eximia* MIQ.

4: 166b *Dillenia borneensis* HOOGL.: *Blumea* 7 (1952) 80, f. 9 e–h.

4: 168b *Dillenia luzoniensis*: Authorship and synonymy are to be corrected as follows:

29. *Dillenia luzoniensis* MERR. *Philip. J. Sc.* 1 (1906) *Suppl.* 95. — *Wormia luzoniensis* VIDAL, *Rev. Pl. Vasc. Filip.* (1886) 36, non *W. luzonensis* BAILL. (1868).

Note. Because of the earlier name of BAILLON, not listed in *Index Kewensis*, the authorship of this species as given pre-

vously is incorrect. *Wormia luzonensis* BAILL. = *Dillenia reifferscheidia* VILLAR. 4: 174a *Dillenia grandifolia* under 'Excluded and Doubtful': *Dillenia grandifolia* HOOK. f. & TH. is the correct name for 25, previously entered as *Dillenia eximia* MIQ.

Ericaceae

6: 474 *Rhododendron* L.
Dr SLEUMER has published an important supplement on his revision in *Blumea* 21 (1973) 357-376, with 9 new *spp.* from Borneo, New Guinea, and New Britain, many important new records, and notes on hybridisation.

6: 669, ANDRES had, for the saprophytic Asian
670 *Ericaceae*, a fairly small generic concept, distinguishing 3 genera for 4 species, in which he was followed by SLEUMER, who in Fl. Mal. treated the Malesian *spp.* under *Andresia* (*Wirtgenia*) and *Monotropastrum*. In KENG's opinion (Reinwardtia 9, 1974, 82-84) they all belong to one genus *Cheilothea*. KENG gave a key with references to the 4 *spp.*; he did not make infra-generic distinctions.

6: 878 *Agapetes* D. DON.
P. F. STEVENS (Not. R. Bot. Gard. Edinb. 32, 1972, 13-28, 5 fig.) reinstated *Paphia* SEEM. as a new subgenus to accommodate 18 Papuan-Melanesian *spp.* and 1 *sp.* from Malaya; the first are distinguished as *sect. Paphia*, the latter as *sect. Pseudagapetes* SHAW. Three new *spp.* and one new *ssp.* are described from New Guinea. An extensive anatomical study was made.

6: 885 *Dimorphanthera* F. v. M.
P. F. STEVENS reviewed the delimitation and relationships of this genus, giving also notes on and new records of some Papuan *spp.* (Contr. Herb. Austr. 8, 1974, 1-34, 9 fig.). He concluded that *Vaccinium sect. Pachyanthum* SLEUM. (Fl. Mal. 6: 747) should be transferred to *Dimorphanthera* and made the 5 new combinations necessary. He concluded also that *Dimorphanthera* is closely related to the west Central and tropical American genus *Satyria* and suggested that the pair is an other example of trans-Pacific tropical distribution.

For the New Guinean species a number of reductions are made: *D. tridens* and *D. declinata* are reduced to *D. kempteriana*, *D. brassii* and *D. clemensiae* to *D. anchorifera*, *D. gracilis* to *D. denticulifera*, *D. splendens* is considered to be a variety of *D. elegantissima*, *D. alba* is removed from the synonymy of *D. forbesii* and kept distinct.

Furthermore, 5 new *spp.* and 1 new variety were described.

Flacourtiaceae

5: 2 Add: *Palyngology*. J. SCHAEFFER (*Blumea* 20, 1972, 65-79) has made a study of pollen in *Hydnocarpus* and related genera. In the genus two subtypes can be distinguished. Within the family the pollen is \pm isolated, but the related monotypic genus *Chlorocarpa* (from Ceylon) has rather similar pollen.

In sculpture there exists some resemblance to that in *Paropsia*, which was classified with either *Flacourtiaceae* or *Passifloraceae*, but newly incorporated in the latter family, according to DE WILDE (*Blumea* 19, 1971, 99-104; Fl. Mal. I, 7, 1972, 406).

5: 8 *Scolopia* SCHREB.

Through the new world revision of the genus by SLEUMER (*Blumea* 20, 1972, 25-64) the following additions and changes are necessary:

5: 8, 10a *Scolopia macrophylla* (W. & A.) CLOS; SLEUM. *Blumea* 20 (1972) 35.

Add to Distr.: Malay Peninsula.

5: 11b Insert after 3. *Scolopia spinosa*:

3a. *Scolopia steenisiana* SLEUM. *Blumea* 20 (1972) 34. — *S. kernodei* (non FISCHER) STEEN. *Blumea* 17 (1969) 270; cf. SLEUM. Fl. Mal. I, 6 (1972) 943b.

Leaves with 2 distinct glands at the base of the lamina or apex of the petiole. Extra-staminal disk glands absent. Inflorescence glabrous (only the pedicels puberulent), rather stoutish and dense-flowered. Pedicels robust, 3-5 mm at anthesis. Berry subglobular.

Distr. *Malesia*: Malay Peninsula (Ulu Kelantan, Gua Musang), on summit of limestone hill.

Note. By the characters mentioned above and taken from SLEUMER's key to be distinguished from *S. spinosa*. *S. kernodei* is only known from Burma and Andaman Is.

5: 11b, 12a *Scolopia luzonensis* (PRESL) WARB.; SLEUM. *Blumea* 20 (1972) 38.

Add to Distr.: Lesser Sunda Is. (Flores).

5: 12b *Scolopia novo-guineensis* WARB.; SLEUM. *Blumea* 20 (1972) 42. — *S. nitida* C. T. WHITE, J. Arn. Arb. 10 (1929) 243; SLEUM. Fl. Mal. I, 5 (1954) 12.

Add to Distr.: New Britain, New Ireland.

Goodeniaceae (LEENHOUTS)

5: 336, *Goodenia* J. E. SMITH.

6: 950a Distr., change to: Four species known from outside Australia/Tasmania.

The first couplet of the key as given in 6: 950a should accordingly be changed as follows:

1. Plant 20 cm high or more. Leaves linear-lanceolate.
 1a. Leaves mainly in a basal rosette; flowers arranged in a terminal inflorescence . . . **3. G. purpurascens**
 1a. Leaves nearly exclusively cauline; flowers axillary **4. G. armstrongiana**
 1. Plant up to 10 cm high. Leaves ovate or obovate.

4. Goodenia armstrongiana DE VRIESE, Nat. Verh. Holl. Mij. Wet. II, 10 (1854) 138, t. 24; BTH. Fl. Austr. 4 (1864) 73; KRAUSE, Pfl. R. Heft 54 (1912) 76.

Erect strigose annual up to c. 30 cm high, with few long and slender branches from the base. *Leaves* nearly exclusively cauline, sessile, linear-lanceolate, up to 3 cm by 1½ mm, herbaceous, entire, acute. *Flowers* solitary, axillary, on patent, up to 2 cm long, filiform pedicels; bracteoles 0. *Calyx lobes* lanceolate, 1½ by 0.3 mm, acute. *Corolla* 1 cm long, yellow, at base reddish, thinly villous, the lobes broadly winged. *Capsules* ellipsoid, 5 mm long. *Seeds* c. 10, ovate, 1½ by 1 mm, granulate, with a marginal rib.

Distr. Australia (Northern Terr., Arnhem Land) and *Malesia*: New Guinea (Papua, Western Distr., near Morehead Patrol Post, PULLEN 7161).

Ecol. Open sandy patch in savannah woodland; alt. c. 25 m. *Fl. fr. Aug.*

Notes. The present species is included by KRAUSE in his *sect. Ebracteolatae ser. Foliosae*.

We owe the identification of the New Guinea specimen to Prof. R. C. CAROLIN, Sydney.

Haloragaceae

- 7: 244b *Haloragis micrantha* (THUNB.) R. BR. ex S. & Z. and Fig. 4.
 Add to Distr.: N. Sumatra (Gajo Lands).
 7: 253a Change 4. *Myriophyllum brasiliense* into: **4. Myriophyllum aquaticum** (VELL.) VERDCOURT, Kew Bull. 28 (1973) 36. — *Enhydrya aquatica* VELL. Fl. Flum. (1825) 57, Icon. 1 (1835) t. 150. — *M. brasiliense* CAMBESS. in A. St. Hil. Fl. Bras. 13, 2 (1829) 182; VAN DER MEIJDEN, Fl. Mal. 1, 7 (1971) 253.

Hydrocharitaceae

- 5: 388b Change 1. *Vallisneria gigantea* into:
1. Vallisneria natans (LOUR.) HARA, J. Jap. Bot. 49 (1974) 129–137. — *Physkium natans* LOUR. Fl. Coch. (1790) 663. — *V. gigantea* GRAEBNER, Bot. Jahrb. 49 (1912) 68; DEN HARTOG, Fl. Mal. I, 5 (1957) 388.
 Note. This is the proper name if the Indo-Australian taxon is kept separate from *V. spiralis* L.

- 5: 396a Change 1. *Limnobium stoloniferum* into: **1. Limnobium laevigatum** (H. B. ex WILLD.) HEINE, Adansonia 8 (1968) 314–316; C. V. MORTON, Contr. U. S. Nat. Herb. 38 (6) (1973) 270. — *Salvinia laevigata* H. B. ex WILLD. Sp. Pl. ed. 4, 5 (1810) 537. — *L. stoloniferum* (G. MEYER) GRISEB. Fl. Br. W. Ind. (1861) 506; DEN HARTOG, Fl. Mal. I, 5 (1957) 396.

Icacinaeae

- 7: 23 Insert in the key, fork 19, first line: 'cm' after 3.5–4.
 7: 42b *Hartleya inopinata* SLEUM.
 Add to Distr.: Bosavi Mts, S. Highlands, 1350–1550 m (JACOBS 8810, fr.).
 7: 43b In Fig. 15 numbers 3 and 4 are interchanged.
 7: 60b *Stemonurus malaccensis* (MAST.) SLEUM.
 Add to Distr.: Sumatra.
 7: 70b *Iodes cirrhosa* TURCZ.
 Line 11–13 from top: delete the synonym *I. horsefieldii* BAILL.
 7: 80 Delete 4. *P. malacothrix* from the key.
 7: 83b Transfer *Phytocrene malacothrix* SLEUM. to 'Excluded' on p. 87b. It is *Legnephora minutiflora* (K. SCH.) DIELS; FORMAN, Kew Bull. 27 (1972) 279 (*Menispermaceae*).
 7: 87b Fourth line under 3. *Phytocrene macrophylla* (BL.) BL. var. *dasycarpa*: 'which is var. *macrocarpa*' must be changed into 'which is var. *macrophylla*'.

Loganiaceae (LEENHOUTS)

- 6: 294 Add to Morphology: For inflorescences see TIREL-ROUDET, Fl. C. L. & V. 13 (1972) 8–11.
 6: 296 Add to (7) *Androya*: See revision by LEEUWENBERG, Acta Bot. Neerl. 22 (1973) 456–459.
 Add to (26) *Mitreola*: See revision by LEEUWENBERG, Meded. Landb. Hogesch. Wageningen 74–23 (1975) 1–28.
 6: 317b *Fagraea ceilanica* THUNB.
 Add to Distr.: Solomon Islands.
 6: 328b *Fagraea auriculata* JACK ssp. *auriculata*.
 Add to Distr.: Flores.
 6: 331a *Fagraea resinosa* LEENH.
 Add to Distr.: Sarawak (5th Div., Ulu Sg. Pandarasan).
 Add to Ecol.: Kerangas forest on sandy soil, at c. 900 m.
 6: 343 *Gelsemium* JUSSIEU.
 Add to literature: ORNDUFF, J. Arn. Arb. 51 (1970) 1–17; TIREL-ROUDET, Fl. C. L. & V. 13 (1972) 68–70.
Strychnos LINNÉ.
 Add to literature: BISSET *et al.* Lloydia 36 (1973) 179–201.
 6: 347a *Strychnos ignatii* BERG.
 Add to synonymy: *S. lanceolaris* MIQ.

Sum. (1861) 551, 227; HILL, Kew Bull. (1911) 295, excl. fl. material; LEENH. Fl. Mal. I, 6 (1962) 357, *ditto*.

- 6: 347b Add to description: Pericarp up to 1½ cm thick.

Add to Distr.: Sumatra (Palembang), N. & S. Vietnam, Hainan (*cf.* TIREL-ROUDET, 1972).

- 6: 351a *Strychnos ovata* HILL.

Add to synonymy: *S. lanceolaris* MIQ. *sensu* HILL, Kew Bull. (1911) 295, as to fl. specimens; LEENH. Fl. Mal. I, 6 (1962) 357, *ditto*.

Add to description: Calyx to 1½ mm. Corolla inside sometimes woolly only at the tips of the lobes.

Add to Distr.: Sumatra, Hainan, and Indo-China (*cf.* TIREL-ROUDET, 1972).

- 6: 357b *Strychnos lanceolaris* MIQ.: This name has to be reduced to *S. ignatii* BERG., *vide supra*; the flowering material represents *S. ovata* HILL.

- 6: 375, *Mitreola* LINNÉ.

959b Add to literature: LEEUWENBERG, Meded. Landb. Hogesch. Wageningen 74-23 (1975) 1-28 (revision).

- 6: 377b, *Mitreola sphaerocarpa* (LEENH.) LEENH.

960a A 3rd collection is from Sarawak (S 30397), Mt Api, at only 120 m. *Fl. fr.* Sept.; on limestone; described as a shrub-let 30 cm high (S 30752).

Note. The name *Cynoctonum pedicellatum* (BTH.) B. L. ROB. to be replaced by *Mitreola pedicellata* BTH. This species is also known from Nepal and Bhutan.

- 6: 378b *Spigelia anthelmia* LINNÉ.

Add to Distr.: New Ireland (NGF 40480).

Nyctaginaceae

- 6: 467a *Pisonia aculeata* L.; STEEN. Blumea 20 (1972) 434.

Add to synonymy: *Samyda macrophylla* WILLD. Sp. Pl. 2 (1799) 625, *non Pisonia macrophylla* LINK, 1821. — *Calpidia macrophylla* BOJER, Hort. Maur. (1837) 265. — *P. macrophylla* (BOJER) CHOISY in DC. Prod. 13, 2 (1849) 446.

Note. WILLDENOW's type was based on a specimen collected by KLEIN in India (herb. WILLDENOW, no. 8340, in B); his name was omitted from Indian botany.

Oxalidaceae

- 7: 158a Change 5. *Oxalis deppei* into:

5. *Oxalis tetraphylla* CAV. Ic. Descr. 3 (1795) 19, t. 237; DENTON, Publ. Mus. Michigan State Univ., biol. ser. 4 (1973) 590. — *O. deppei* LODD. Bot. Cab. 15 (1828) 1500; VELDKAMP, Fl. Mal. I, 7 (1971) 158.

The note under this species on p. 158b should be deleted; it was due to a mis-

placed trust in KNUTH's revision. It should be replaced by:

Note. The Malesian specimens belong to *var. tetraphylla*.

Passifloraceae

- 7: 406 See Taxonomy and Key: The inclusion of *Paropsis* in *Passifloraceae* is supported by the systematic wood-anatomy according to R. B. MILLER (J. Arn. Arb. 56, 1975, 95).

- 7: 411 Second line from top, read: *P. incarnata* L.

Pedaliaceae

- 4: 217a Change 1. *Sesamum indicum* into:

1. *Sesamum orientale* LINNÉ, Sp. Pl. (1753) 634; GAERTN. Fruct. 2 (1791) 132, t. 110 f. 2; BACK. & BAKH. f. Fl. Java 2 (1965) 544. — *S. indicum* LINNÉ, Sp. Pl. (1753) 634; BACK. Fl. Mal. I, 4 (1951) 217.

Note. Sofar the first to combine these two names was GRAHAM, Cat. Pl. Bombay (1839) 126; he chose the epithet *orientale*, which must then be followed.

Philydraceae

- 4: 5b *Philydrum lanuginosum* BANKS & SOL. *ex* GAERTN.

Add to Distr.: SE. Borneo (near Bandjermasin, DRANSFIELD, June 1974). A welcome filling of the gap between Papua and Malaya.

Pittosporaceae

- 5: 360 *Citriobatus* CUNNINGHAM *ex* PUTTERLICK. The occurrence of *C. spinescens* (F. v. M.) DRUCE was expected in the Lesser Sunda Islands and in New Guinea. Now it is found indeed in the Lesser Sunda Is. (Flores) and the genus is also found in New Guinea.

Just before vol. 6 of Fl. Mal. was completed, SCHODDE (Austr. J. Bot. Suppl. 3, 1972, 1-60) published a revision of Papuan *Pittosporaceae* in which he recorded also for the first time *Citriobatus* from New Guinea. He distinguished this as a new species; *C. papuanus* SCHODDE, *l.c.* 5, fig. 1. At that time I had no material to check and refrained from commenting. It would differ from *C. spinescens* in the less thorny habit, the thinner smooth pericarp and less seeds (*c.* 20-30), *c.* 3 placentas, longer funicles (up to 6 mm), and slightly larger fruit (1¾-2½ cm).

After re-examination of Malesian and Australian material I have come to the conclusion that the differences in sizes of fruit and seeds, the surface of the pericarp, and the degree of spinescence are

variable and cannot count taxonomically. The number of placentas I cannot well count in the fruit; also SCHODDE adds *circiter* before his count.

The only difference with *C. spinescens* I found in the single Papuan specimen available to me (NGF 49455 HENTY & KATIK); it confirms less seeds (but many ovules abortive), a thinner pericarp, and flatter seeds.

For the present I believe the material available (flowers being absent, also in the type K. PAYMANS 433 = CANB 211692) reveals insufficient knowledge of the variability. I wish to postpone a decision of its being really a distinct species until more material becomes available.

Proteaceae

- 5: 152 *Gevuina* MOLINA.
In a recent study A. C. SMITH (Amer. J. Bot. 62, 1975, 133-147, 51 fig.) disagreed with SLEUMER about the application of the generic name *Gevuina* to the New Guinean species. In his opinion this should be restricted to South America as a monotypic genus. *Kermadecia* would consist of 4 spp. endemic to New Caledonia (with an allied monotypic genus *Sleumerodendron*), while the New Guinean species, together with the N. Queensland species, 2 from Fiji and 1 from the New Hebrides, would together form the genus *Bleasdalea* F. v. M.
- 5: 190 *Heliciopsis* SLEUM.
Recently 3 new spp. have been described by KOCHUMMEN from Malaya (Gard. Bull. Sing. 26, 1973, 286-287; Tree Fl. Malaya 2, 1973, 317-320, 2 fig.), bringing the number of species known from Malaya up to 5. Unfortunately there is no key and there are no diagnoses with the descriptions to point out in which way they differ from the species distinguished by SLEUMER in Fl. Mal. and how they should be inserted in the key given there.

Scyphostegiaceae

- 5: 297 *Scyphostegiaceae*. DING HOU succeeded in studying the germination (Blumea 20, 1972, 89-92, pl. 1, fig. 1) which is epigeal, and in which the testa and flimsy endosperm are shed off the cotyledons; the first two leaves are opposite, stipulate, ovate, serrate and decussate to the cotyledons.

The haploid number of chromosomes is 9 (cf. pl. 1) which is close to the base number in Angiosperms: it is far removed from that in *Monimiaceae*, and closer to that in *Flacourtiaceae*.

Thymelaeaceae

- 4: 352, *Gonystylus* T. & B.
353; To the 28 spp. keyed out by SHAW in Fl. Mal. vol. 6 a new one is to be added: *G. eximius* SHAW, and a new variety: *G. affinis* RADLK. var. *elegans* SHAW. Cf. SHAW, Kew Bull. 28 (1973) 267-268.
- 6: 976
6: 15 *Phaleria* JACK.
Since 1960 much new material has been collected in the highlands of New Guinea between 1500 and 2600 m. Among them are some long-flowered specimens. STEVENS (J. Arn. Arb. 55, 1974, 264-268) described three new species and indicated how these would fit into the key of DING HOU (Fl. Mal. I, 6, 1960, 16), including *P. nisidai* KANEH. (which DING HOU also had), preceding this key as follows:
*1. Flowers 8-8½ cm long. Leaves 5¼-9 by 2½-3¼ cm.
P. longituba STEVENS, l.c. 265
*1. Flowers less than 4½ cm long. Leaves usually larger.
*2. Anthers included, ± sessile; stigma included.
*3. Inflorescences borne on twigs, 2-5-flowered. Calyx lobes erect.
P. okapensis STEVENS, l.c. 265
*3. Inflorescences usually terminal and/or in the axils of the uppermost or adjacent leaves, 8-20-flowered. Calyx lobes reflexed.
*4. Inflorescences 9-20-flowered. Involucral bracts 2, c. 4 by 2 mm. Style with short crisped hairs along its entire length.
P. pilistyla STEVENS, l.c. 267
*4. Inflorescences 8-12-flowered. Involucral bracts 4¾-10 by 4-6 mm. Style with long hairs only at the base. . . . **P. nisidai** KANEH.
*2. Anthers and stigma usually exerted, if included then anthers with prominent filaments and floral tube more than 1 cm Ø at the throat.
*5. Follow the key by DING HOU, l.c., as in lead 1, from which then *P. nisidai* KANEH. must be deleted.

DING HOU is at the moment not prepared to restudy and check the new species, especially as he has a new collection of Papua with flowers 6 cm long. He wants to postpone his decisions.

Umbelliferae

- 4: 125; Change 1. *Sanicula europaea* into:
5: 555b, **I. *Sanicula europaea* L. ssp. *elata* (D. DON) HULTÉN**, Kungl. Svensk. Vet. Ak. Handl. IV, 13. n. 1 (1971) 363, map 138; STEEN. Mt. Flora Java (1972) pl. 54, in text. — *S. elata* D. DON, Prod. Fl. Nepal. (1925) 183; SHAN & CONSTANCE, Un. Cal.

Publ. Bot. 25 (1951) 47; BACK. & BAKII. f. Fl. Java 2 (1965) 173.

A close study of abundant material revealed that the Malesian taxon does not deserve more than the rank of a subspecies; it ranges from the Himalayas to S. China, Japan, Formosa, and all Malesian islands, but is yet not found in New Guinea.

Violaceae (JACOBS)

7: 197, Add after 1. *Hybanthus enneaspermus* (L.)
198b F. v. M. the following variety:

1a. var. verbi-divini EVERAARTS, var. nov.
Differt a specie; glandula filamenti anterioris breviter cylindrico-cupulari, dense pilosa, petalo anteriori 28–31 mm longo, aurantiaco.

Typus. SCHMUTZ 3135 (L, holo; PERTH), Lesser Sunda Is., Flores, Kangdang.

Shrubby plant 40–175 cm tall. Anterior petal 28–31 mm long, orange. Gland at the anterior filament straight, cylindrical-cup-shaped, mostly about as long as wide, c. 0.3 mm wide, densely long-hairy.

Distr. *Malesia*: Lesser Sunda Is. (W. Flores), 6 collections.

Ecol. Shade-loving, in forest-fringes, in distinct dry season, 160–850 m.

Notes. Named in honour of the Societas Verbi Divini, to which several botanically active missionaries belong, namely Fathers KOOY, LOETERS, SCHMUTZ, and VERHEIJEN, see Cyclopaedia Suppl. 2 in Fl. Mal. vol. 8.

Discovered by Father SCHMUTZ who made field observations and photographs, and corresponded with Dr JACOBS about it. At the latter's request Mr A. P. EVERAARTS at the Rijksherbarium dissected and described these specimens and analysed the differences with other *H. enneaspermus*. He also compared it with the Australian species dealt with in *Nuytsia* 1 (1972) 218–241 by Mrs E. M. BENNETT, Perth, who was consulted. The decision about the rank was taken by Dr M. JACOBS following an overview of the genus at Kew. Thanks are due to Mr P. G. WILSON, Perth, for his speedy cooperation.

INDEX TO SCIENTIFIC PLANT NAMES

compiled by

M. J. VAN STEENIS-KRUSEMAN

Families and higher taxa have been entered under their name.

Names of families which have been revised in volumes 4, 5, 6, and 7 have been entered and are printed in **bold type**, so that as far as this is concerned this index is complete for all preceding volumes as well.

Suprageneric epithets have been entered under the family name to which they belong preceded by the indication of their rank (subfamilies, tribes, etc.).

Infrageneric epithets have been entered immediately under the generic name to which they belong preceded by the indication of their rank (subgenera, sections, series, etc.).

Infraspecific epithets have been entered under the specific name to which they belong preceded by the indication of their rank (subspecies, variety, forma, etc.).

New names and *new combinations* have been printed in **bold type**, *synonyms* in *italics*.

'Map' printed behind a page number denotes that a map of the concerned taxon is present on that page.

An *asterisk* behind a page number denotes the presence of a figure of the concerned taxon.

Page numbers in **bold type** denote main treatment.

Some minor printing errors in plant names have been corrected.

Of synonyms with a double authority, the latter has not always been cited in full. The full authority can easily be derived from the text.

- Abildgaardia* Vahl 542, 565
brevifolia Steud. 589
compressa Presl 565
cypeoides Nees 567
eragrostis Nees & Mey. ex Nees 567
finbristylloides F.v.M. 569
fulvescens Thw. 569
fusca Nees 565, 567
 var. *longifolia* Boeck. 567, 569
javana Nees 565, 586
javanensis Gandoger 592
javanica Steud. 586
monostachya Vahl 565
 var. *rigidior* Steud. 565
nervosa Presl 573
pauciflora Kunth 567
pubescens Presl 560, 561
- Abilgardia* 586
Acacia melanoxylon R.Br. 795
Acer caesium Brandis 820
 caesium (Reinw. ex Bl.) Kos-term. 820
 laurinum Hassk. 820
 niveum Bl. 820
- Aceraceae** 4: 3-4, 592; 6: 915; 7: 820
- Acorus* 536
Acroblastum Soland. 791
 fawcettii (Elm.) Setch. 802
 insulare (Ridl.) Setch. 802
 subglobosum (Elm.) Setch. 802
- Actinidiaceae** s.str. 4: 37-39
- Actinoschoenus* Benth. 447, 543, 591
 chinensis Benth. 591
 filiformis (Thw.) Benth. 591
 var. *rupestris* Ridl. 591
 filiformis Ridl. 591
 thouarsii Benth. 591
- Adenia* Forsk. 405, 406, 417, 430, 434
 sect. *Blepharantes* 418, 424
 sect. *Erythrocarpus* (Roem.) de Wilde 418, 424
 sect. *Microblepharis* (W. & A.) Engl. 418, 419, 424
 sect. *Microblepharis* Hall. f. 424
 acuminata (non Bl.) King 426, 428
 angustisepala Craib 423
 australia Engl. 427
 borneensis Hall. f. 429
 var. *microcarpa* Hall. f. 429
 cardiocalpa Koord. 426
 cardiophylla (Mast.) Engl. 418
 catharinae Merr. 423
 celebica Koord. 427
 chevalieri Gagn. 426
 clementis Merr. 429
 coccinea Merr. 426
 cordifolia (Bl.) Engl. 418, 419, 420*, 430 map, 431
 cordifolia (non Bl.) Gagn. 426
 crassa Merr. 419, 430 map, 431
 digitata 406
 diversifolia Hall. f. 426
 formosana Hayata 426, 427
 grandifolia Ridl. 429
 heterophylla (Bl.) Koord. 418, 424, 425 map, 426
 ssp. *andamanica* de Wilde 426
 ssp. *arcta* (Craib) de Wilde 426
 ssp. *australis* (R.Br. ex DC.) de Wilde 425 map, 427
 ssp. *heterophylla*
 var. *celebica* (Koord.) de Wilde 425 map, 427
 var. *heterophylla* 425 map, 426
 kinabaluensis de Wilde 405, 419, 425 map, 429
 linearis Craib 423
 longifolia Merr. 426
 longipedunculata Merr. 429
 maclurei Merr. 426
 macrophylla (Bl.) Koord. 419, 427, 428 map
 var. *macrophylla* 428 map, 430
 var. *singaporeana* (Wall. ex G. Don) de Wilde 428 map, 429
 var. *smilacina* (Hall. f.) de Wilde 428 map, 429, 430
 nicobarica (non Kurz) Gagn. 426
 nicobarica (Kurz) King ex Ridl. 423
 var. *obliqua* Craib 423
 oblonga Koord. 426
 obtusata Engl. 430
 palmata (non Lamk) Steen. 429
 palmatifolia Merr. 426
 pandurata Hall. f. 426
 parviflora Cusset 426
 parviflora Pierre ex Gagn. 423
 var. *iusularis* Craib 423
 var. *nervosa* Craib 423
 penangiana (Wall. ex G. Don) de Wilde 418, 419, 423 map

- var. *parvifolia* (Pierre ex Gagn.) de Wilde 421*, 422*, 423 map
var. *penangiana* 421*, 422*, 423 map
pinnatisecta (non Craib) Pham-Hoang-Hô 426
populifolia Engl. 427
var. *pentamera* King 430
populifolia (non Bl.) Ridl. 430
populifolia (non Bl.) K.Sch. & Laut. 426
quadrifida Merr. 430, 431
quadrifida (non Merr.) Merr. 431
quintuplinervia Hall. f. 428
singaporeana Engl. 429
smilacina Hall. f. 429
sumbawana Hall. f. 426
vespertilio Hall. f. 430, 431
viridiflora Craib 418
zucca Merr. 426
- Aerva 820
cochinchinensis Gagn. 820
curtisii Oliv. 820
- Agapetes D. Don 827
subg. *Paphia* Seem. 827
sect. *Paphia* 827
sect. *Pseudagapetes* Shaw 827
- Agatea A.Gray 179, 180, 192
sect. *Enagatea* Melch. 194
sect. *Macrobotrys* Melch. 194
macrobotrys K.Sch. & Laut. 194
salomonensis Merr. & Perry 192, 194
violaris A.Gray 193*, 194
- Agathaea 194
- Agathis 268, 269, 270, 488
alba 403
dammara 270
- Agation* Brongn. 192, 194
- Aizoaceae 4: 267-275; 7: 133
- Alangium villosum* (Bl.) Wang. 73
- Albikia* Presl 489
schoenoides Presl 490
scirpoides Presl 490, 492
- Albizia lophanta* (Willd.) Benth. 788, 795, 798
- Aldrovanda 135
- Alismataceae 5: 317-334; 6: 915
- Allexis 179
- Alseodaphne *lucida* Nees 318
- Alsodeia* Thouars 180, 182
sect. *Doryctandra* (Hassk.) Hook. f. & Th. 182
sect. *Pentaloba* (Wall.) King 182
sect. *Prosthesis* (Bl.) King 182
sect. *Scyphellandra* Hook. f. & Th. 182
astrolabes K.Sch. & Laut. 185
- bengalensis* Wall. 184
Brownei 185
browni (non Korth.) Hassk. 187
brownii Korth. 185
Brownii 185
capillata Ling 183
chrysodasys Miq. 191
cinerea King 189
var. *hirsutiflora* King 189
comosa King 183
condensa King 186
corylifolia (Turcz.) Turcz. 183
cynulosa Miq. 187
dasycaula Miq. 190
dasyprysis 187
dasyprysis Miq. 187
dubia Elm. 192
echinocarpa Korth. 183
var. *nervosa* Capit. 183
var. *zollingeri* Boerl. ex Capit. 183
floribunda King 187
formicaria Elm. 188, 189
glabra Burgersd. 192
grandiflora Ridl. 187
grandis Miq. 192
haplobotrys Hassk. 188
hirtella Ridl. 185
hispida Ridl. 190
hookeriana King 188
horneri Korth. 185
horsfieldii Miq. 190
horsfieldii Turcz. 190
javanica (Bl.) Miq. 187, 188
kunstleriana King 185
lanceolata Oudem. 187
lankawiense Ridl. 184
longiracemosa Kurz 189
macrophylla Decne 190
macropyxis Capit. 189
maingayi Hook. f. & Th. 187
membranacea King 190
minahassae Koord. 188
minutiflora Ridl. 190
mollis Hook. f. & Th. 187
obtusata Korth. 184, 187
pachycarpa King 186
paradoxa Bl. ex Oudem. 184
pruinosa Pulle 184
rugosa Miq. 186, 187
salomonensis Rech. 184
sclerocarpa Burgersd. 186
scortechinii King 186
semigrata (Turcz.) J.J.S. 184
wallichiana Hook. f. 184
wrayi King 188
- Alternanthera *bettzickiana* (Regel) Nichols. 820
ficoidea (L.) R.Br. 820
manillensis (Walp.) Kanis 820
- Altingia 268
- Amaranthaceae 4: 69-98, 593; 5: 554; 6: 915-917; 7: 820
- Amaryllidaceae 806
- Amentiferae 267
- Ammannia *pinnatifida* L. f. 259
- Amorphophallus 809, 811
- Ampelopsis *latifolius* (Wall.) Planch. 782
- Amphirrhox 179
- Anabaena 221
- Anacampseros 121
- Anchieta 180
- Ancistrocladaceae 4: 8-10; 5: 553
- Andesia 827
- Andropogon *dulce* Burm. f. 529
- Androea 828
- Anisomallon 2
- Anisophyllea *disticha* (Jack) Baill. 246
- Anisoptera 296, 309, 375
- Anosporum Nees 633, 634
cephalotes Kurz 633
pallidum Boeck. 618
- Anthactinia* Bory 407
- Anthactinia* (non Bory) Roem. 412
horsfieldii Roem. 413
moluccana Roem. 412
penangiana Roem. 423
singaporeana Roem. 429
sumatrana Roem. 414
timorensis Roem. 413
- Antidesma *megalocarpum* Sp. Moore 39
- Apodytes E.Meyer ex Arn. 1, 2, 3, 47
beddomei Mast. 3
brachystylis F.v.M. 49 map
cambodiana Pierre 48
dimidiata E.Meyer ex Arn. 3, 48*, 49 map
javanica K. & V. 48
sp. 49
- Aponogeton L. f. 213
crispus (non Thunb.) Hook. f. p.p. 213
crispus (non Thunb.) F.v.M. 216
crispus Thunb. 213
lakhonensis A.Camus 213, 214*, 216*
loriae Martelli 213, 214*, 216, 217*, 218*
loriae (non Martelli) Steen. 216
luteus A.Camus 216
microphyllum Roxb. 213
monostachyon (non L. f.) Andr. 213
monostachyon (non L. f.) A. Camus 216
monostachyon (non L. f.) Hemsl. 216
pygmaeus Krause 216
stachyosporus de Wit 213, 214

- undulatus* Roxb. 213, 214*, 215*, 222
womersleyi Bruggen 214*, 217*, 218
Aponogetonaceae 4: 11–12; 5: 553; 7: 213–218
Aquilicia L. 755
otillis Gaertn. 779
sambucina L. 779
Araceae 222
Aralia capitulata Jungh. & De Vriese 24
chinensis L. 782
Araliaceae 760
Araucaria 269, 281, 291
Arcaula Rafin. 318
spicata (Sm.) Rafin. 367
Arthrophyllum 760
Arthrostylis
 subg. *Actinoschoenus* Kük. 591
chinensis Benth. 591
 var. *filiformis* Kük. 591
filiformis Thw. 591
thouarsii Kunth 591
Ascolepis kyllingioides Steud. 522
tenuior Steud. 516
Asephananthes Bory 407
Aspidocarya kelidophylla K. Sch. & Laut. 96
Asterochaete 666
arundinacea Kunth 666
Astrophea (DC.) Roem. 407
Atacca 811
Ataccia Presl 806
aspera Kunth 811
cristata Kunth 811
integrifolia Presl 811
laevis Kunth 811
lancaefolia Kunth 811
Averrhoa L. 151, 152, 153, 174
 sect. *Bilimbi* Endl. 174
 sect. *Carambola* Endl. 174
acida L. 178
acutangula Stokes 175
bilimbi L. 151, 152, 175, 177
 f. *papuana* Knuth 177
carambola L. 152, 174, 175, 176*, 177
 f. *acida* Koord. 177
 f. *dulcis* Koord. 177
 var. *angustisepala* Progel 175
frondosa Salisb. 178
microphylla Tard.-Blot 178
minima Perrottet 178
obtusangula Stokes 177
pentandra Blanco 175
sinica Hance 178
Averrhoaceae 174
Azolla 220
Baeothyron A.Dietr. 505
confervoides A.Dietr. 505
Balanaulax Rafin. 318
moluca (Rumph. ex L.) Rafin. 385
Balaniella Tiegh. 791
abbreviata (Bl.) Tiegh. 802
alutacea (Jungh.) Tiegh. 802
elongata (Bl.) Tiegh. 797
forbesii (Fawc.) Tiegh. 797
globosa (Jungh.) Tiegh. 795
junghuehnii Tiegh. 795
latisepala Tiegh. 803
lowii (Hook. f.) Tiegh. 800
maxima (Jungh.) Tiegh. 797
multibrachiata (Fawc.) Tiegh. 797
papuana (Schltr) Hosok. 798
ramosa (Fawc.) Tiegh. 795
reflexa (Becc.) Tiegh. 800
Balanophora J.R. & G.Forst. 783, 784, 785, 791
abbreviata Bl. 783, 784, 793, 794, 801*, 802 map
alutacea Jungh. 801
bulbosa Jungh. 784
celebica Warb. 798
decurrens Fawc. 794
decurrens (non Fawc.) Merr. 798
dioica Ridl. 794
dioica (non R.Br. ex Royle) Unger 797
elongata Bl. 784, 785, 793, 797, 798 map, 800
 var. *elongata* 793, 796*, 797*, 798*
 var. *macropanicis* Val. 797
 var. *maxima* (Jungh.) Hook. f. 797
 var. *ungeriana* (Val.) Hansen 793, 796*, 798
elongata (non Bl.) Hook. f. 794
elongata (non Bl.) Stapf 798
fasciculigera Suesseng. & Heine 800
fawcettii Elm. 802
forbesii Fawc. 797
fungosa J.R. & G.Forst. 783, 784, 793, 794, 805
 ssp. *fungosa* 783, 792*, 794 map, 803
 ssp. *indica* (Arn.) Hansen 783, 793, 794
 var. *globosa* (Jungh.) Hansen 784, 792*, 793, 794 map, 795*
 var. *indica* 793, 794 map, 795*
gigantea Wall. ex Fawc. 795
globosa Jungh. 784
incarnata Elm. 798
indica (Arn.) Griff. 794
insularis Ridl. 802
japonica Makino 784
latisepala (Tiegh.) Lecomte 793, 803* map
lowii Hook. f. 793, 799, 800*
maxima Jungh. 797
micholitzii Ridl. 794
micrantha Warb. 802
multibrachiata (non Fawc.) Burk. & Holtt. 798
multibrachiata Fawc. 797
multibrachiata (non Fawc.) Hend. 803
oosterzeeana Val. 798
papuana Schltr 793, 796*, 798, 799* map, 800
polyandra Griff. 803
ramosa Fawc. 795
reflexa Becc. 783, 792*, 793, 800, 801*, 803 map
sarasinorum Warb. ex Harms 802
subglobosa Elm. 802
trimeria Tiegh. 802
truncata Ridl. 803
ungeriana Val. 798
wilderi 783
zollingeri Fawc. 802
Balanophoraceae 783–805
 subfam. *Balanophoroideae* 785
 subfam. *Helosidoideae* 787, 790
Bambusa 793, 803
Barringtonia
asiatica (L.) Kurz 795
Barteria fistulosa 406
Basellaceae 5: 300–304
Batidaceae 5: 414–415; 6: 917
Baumea Gaud. 690
aspericaulis S.T.Blake 696
crassa Thw. 701
disticha S.T.Blake 699
falcata Nees 694
glomerata Gaud. 698
gumii S.T.Blake 701
loculata Boeck. 700
mariscoides Gaud. 698
meyenii Kunth 698
rubiginosa Boeck. 701
teretifolia Palla 700
Beera Lestib. 489
Betulaceae 5: 207–208; 6: 917: 7: 272, 274, 275
Bilimbi Rheede 177
Biophytum DC. 151, 152, 153, 154, 159
 sect. *Prolifera* Knuth 161
 sect. *Sensitiva* Knuth 161
adiantoides Wight ex Edgew. & Hook. f. 152, 160, 161, 165 map, 166
albiflorum F.v.M. 166
apodiscias (Turcz.) Edgew. & Hook. f. 161
candolleum 161
cumingianum (Turcz.) Edgew. 163

- cumingii* Klotzsch 162
dendroides (H.B.K.) DC. 152, 160, 161, 162, 163*
esquirolii Lév. 166
fruticosum Bl. 152, 160, 161, 165 map, 166
 var. *fruticosum* 166
 var. *papuanum* Veldk. 166
intermedium 161, 166
microphyllum Veldk. 152, 160, 161, 162*, 164, 165 map, 166
nudum 166
petersianum Klotzsch 152, 161, 162*
polyphyllum 166
proliferum 161, 166
reinwardtii (Zucc.) Klotzsch 152, 160, 161, 162*, 164
sensitivum (non L.) F.M. Bailey 164
sensitivum (L.) DC. 152, 160, 161, 162*
 var. *cumingianum* (Turcz.) Edgew. & Hook. f. 162
 var. *nervifolia* (non Edgew. & Hook. f.) F.-Vill. 163
 var. *reinwardtii* (Zucc.) Guillaum. 164
sessile (Buch.-Ham. ex Baill.) Knuth 161
thorelianum Guillaum.
 var. *sinensis* Guillaum. 166
Bixaceae s.str. 4: 239-241
Bleasdealea F.v.M. 830
Blephistelma Raf. 412
 aurantia Raf. 415
Blimbing bula Rumph. 177
Blimbingun teres Rumph. 177
Bolboschoenus Palla 499
Brackenridgea A.Gray 97, 98, 101, 105
 sect. *Brackenridgea* 98, 101
 sect. *Notochnella* (Tiegh.) Kanis 97, 98, 101, 104
 corymbosa (King) Tiegh. 102
 denticulata Furtado 102
 elegantissima (Wall.) Kanis 104
 fascicularis (Blanco) F.-Vill. 101, 104
 ssp. *fascicularis* 104
 ssp. *mindanaensis* (Merr.) Kanis 104
 forbesii Tiegh. 101, 103
 foxworthyi (Elm.) Furtado 102
 hookeri (Planch.) A.Gray 101, 102, 103*, 104
 var. *leucocarpa* Scheff. 102
 kingii Tiegh. 102
 palustris Bartell. 101, 102, 103*, 104
 ssp. *foxworthyi* (Elmer) Kanis 102, 103
 ssp. *kjellbergii* Kanis 102, 103
 ssp. *palustris* 102
 perakensis Tiegh. 102
 rubescens Tiegh. 102
 serrulata Bartell. 102
Bruniiera Franch. 235
Buchanania novoguineensis Warb. 36
Bulbostylis Kunth 435, 446*, 447, 448, 449, 452, 454, 523, 537, 542, 561
 barbata (Rottb.) Clarke 436, 438, 538, 539, 540, 561
 f. *paupercula* Kük. 539
 capillaris (non Clarke) Camus 538
 capillaris (L.) Clarke 538, 539, 561
 var. *trifida* Clarke 538
 densa (Wall. in Roxb.) Hand.-Mazz. 440, 538
 puberula (Poir.) Clarke 438, 538, 539*, 540
 pubescens Svens. 560
 trifida Nelves 538
Burmanna L. 820
coelestis Don 820
Burmanniaceae 4: 13-26, 592; 5: 553; 7: 820
Burseraceae 5: 209-296, 567; 6: 917-928; 7: 820-822
Butomaceae 5: 118-120, 566
Byblidaceae 135-137
Byblis Salisb. 135
 gigantea Lindl. 136
 liniflora Salisb. 136*, 137
Calandrinia H.B.K. 121, 122, 123
 grandiflora Lindl. 122*, 123
Callaeocarpus Miq. 294
 rhamnifolia (Miq.) Miq. 299
 sumatrana Miq. 315
Callitrichaceae 4: 251-252; 7: 240
Callitriche 239, 240
Calophyllum vidalii F.-Vill. 116
Calpidia macrophylla Bojer 829
Calucechinus Hombr. & Jacq. 277, 278
Calusparassus Hombr. & Jacq. 278, 280
Calyptrostylis Nees & Mey. ex Nees (Div.) 713
 sect. *Aureae* Clarke 713
 articulata Nees 714
Campanulaceae 6: 107-141, 928
Campylocerium Tiegh. 105
 neriifolium (Bartell.) Tiegh. 105
 zollingeri Tiegh. 107
Campylopora Tiegh. 101
Campylospermum Tiegh. 105
abbreviatum Tiegh. 107
beccarianum (Bartell.) Tiegh. 105
borneense (Bartell.) Tiegh. 105
cumingii Tiegh. 107
kingii Tiegh. 107
perakense Tiegh. 107
plicatum Tiegh. 107
strictum Tiegh. 107
sumatranum (Jack) Tiegh. 105
wallichianum Tiegh. 107
Canarium expansum Ridl. 821
pseudosumatranum Leenh. 822
 vitiense A.Gray 822
Cannabinaceae 4: 222-223
Cantleya Ridl. 1, 2, 3, 4, 51
corniculata (Becc.) Howard 3, 51, 52*, 53* map, 59
johorica Ridl. 51
Capitularia Flörke 458
Capitularia Rabenh. 458
Capitularia Valck.Sur. 458
 foliata Uittien 460
 var. *archboldii* Uittien 460
 involutrata Valck.Sur. 460
Capitularina Kern 435, 448, 449, 452, 458
 involutrata (Valck.Sur.) Kern 437, 438, 454, 459*, 460
Cappar(id)aceae 6: 61-105; 7: 822
Capparis magna Lour. 822
Caprifoliaceae 4: 175-194; 6: 928-930
Cardiopteridaceae 93-96
Cardiopteris (Wall. ex) Royle 93
 celebica R.Br. ex Koord. 96
 javonica Bl. 95
 lobata (non R.Br.) Becc. 95
 lobata R.Br. 95
 var. *moluccana* (Bl.) Mast. 95
 moluccana Bl. 94*, 95 map
 moluccana (non Bl.) Wu & Wang 95
 platycarpa Gagnep. 95
 quinqueloba (Hassk.) Hassk. 95 map, 96
 rumphii Baill. 95
 var. *blumeana* Baill. 95
 var. *integrifolia* Baill. 95
 var. *lobata* Baill. 95
 var. *subhamata* Baill. 95
Cardiopterygaceae 93
Cardiopteryx Engl. 93
Carex 435, 436, 441, 443, 444, 445*, 446*, 447, 449, 450, 451, 452, 453, 455, 456, 591, 724, 752, 753, 823
 aggregata 450
 anemocarya 440
 baccans 440, 443
 brachyathera 440

- brevicollis 450
 breviculmis 440
 breviscapa 440
 brownii 440
 brunnea 440
 capillacea 440
 celebica 440
 commixta 440
 cryptostachys 439
 curta 436
 divulsa 436, 606
 dolichostachya 440
 duriuscula 437
 echinata 436, 440
 eremostachya 437
 filicina 440
 finitima 440
 flava 450
 gajonum 437, 440
 gaudichaudiana 440
 glomerata (non Thunb.) Blanco 513
 graeffeana 440
 helferi 440
 horsfieldii 439
 indica 439
 jackiana 440
 laevis major Rumph. 470
 laevis minor Rumph. 490
 lamprochlamys 440
 lateralis 440
 loheri 437, 440
 longipes 440
 macrothyrsa Miq. 516
 maculata 440
 malaccensis 437, 440
 maubertiana 439
 merrillii 437
 michauxiana 436, 437, 440
 montivaga 441
 muricata 436, 606
 myosurus 440
 nodiflora 437
 nubigena 441, 549
 oedorrhapha 441
 ovata Burm. f. 565
 pairaei 436, 606
 palawanensis 437
 perciliata 440
 phacelostachys 440
 phacota 441
 pruinosa 441
 pseudocyperus 436, 441
 rafflesiana 439
 ramosii 440
 remota 436
 rhynchachaenium 440
 sarawaketensis 437, 440
 satzumensis 439, 440
 spathaceo-bracteata 437, 440
 speciosa 439
 stramentitia 442
 teinogyna 440
 teres 441
 tricephala 442
 tuberosa (non Degl.) Blanco 530
 turrita 440
 verticillata 440
 vesiculosa 441
 vietnamica Raym. 480
 Carices 436, 439, 440, 446
 Carissa carandas L. 795
 Carpha Banks & Sol. 436, 448, 452, 453, 666, 673
 alpina R.Br. 437, 441, 444, 455, 666, 667*
 arundinacea Brongn. 666
 junciformis Boeck. 672
 paniculata Phil. 668
 urvilleana Gaud. 666
 Cassinopsis Sonder 93
 Castanea Mill. 266, 267, 268, 271, 272, 273, 274, 275, 276
 acuminatissima Bl. 307
 argentea Bl. 311
 var. rigida Bl. 311
 brevicuspis Miq. 312
 burnana (Miq.) Oerst. 307
 cooperta (Blanco) Oerst. 335
 costata Bl. 312
 furfurella Miq. 384
 glomerata (non Roxb.) Wall. ex Bl. 315
 inermis Lindl. ex Wall. 315
 javanica Bl. 306
 var. 306
 var. fuscescens Bl. 306
 var. montana Bl. 306
 latifolia Bl. 375
 montana Bl. 306
 rhamnifolia (Miq.) Oerst. 299
 sativa 270, 272, 273
 sessilifolia Bl. 307
 spectabilis Miq. 313
 sumatrana (Miq.) Oerst. 315
 tungurrut Bl. 303
 f. sumatrana Miq. 303
 Castanopsis Spach 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 281, 283, 285, 289, 294, 296 map, 298 map
 acuminatissima (Bl.) A.D.C. 267, 268, 269, 291, 296, 297, 307, 308*, 311
 andersonii 310
 andersonii Gamble 310
 argentea (Bl.) A.D.C. 267, 268, 270, 297, 311
 armata Spach 299
 bejardii A. Camus 309
 blumeana (Korth.) Rehd. 339
 borneensis King 267, 296, 299
 brevicuspis (Miq.) A.D.C. 313
 brevispina Hayata 309, 315
 brevispina Schottky 315
 buruana Miq. 267, 296, 297, 307, 309
 f. grandifolia Miq. 307
 catalpaefolia 311
 catappaefolia King ex Hook. f. 296, 297, 311
 chinensis 309
 chrysophylla 295
 clemensii Soepadmo 297, 302
 conspersispina Merr. 303, 305
 costata (Bl.) A.D.C. 267, 270, 297, 307, 312, 313*
 β bancana Scheff. 313
 costata (non A.D.C.) F.-Vill. 335
 curtisii King 296, 298
 cuspidata 309
 densinervia Soepadmo 297, 301
 discocarpa (Hance) Hance 306, 307
 dispersispina Merr. 305
 echidnocarpa 307, 309
 elmeri Merr. 305
 enclisacarpa (Korth.) Redh. 338
 endertii Hatus. ex Soepadmo 297, 301
 evansii Elmer 297, 305
 ferox 307, 309
 foxworthyi Schottky 267, 297, 309, 313*, 314
 fulva Gamble 267, 296, 297, 312, 314
 hullettii King ex Hook. f. 318
 hypophoenicea (Seemen) Soepadmo 297, 304*, 305
 hystrix 312
 inermis (Lindl. ex Wall.) B. & H. 270, 296, 298, 315, 316, 318
 inermis (non B. & H.) Merr. 315
 javanica (Bl.) A.D.C. 268, 270, 297, 306, 310
 var. montana (Bl.) A.D.C. 306
 javanica (non A.D.C.) Elmer 314
 javanica (non A.D.C.) Merr. 305
 johorensis Soepadmo 296, 300
 junghuhii (Miq.) Markgr. 309
 kinabaluensis A. Camus 309, 310
 lancaefolia 316
 lentiginosa E.F. Warb. 306
 longispicata Hu 309
 lucida (Nees) Soepadmo 269, 296, 298, 316, 318
 malaccensis Gamble 296, 297, 303
 megacarpa Gamble 269, 297, 305
 microphylla Soepadmo 297, 310

- mitifica* Hance 315
motleyana King 296, 298, 314
mottleyana 314
nebularium Hickel & A. Camus 309
nepheleoides King ex Hook. f. 296, 298
oligoneura Soepadmo 296, 297, 300
oviformis Soepadmo 297, 302, 303
pachycarpa A. Camus 299
paucispina Soepadmo 297, 301
pearsonii Merr. 314
pedunculata Soepadmo 296, 298, 315
penangensis A. Camus 306
philipensis (Blanco) Vidal 298, 315, 316, 317*
psilophylla Soepadmo 298, 315, 316, 317*, 318
reflexa (King) Rehd. 335
rhamnifolia (Miq.) A. DC. 296, 298, 299, 317*
ridleyi Gamble 303, 306
schefferiana Hance 297, 310
schenkeriae Bail. 309
scortechinii Gamble 297, 312
spectabilis (Miq.) A. DC. 313
sumatrana (Miq.) A. DC. 315
tribuloides 309
trisperma Scheff. 313
tungurrut (Bl.) A. DC. 268, 270, 297, 303
turbinata Stapf 329
wallichii King ex Hook. f. 296, 297, 300
woodii Merr. 305
Castanoxylon 266
Casuarina equisetifolia 606
Casuarinaceae 272
Celastraceae 6: 227–291, 389–421, 930–932; 7: 89
Celastrales 93
Celastrus paniculatus Willd. 192
Celosia argentea L. 820
var. cristata 820
Centrolepidaceae 5: 421–427
Centrolepis 441
Cephaloschoenus longisetis Nees 717
zeylanicus Nees 714
Cephaloscirpus Kurz 468
macrocephalus Kurz 470
Ceratophyllaceae 4: 41–42
Cercinia Tiegh. 105
Chaetocyperus Nees 523, 534
arenicola Steud. 534
limnocharis Nees 534
setaceus (non Nees) Kurz 564
setaceus Nees 534
Chaetospora R. Br. 672
alpina F. v. M. 666
axillaris R. Br. 679
calostachya R. Br. 675
fimbristylloides F. v. M. 672
nitens R. Br. 680
paludosa R. Br. 672
Chapelliera Nees 691
Chariessa Miq. 4
cauliflora (Pulle) Sleum. 9
latifolia (Merr.) Sleum. 6
philippinensis (Merr.) Sleum. 7
suaveolens (Bl.) Miq. 6
Cheilothea Keng 827
Cheiranthra 135
Chenopodiaceae 4: 99–106, 594; 6: 932; 7: 822
Cherodendron 813
Chionanthus ghaeri Gaertn. 456
Chlorocarpa 827
Chlorocharis Rikli 523
Chlorocyperus Rikli 592
compressus Palla 617
globosus Palla 648
var. oblonginux Kük. 648
iria Rikli 616
latispicatus Rikli 653
malaccensis Palla 615
nilagiricus Rikli 648
polystachyus Rikli 649
rotundus Palla 604
Chondrache R. Br. 460
articulata R. Br. 462
Choricarpha Boeck. 460
aphylla Boeck. 462
Chorizandra R. Br. 449, 451, 458
Chroococcus 261
Chrysihrix 449
Chrysolepis Hjelmqvist 276, 294, 295
Cieca Medik. 407
Cinnamomum 289
Cintractia leucoderma (Berk.) P. Henn. 714
Cissus flexuosa Turcz. 46
sp. 795
Citriobatus Cunn. ex Putterl. 829
papuanus Schodde 829
spinescens (F. v. M.) Druce 829, 830
Citronella D. Don 1, 2, 3, 4, 6
map
brassii Howard 6
latifolia (Merr.) Howard 5, 6
philippinensis (Merr.) Howard 5, 7
suaveolens (Bl.) Howard 5*, 6
Citrus sp. 794
Cladium P. Browne 436, 447, 448, 452, 453, 670, 688, 691, 706
sect. Baumea B. & H. 691
sect. Eucladium Benth. 688
sect. Vincentia B. & H. 691
subg. Baumea Clarke 672, 691
subg. Baumea Kük. 691
subg. Eucladium Clarke 688
subg. Machaerina Clarke 691
subg. Machaerina Kük. 691
subg. Vincentia Clarke 691
anceps Hook. f. ex Chermesz. 694
angustifolium Drake 696
angustifolium (non Drake) Kük. 694
arfakense Rendle 668, 700
aromaticum Merr. 677
articulatum R. Br. 700
aspericaule Kük. 696
asperum F. v. M. 708
borneense Clarke 668
brevipaniculatum Kük. 701, 703
chinense Nees 690
colpodes Laut. 698
crassum Kük. 701
crinitum Merr. 694
cyperoides Merr. 566, 567
distichum Clarke 699
falcatum Clarke 694, 696
var. celebicum Kük. 696
var. sumatrense Clarke 696
filiforme Merr. 678
gaudichaudii (non W. F. Wight) Ohwi 698
gaudichaudii W. F. Wight 698
germanicum (non Schrad.) Rendle 690
germanicum Schrad. 690
globiceps Clarke 698
var. colpodes Kük. 698
glomeratum R. Br. 701
glomeratum F. - Vill. 698
gunnii Hook. f. 701
var. brevipaniculatum Kük. 701
iris Ohwi 694
jamaicense Crantz 690
juncoides Elmer 698
lamii Kük. 696
latifolium Merr. 694
laxiflorum Hook. f. 701
leptostachyum Nees & Mey. 690
maingayi C. B. Clarke 693
var. subsetosum Kük. 694
maingayi (non Clarke) Koord. 694
mariscoides (Mühl.) Torr. 688
mariscoides F. - Vill. 698
mariscus (L.) Pohl 436, 439, 443, 454, 677, 688, 689*, 690, 691
ssp. intermedium Kük. 690
ssp. jamaicense (Crantz) Kük. 689*, 690
ssp. mariscus 690
meyenii Drake 698, 699
var. gaudichaudii Kük. 698
var. juncoides Kük. 698
f. atrofussum Kük. 694, 698

- micranthes* Clarke 699
nipponicum Ohwi 701
nudum 701
philippinense Merr. 699
procerum S.T.Blake 690
pulchrum Ridl. 672
riparium Benth. 701
 var. *crassum* Clarke 701
riparium Merr. 701
rubiginosum Domin 701
 var. *subriparium* Kük. 701
 var. *subseptatum* Kük. 701
samoense Clarke 694, 696
sinclairii Hook. f. 694
 var. *crinitum* Kük. 694
sinuatum Ridl. 698
tenax 703
teretifolium R.Br. 700
 var. *typicum* Domin 700
tetragonum (Labill.) Black 700
undulatum Thw. 672
 var. *finbristlyoides* Domin 672
 var. *pulchrum* Kük. 672
Cladonia 458
Claytonia 121, 126
Clerodendron esquirolii Lévl. 813
Clethra Linné 139, 141, 142 map
 sect. *Clethra* 141, 142 map
 sect. *Cuellaria* 141
acuminata Michx 139
alnifolia (non L.) Blanco 146
alnifolia L. 139
 var. *pubescens* Ait. 139
arborea 141
arfakana Sleum. 142, 148
canescens Reinw. ex Bl. 141, 145
 var. *canescens* 145
 var. *clementis* (Merr.) Sleum. 145
 var. *ledermannii* (Schltr) Sleum. 145, 146
 var. *luzonica* (Merr.) Sleum. 145
 var. *novoguineensis* (Kaneh. & Hatus.) Sleum. 145, 146
canescens (non Reinw. ex Bl.) Miq. 144
canescens (non Reinw. ex Bl.) Ridl. 143
canescens (non Reinw. ex Bl.) Stapf 145
canescens (non Reinw. ex Bl.) F.-Vill. 146
castanea Elmer 146
clementis Merr. 145
elongata J.J.S. 148
hendersonii Sleum. 141, 143*
javanica Turcz. 141, 144
 var. *javanica* 144
 var. *lombokensis* Sleum. 144
 var. *novoguineensis* Kaneh. & Hatus. 146
luzonica (Merr.) Sleum. 145
pachyphylla Merr. 140*, 142, 150
papuana J.J.S. 142, 149*
 var. *papuana* 149
 var. *trichostyla* Sleum. 150
papuana Schltr 146
pubifolia Merr. 142
pulcherrima Ridl. 142
pulgarensis Elmer 142, 150
sp. 144
sumatrana J.J.S. 141, 142
sumbawaensis Sleum. 142, 147
symingtonii Sleum. 141, 144
tomentella Rolfe ex Dunn 142, 148
williamsii C.B.Rob. 146
Clethraceae 139-150
Cobresia 751
Cochlospermaceae 4: 61-63
Codiocarpus Howard 1, 2, 3, 42
andamanicus (Kurz) Howard 43 map
 merrittii (Merr.) Howard 43 map, 44*
Coleochloa 451
Coleochloaceae 4: 533-589; 5: 564; 6: 932-933; 7: 823
Combretopsis K.Sch. 89
pentaptera K.Sch. & Hollr. 91
Coniferae 267
Connaraceae 5: 495-541; 6: 933-936; 7: 152, 153, 823
Connaropsis Planch. ex Hook. f. 168
 acuminata Pearson 170
 diversifolia Kurz 170
 glabra Ridl. 171
 glauca Hook. f. 172
 grandiflora Ridl. 170
 griffithii Planch. ex Hook. f. 170
 laxa Ridl. 171
 macrophylla King 170, 174
 monophylla Planch. ex Hook. f. 172
 philippica F.-Vill. 174
 rubescens Ridl. 174
 sericea Ridl. 171
 simplicifolia Ridl. 171
 varians Craib 174
Connarus paniculatus Roxb. 823
 var. *hainanensis* Vidal 823
Convolvulaceae 4: 388-512, 599;

5: 558; 6: 936-941; 7: 823

Corylaceae 274, 275

Corynocarpaceae 4: 262-264; 5: 557; 6: 941

Costularia Clarke 436, 447, 448, 449, 452, 453, 664, 670, 672, 673

subg. *Lophoschoenus* (Stapf) Kük. 666*paludosa* Clarke 672, 678*pilispala* (Steud.) Kern 437, 455, 664, 665*, 666*urvilleana* Kük. 666

Courtoisia 593

cyperoides (non Nees) Miq. 661**Crassulaceae 4: 197-202***Crateva magna* (Lour.) DC. 822 var. *magna* 822 *nurvala* Ham. 822

Crossostemma 405

Croton laurifolius Nor: 59

Cryptocarya 281

Cryptoneuma malaccensis Turcz. 820

Cupuliferae 274

Cyanophyceae 261

Cyclandrophora scabra Hassk. 398*Cyclobalanopsis* Oerst. 274, 276, 385 *argentata* (Korth.) Oerst. 389 *horsfieldii* (Miq.) Oerst. 396 *lineata* (Bl.) Oerst. 396 *lowii* (King) Schottky 393 *merkusii* (Endl.) Oerst. 396 *merrillii* (von Seemen) Schottky 394 *muricata* (Roxb.) Oerst. 375 *oidocarpa* (Korth.) Oerst. 392 *sericea* (Scheff.) Schottky 393 *treubiana* (von Seemen) Schottky 398 *turbinata* (Bl.) Schottky 396*Cyclobalanus* (Endl.) Oerst. 274, 276, 318 *bemettii* (Miq.) Oerst. 356 *blancoi* (A.D.C.) Oerst. 361 *blumeana* (Korth.) Oerst. 339 *celebica* (Miq.) Oerst. 374 *conocarpa* (Oudem.) Oerst. 349 *costata* (Bl.) Oerst. 325 *cyrtopoda* (Miq.) Oerst. 384 *daphnoidea* (Bl.) Oerst. 352 *diepenhorstii* (Miq.) Oerst. 362 *encleisacarpa* (Korth.) Oerst. 338 *ewyckii* (Korth.) Oerst. 351 *gracilis* (Korth.) Oerst. 362 *hystrix* (Korth.) Oerst. 384 *induta* (Bl.) Oerst. 344 *javensis* (Bl.) Oerst. 325 *lamponga* (Miq.) Oerst. 375

- lanosii* 374
leptogyne (Korth.) Oerst. 379
llanosii (A.DC.) Oerst. 374
nitida (Bl.) Oerst. 352
omalokos (Korth.) Oerst.
oogyne (Miq.) Oerst. 385
ovalis (Blanco) Oerst. 361
philippensis (A.DC.) Oerst.
 353
platycarpa (Bl.) Oerst. 340
rassa (Miq.) Oerst. 364
reinwardtii (Korth.) Oerst. 359
tysmanni (Bl.) Oerst. 343
tysmanninii 343
Cyclocampe Steud. 673
waigiouensis Steud. 675
Cyclocarpa 673
waigiouensis 675
Cynoctonum pedicellatum (Bth.)
 B.L.Rob. 829
Cynomorium 784
philippinense Blanco 805
Cynopsole Endl. 791
elongata (Bl.) Endl. ex Jacks.
 797
Cyperaceae 435–753, 823
 subfam. Caricoideae 435, 445,
 446, 449, 450, 451, 452, 453,
 752
 tribe Cariceae 449, 451, 452,
 453, 753
 tribe Sclerieae 447, 452, 453,
 753
 subfam. Cyperoideae 435, 445,
 446, 449, 450, 451, 452, 496
 tribe Cypereae 435, 449, 452
 tribe Hypolytreae 435, 447,
 449, 452
 tribe *Mapanieae* 437, 439,
 446, 447, 460
 tribe Rhynchosporeae 446,
 449, 452, 644, 645
 subfam. *Scirpoideae* 450
 tribe *Scirpeae* 447, 449
Cyperus L. 436, 439, 441, 443,
 445*, 446*, 447, 448, 449, 450,
 452, 454, 543, 592, 673, 717
 subg. *Anosporum* Clarke 633
 subg. *Cyperus* 595, 601, 638
 sect. *Abildgaardia* Endl.
 565
 sect. *Alopecuroidei* Cherm.
 595, 603
 sect. *Alternifolii* Kunth 595,
 617
 sect. *Amabiles* Clarke 595,
 629
 sect. *Aristati* Kunth 595,
 630
 sect. *Brevifolii* Clarke 607
 sect. *Bulbocaulis* Kük. 643
 sect. *Bulbosi* Clarke 604
 sect. *Cephalotes* Valck.Sur.
 596, 633
 sect. *Compressi* Kunth 595,
 617
 sect. *Corymbosi* Kunth 595,
 607
 sect. *Cyperus* 595, 604
 sect. *Dichostylis* (Lestib.)
 Baill. 596, 634
 sect. *Diclidium* (Nees)
 Benth. 596, 645
 sect. *Difformes* Clarke 629
 sect. *Diffusi* Kunth 593,
 595, 619
 sect. *Distantes* Clarke 595,
 609
 sect. *Esculenti* Kük. 604
 sect. *Exaltati* Kunth 595,
 601
 sect. *Fastigiati* Kük. 601
 sect. *Feraces* Kük. 645
 sect. *Flabelliformes* (Clarke)
 Kern 596, 638
 sect. *Flavescentes* Kük. 596,
 651
 sect. *Fusci* Kunth 595, 629
 sect. *Graciles* Benth. ex
 Kük. 624
 sect. *Halpani* Kunth 595,
 623, 624
 sect. *Haspani* 624
 sect. *Humiles* Kunth 596,
 631
 sect. *Incurvi* Kük. 619
 sect. *Iriae* Kunth 595, 616
 sect. *Kyllingoides* Kunth
 596, 643
 sect. *Latifolii* Clarke 611
 sect. *Leucocephali* Cherm.
 632
 sect. *Longispicati a. Distan-*
tes Valck.Sur. 609
 sect. *Longispicati b. Pilosi*
 Valck.Sur. 611
 sect. *Longispicati c. Digitati*
 Valck.Sur. 601
 sect. *Mariscus* (Vahl) Benth.
 596, 641
 sect. *Natantes* Clarke 618
 sect. *Pennati* Kunth 596,
 635
 sect. *Pinnati* Kük. 596, 637
 sect. *Platystachyi* Kunth
 596, 632
 sect. *Proceri* Kunth 595, 611
 sect. *Pseudanosporum*
 Clarke 595, 618
 sect. *Radiantes* Valck.Sur.
 595, 623
 sect. *Remirea* (Aubl.) Koyama
 596, 644
 sect. *Rotundi* Clarke 604
 sect. *Ruprestres* Clarke 631
 sect. *Strigosi* Kük. 596, 640
 sect. *Subimbricati* Clarke
 595, 608
 sect. *Subquadrangularis*
 Kük. 608
 sect. *Subulati* Clarke 638
 sect. *Tenelli* Clarke 595, 624
 sect. *Textiles* Clarke 617
 sect. *Thunbergiani* Clarke
 596, 637
 sect. *Tunicati* Clarke 604
 sect. *Umbellati* Clarke 641
 sect. *Zollingeriani* Clarke
 608
 subg. *Iria* L.C.Rich. ex Pers.
 540
 subg. *Kyllinga* (Rottb.) Valck.
 Sur. 596, 653
 sect. *Alati* Kük. 596, 659
 sect. *Eu-Kyllinga* Kük. 655
 sect. *Kyllinga* 442, 596, 655
 sect. *Queenslandiella* (Do-
 min) Kern 596, 654
 subg. *Mariscus* 593, 631, 638,
 655
 subg. *Pycreus* (Beauv.) Miq.
 596, 646, 655
 sect. *Chrysanthi* Clarke 596,
 648
 sect. *Flavescentes* Kük. 596,
 651
 sect. *Lancei* Kük. 648
 sect. *Latespicata* Kük. 651
 sect. *Pumili* Kük. 596, 650
 sect. *Pycreus* 596, 613, 648
 sect. *Sulcati* Kük. 646
 sect. *Vestiti* (Clarke) Kern
 596, 646
 albus Presl 660
 alopecuroides Rottb. 439, 442,
 593, 596, 603
 var. β *digynus* 603
 var. α 603
 var. γ 603
alternifolius (non L.) Back.
 618
alternifolius L. 617, 618, 660
 ssp. *flabelliformis* Kük. 618
 var. *obtusangulus* Koyama
 618
altus Nees 602
amabilis (non Vahl) Camus
 630
amabilis Vahl 629, 630
anabaptistus Steud. 603
andersonius Boeck. 642
angulatus Nees 648
angustatus R.Br. 437, 442,
 599, 637, 638
angustifolius Nees 630
anomalous Steud. 635
aphyllus Hassk. 655
aquatilis R.Br. 437, 599, 624
aristatus Rottb. 630
armstrongii Benth. 637
aromaticus (Ridl.) Mattf. &
 Kük. 444, 593, 600, 656

- var. *elatus* (Steud.) Kük.
656
articulatus 450
atratus Steud. 647
auricomus (non Sieb.) Benth.
 601
 var. *microstachyus* Boeck.
 601
auriculatus (non Nees) Steud.
 619
babakan Steud. 439, 593, 597,
 598, **613**, 621
babakensis Steud. 613
bancanus Miq. 621
bancanus (non Miq.) Naves
 619
benghalensis Clarke 613
bifax Clarke 605
bispicatus Steud. 601
bowmannii F.v.M. ex Benth.
 641
brachiatus Poir. 617
bracteolatus Steud. 646
breviculmis (non R.Br.) F.v.M.
 651
brevifolius A.Dietr. 661
brevifolius (Rottb.) Hassk.
 436, 442, 593, 600, **656**, **658***
 f. *firmiculmis* Kük. 656
 f. *gracilis* Valck.Sur. 656
 f. *pumilus* Valck.Sur. 656
 f. *stellulatus* Valck.Sur. 658
 f. *subtrifoliatus* Valck.Sur.
 656
 f. *vaginatus* Valck.Sur. 656
brunnescens Boeck. 660
bulboso-stoloniferus Steud. 607
bulbosus (non Vahl) Camus
 604
 var. *elatus* Camus 607
bulbosus Vahl 438, 442, 443,
 593, 598, **605**
caespitosus (non Poir.) Llanos
 625
calacaryensis Steud. 619
calicicola Domin 631
calicolus 631
calopterus Miq. 609
canescens Vahl 635
capillaris Koenig ex Roxb.
 648
capitatus (non Retz.) Naves
 644
caribaeus Rich. ex Pers. 565
carrii Kük. 607
castaneus Willd. 599, **630**
 f. *sundaicus* Miq. 630
 var. *brevimucronatus* Kük.
 630
cephalotes Vahl 439, 443, 596,
633*
chrysanthus Boeck. 648
chrysomelinus Link 617
cinereobrunneus Kük. 437,
 593, 600, **622**
clavatus Lamk 660
compactus Retz. 593, 599, **638**
 f. *decolorans* Kük. 638
 var. *macrostachys* Kük. 638
 var. *pauciflorus* Kük. 638,
 642
compressus L. 436, 597, 599,
 600, **617**
 var. *brachiatus* Boeck. 617
 var. *capillaceus* Clarke 617
 var. *meyenii* Miq. 617
 var. *pectiniformis* Clarke
 617
concolor Steud. 647
corymbosus (non Rottb.) Miq.
 615
corymbosus Rottb. 607, 661
 var. *scariosus* Kük. 607
cruentus (non Rottb.) Boeck.
 643
crypsoides Kern 656
cuadriflorus 640
curvatus (non Vahl) Llanos
 604
cuspidatus Kunth 436, 599,
629, **630***
 var. *angustifolius* Kük. 629
cylindrostachys Boeck. 642
 f. *subcompositus* Valck.Sur.
 642
 var. *evolutior* (Clarke) Kük.
 642
cyperinus (Retz.) Valck.Sur.
 440, 444, 598, **641**, 642, 643
 f. *curvatus* Valck.Sur. **642**,
 643
 f. *maxima* Clarke ex Valck.
 Sur. 642
 var. *bengalensis* (Clarke)
 Kük. 642
 var. *laxatus* (Clarke) Kük.
 642
 var. *maximus* (Clarke) Kük.
642
 var. *pictus* (Nees) Kük. 642
cyperoides (L.) O.K. 436, 440,
 598, 641, **642**, 643
 ssp. *cyperinus* Kük. 641
 var. *andersonianus* Kük.
 642
 var. *subcompositus* (Clarke)
 Kük. 642
dehiscens (non Nees) Naves
 625
densespicatus Hayata 603
diaphaniria Steud. 616
diaphanus Schrader ex R. &
 S. 593, 600, **651**
 ssp. *setiformis* (Korth.)
 Kern **653**
 var. *diaphanus* **651**
 var. *latespicatus* (Boeck.)
 Kern **653**
dietrichiae Boeck. 437, 598,
 639*, **640**
difformis (non L.) Blanco 498,
 615
difformis L. 453, 593, 599,
629
 var. *breviglobosus* Kük. 629
diffusus (non Vahl) Clarke 619
 f. *macrostachyus* Valck.Sur.
 619
 var. *pubisquama* Hook. f.
 619
diffusus Vahl 439, 440, 600,
619
 f. *microstachyus* Valck.Sur.
 619
 f. *turgidulus* Valck.Sur. 619,
 621
 var. *celebicus* Kük. 619
 ssp. *bancanus* Kük. 619,
 621
 var. *diffusus* **619**, 621
 var. *macrostachyus* Boeck.
619, **620***, 621
digitatus (non Roxb.) Kük.
 610
digitatus (non Roxb.) Ridl.
 601
digitatus Roxb. 436, 439, 597,
601, 602
digitatus (non Roxb.) Valck.
 Sur. 602
dilutus Vahl 638
 f. *decolorans* Kük. 638
 var. *macrostachys* Boeck.
 638
diphyllus (non Retz.) Valck.
 Sur. 607
disruptus Clarke 605
distans L. f. 439, 598, 609, **610**,
 640
 f. *pachyanthos* Kük. 610
 var. *pseudonutans* Kük.
610, **613**
distans L. f. × *rotundus* L.
660
dubius Rottb. 438, 443, 593,
 599, **643**
dulcis Rumph. 529
elatus (non L.) Camus 601
 var. *laxus* Camus 601
 var. *macronux* (non Clarke)
 Camus 602
elatus L. 439, 593, 597, **601**,
 646
 var. *macronux* Clarke 602
 elatus (non L.) Rottb. 610
 var. *graminicola* Miq. 610
 elegans (non L.) Boeck. 619
 var. *moestus* Boeck. 619
 eleusinoides Kunth 610
 eleusinoides (non Kunth) K.
 Sch. & Laut. 609
engelmannii Steud. 646

- eragrostis* (non Lamk) Vahl 646
 f. *comosus* Valck.Sur. 646
 f. *cyrtostachys* Valck.Sur. 647
 f. *humilis* Valck.Sur. 647
 f. *melanocephalus* Valck. Sur. 647
 f. *sanguinolentus* Valck.Sur. 646
 f. *teysmannii* Valck.Sur. 647
 var. *cyrtolepis* 647
 var. *cyrtostachys* Miq. 647
 var. *humilis* Miq. 647
 var. *sanguinolentus* Miq. 646
esculentus L. 436, 593, 598, 601, 604, 605
eumorphos Steud. 624
exaltatus Retz. 439, 593, 597, 601, 602
 var. *amoena* Clarke 603
 var. *digynus* Willd. 602
 var. *iwasakii* (Makino) Koyama 602
ferax L.C.Rich. 645, 646
 var. *novae-hannoverae* Kük. 643, 646
filicinus Vahl 650
firmus Presl 635
flabelliformis Rottb. 593, 599, 618
 var. *obtusangulus* Boeck. 618
flavescens (non L.) Benth. 648
flavescens L. 651, 653, 661
flavicomus Michx. 661
flavidus (non Retz.) Clarke 625
 var. *africanus* Camus 625
flavidus Retz. 600, 648
fulvus R.Br. 437, 599, 638
 var. *confusus* (Clarke) Kük. 638
fuscus L. 629
globosus All. 648, 650
 f. *atrosanguineus* Kük. 647
 f. *strictus* Valck.Sur. 648
 var. *latisquamatus* Kük. 647
 var. *nilagiricus* Clarke 648
goeringii Steud. 629
grabowskianus Boeck. 640
graminicola Steud. 610
griffithianus Boeck. 611
griffithii Steud. 623
gymmoleptus Steud. 650
haematodes Endl. 661
haenkeanus Kunth 640
haenkei Presl 646
halpan L. 436, 439, 444, 453, 593, 599, 624, 626*, 627*, 629
 f. *evoluta* Valck.Sur. 625
 f. *flavidus* Valck.Sur. 625
 ssp. *halpan* 625
 ssp. *juncoides* (Lamk) Kük. 625
 var. *americanus* Boeck. 625
 var. *dicranolepis* Miq. 625
 var. *flaccidissimus* Kük. 625
 var. *indicus* Boeck. 625
halpan (non L.) Rottb. 625
haspan 624
hebes Steud. 613
helferi (non Boeck.) Camus 621
hexastachyos B pendulus Nees 661
heynei Boeck. 611
holciflorus Presl 635
holophyllus Miq. 619
 var. *celebicus* Miq. 619
holoschoenus R.Br. 439, 442, 599, 637
 var. *fuscisquamatus* Kük. 637
humilis (non Kunth) Llanos 617
hyalinus Vahl 438, 440, 443, 593, 600, 632, 654*, 655
imbricatus (non Retz.) Llanos 635
imbricatus Retz. 439, 597, 602, 603
 var. *densespicatus* (Hayata) Ohwi 603
 var. *elongatus* Boeck. 603
 var. *elongatus* Kük. 603
incompletus (non Link) O.K. 642
indicus Rich. ex Pers. 565
inflexus Muehlenb. 631
involutus Poir. 603
iria L. 453, 593, 598, 616, 629
 f. *chrysomelinus* (Link) Kük. 617
 var. *diaphaniria* Miq. 616
 var. *parviflorus* Miq. 616
iwasakii Makino 602
javanicus Houtt. 438, 597, 635, 636*
javanicus Kük. 661
jeminicus (non Rottb.) Clarke 605
juncoides Lamk 625
jungendus Steud. 648
junghuhnii Miq. 648
kernianus Ohwi & Koyama 659
kükenthalii Merr. 661
kurzii Steud. 610
kurzii (non Clarke) Camus 619
kyllingaeoides Vahl 643
kyllingia Endl. 436, 593, 600, 658, 659
 f. *humilis* Kük. 659
 f. *subtriceps* Kük. 659
 f. *tenuis* Kük. 659
laevigatus L. 661
lagorensis Steud. 619
lanprocarpus Nees 607
lanceolatus Poir.
 var. *compositus* Presl 661
lanceolatus (non Poir.) Presl 648
lanceus Thunb. 661
latespicatus Boeck. 653
 var. *setiformis* Koyama 653
leucocephalus Hassk. 660
leucocephalus (non Retz.) Nees 632
leucocephalus Retz. 632
ligularis L. 637
lipocarpha Koyama 521
litoralis R.Br. 607
longifolius (non Poir.) Decne 619
longus L. 661
 var. β Miq. 608
 var. *badius* (Desf.) Asch. & Gr. 661
longus Rumph. 644
longus (non L.) K.Sch. & Laut. 604
lucidulus (non Klein) Clarke 608
lucidus R.Br. 437, 441, 597, 637
 var. *lucidus* 637
 var. *sanguineo-fuscus* (Nees) Kük. 637
luzonensis Presl 661
luzoniensis Llanos 640
luzulae (L.) Retz. 661
macropus Miq. 623
macrosciadon Steud. 603
maderaspatanus Willd. 631
malaccensis Lamk 439, 453, 593, 597, 613, 615*
 var. *brevifolius* Boeck. 616
manilensis Boeck. 641
marginellus Nees 611
maritimus Poir. 644
maritimus Valck.Sur. 643
mayeri Kük. 607
meistostylus S.T.Blake 437, 593, 600, 622
melanocephalus Miq. 647
melanospermus (Nees) Valck. Sur. 441, 600, 655, 656, 657*
 ssp. *bifolius* (Miq.) Kern 656
 ssp. *melanospermus* 656
 var. *plurifoliatus* Kük. 661
merrillii Kük. 643
meyenii Nees 617
michauxianus (non Torr.) Valck.Sur. 646
melichianus (L.) Delile
 ssp. *pygmaeus* Aschers. & Graebn. 634
micranthus Presl 625, 661
microcephalus Naves 640
microiria Steud. 617
minutiflorus Presl 625, 661

- mitis Steud. 661
moestus Kunth 619
monocephalus F.v.M. 660
monocephalus Roxb. 633
monogyms Boeck. 633
monophyllus Vahl 616
monostachyos L. 565
montis-sellae K.Sch. 621
mucronatus (non Rottb.) Mor. 648
multiflorus 625
multispicatus Boeck. 439, 593, 599, **623**
neoguineensis Kük. 437, 593, 600, **621**
nervulosus (Kük.) S.T.Blake 442, 600, **651**, 652*
nilagiricus Hochst. ex Steud. 648
 f. *pauperior* (Boeck.) Kük. 648
 var. *pauperior* Hochst. ex Boeck. 648
nitens Retz. 650
nitidulus Boeck. 646
novae-hannoverae Boeck. 646
nutans Vahl 439, 597, 598, **609**
 var. *eleusinoides* (Kunth) Haines **610**
 var. *nutans* **609**
 var. *subprolixus* Kük. 610
nutans (non Vahl) Valck.Sur. 613
nutallii (non Torr.) Llanos 616
obliquus Nees 611
obscurus Nees 603
odoratus (non L.) Back. 649
odoratus L. 436, 439, 443, 596, **645**
ohwii Kük. 439, 592, 597, **602**
ornans Valck.Sur. 641
 var. *stenophyllus* Kük. 641
ornatus R.Br. 611
ovatus Llanos 635
pachycephalus Kern 437, 593, 597, **634**
pallidus Nees 618
pangorei Rottb. 661
panicus (Rottb.) Boeck. 442, 598, **642**, **643**
 var. *roxburghianus* (Clarke) Kük. **643**
panicus (non Boeck.) O.K. 641
paniculatus Rottb. 649
papuanus (non Ridl.) Kük. 622
papuanus Ridl. 621
papyrus 593, 596
parviflorus (non Vahl) Nees 616
parviflorus Vahl 635
pauciflorus Steud. 613
pectiniformis R. & S. 617
pedunculatus (R.Br.) Kern 436, 438, 442, 443, 450, 593, 597, **644**, 645*
pedunculatus F.v.M. 437, 439, 600, **621**
 var. *alatus* Kük. 621
 var. *atrocastaneus* Kük. 621
 var. *floribundus* Kük. 621
penmatus Lamk 635
 var. *armstrongii* (Benth.) Kük. 637
penmatus (non Lamk) Zoll. 613
petraeus Hochr. 632
philippensis Presl 661
pilosus Vahl 439, 598, **611**, 614*
 f. *babakensis* Valck.Sur. 613
 f. *badius* O.K. 611
 f. *pallidus* O.K. 611
 var. *babakensis* Clarke 613
 var. *contractus* Kük. 611
 var. *muticus* Boeck. 611
 var. *obliquus* Clarke 611
 var. *polyanthus* Clarke 611
pintolepis Steud. 611
 var. β 613
 var. *contractus* Miq. 613
 var. *pyrophilus* Miq. 613
platyphyllos Ridl. 621
platystylis R.Br. 439, 443, 599, **618**, 634
polystachyos Rottb. 436, 439, 444, 600, 646, 648, **649**
 f. *longispiculatus* Valck.Sur. 650
 var. *laxiflorus* Benth. **649**
 var. *leptostachyus* Boeck. 650
procerus Rottb. 439, 593, 598, **611**, 612*, 613
 f. *lasiorhachis* Valck.Sur. 611
 var. *griffithianus* (Boeck.) Kük. 611
 var. *lasiorhachis* Clarke **611**
pubisquama Steud. 619
pulchellus R.Br. 599, **632**
pulcherrimus Willd. ex Kunth 439, 593, 599, **624**
 f. *rectiglumis* Valck.Sur. 624
 var. *rectiglumis* Kük. 624
pulvinatus Nees & Mey. ex Nees 650
pumilus (non L.) Benth. 651
pumilus L. 600, **650**, 651*
 f. *borneensis* Clarke 650
 var. *nervulosus* Kük. 651
 var. *punctatus* Clarke 650, 651
pumilus (non L.) Nees 655
punctatus Roxb. 650
punctulatus (non Vahl) Kük. 611
pusillus (non Vahl) Nees 630
pygmaeus (non Rottb.) S.T. Blake 634
pygmaeus Rottb. 439, 593, 596, **634**
 var. *melichianus* Boeck. 634
pyrophilus Reinw. ex Miq. 613
quadriflorus Llanos 640
racemosus (non Retz.) Mor. 619
racemosus Retz. 601
 var. *spiculis infuscatis* Nees 603
racemosus (non Retz.) K.Sch. & Holtr. 601
radians Kunth 438, 443, 593, 599, **623**
 var. *compositus* Kük. 623
 var. *griffithii* Kük. 623
radiatus (non Vahl) Camus 601
radicans 623
ramosii Kük. 608
retzii Nees 605
rheedii F.v.M. 642
rigidulus Ridl. 621, 622
rotundatus 604
rotundus (non L.) Benth. 607
rotundus L. 442, 450, 453, 593, 594*, 598, **604**
 ssp. *retzii* (Nees) Kük. **605**
 ssp. *rotundus* **604**
 ssp. *tuberosus* (Rottb.) Kük. 605
 var. *carinalis* Benth. 608
 var. *centiflorus* Clarke 605
 var. *disruptus* Kük. 605
 var. *elongatus* Boeck. 605
 var. *pallidus* Benth. 605, 607
 var. *pseudesculentus* Kük. 605
rotundus (non L.) Presl 608
rotundus 1 bulbosus sive legitimus Rumph. 604
rotundus floridus II mas Rumph. 649
rubicundus Vahl 631
rubroviridis Cherm. 608
rupestris Kunth 631
sanguineo-fuscus Nees 637
sanguinolentus Vahl 439, 600, 629, **646**, 648
 f. *cyrtostachys* Kük. 647
 f. *humilis* Kük. 647
 f. *melanocephalus* Kük. 647
 ssp. *cyrtostachys* (Miq.) Kern **647**
 ssp. *melanocephalus* (Miq.) Kern 441, **647**
 ssp. *sanguinolentus* **647**
 ssp. *teysmannii* (Boeck.) Kern **647**
 var. *teysmannii* Kük. 647
scariosus R.Br. 439, 450, 597, **607**
scariosus (non R.Br.) Valck.

- Sur. 608
schoenoides Banks & Sol. 667
scirpoides (non Vahl) Presl 619
scoparius (non Poir.) Decne 601
seminudus Zoll. 616
septatus Steud. 640
sesquiflorus (Torr.) Mattf. & Kük. 436, 600, **658**, 659
 ssp. *cylindricus* (Nees ex Wight) Koyama 659
 var. *cylindricus* Kük. 659
 var. *subtriceps* (Nees) Koyama **659**
setaceus Retz. 534
setiformis Korsh. 653
sexflorus R.Br. 661
sieberi Kunth 638
sieberianus Schum. 642
silletensis (non Nees) Camus 624
silletensis (non Nees) Elmer 650
sinensis Debeaux 623
solutus Steud. 630
sorostachys Boeck. 632
sorzogonensis Presl 619
spariophyllus Steud. 615, 616
sphacelatus Rottb. 444, 593, 598, 609, 617
 var. *tenuior* Clarke 608
spicatus Presl 603
squarrosus (non L.) F.v.M. 630
squarrosus L. 442, 597, 599, **631**, 632, 651, 655
stenophyllus Valck.Sur. 598, **640**, 643
 var. *ornans* Kük. 640
stenostachys (non Benth.) Valck.Sur. 661
steudelianus (non Boeck.) Naves 641
stigmatosus Steud. 635
stolonifer 606
stoloniferus Retz. 438, 442, 443, 593, 598, **606***, 622
stramineus Nees 653
strictus Roxb. 648
strigosus L. 640
strigosus (non L.) Llanos 601, 649
stuppeus Forst. f. 635
subpapanus Kük. 437, 592, 599, **622**
subrigidulus Kük. 621, 622
subrotundus Llanos 629
substramineus Kük. 437, 593, 600, **653**
subulatus R.Br. 638
sulcinus Clarke 600, **650**
sundaicus Naves 641
tegetiformis (non Roxb.) Benth. 615
tegetiformis Roxb. 661
tegetum (non Roxb.) Ridl. 615
tenellus L. f. 624
teneriffae Poir. 440, 593, 599, **631**, **632***, 655
 f. *petraeus* (Steud.) Kük. 632
tenuiculmis Boeck. 598, **608**, 609
tenuiflorus Rottb. 661
tenuiflorus Roxb. 661
tenuiflorus (an Rottb.?) Valck. Sur. 661
tenuispica Steud. 439, 593, 599, **625**, **628***
teretifractus 649
teretifractus Steud. 649, 650
teysmannii Boeck. 647
thunbergii Vahl 637
transitorius Kük. 655
trialatus (Boeck.) Kern 600, **621** map
triceps (Rottb.) Endl. 600, **659**, 661
trichostachys Benth. 640
trinervis R.Br.
 var. *aquatilis* Kük. 624
tuberosus (non Rottb.) Kunth 607
tuberosus Rottb. 605, 661
turgidulus Clarke 621
umbellatus Benth. 642
 f. *cyperinus* Clarke 641
 var. *cylindrostachys* Clarke 642
 var. *panicus* Clarke 643
umbellatus (non Benth.) Naves 641
uncinatus (non Poir.) Clarke 630
unioloides R.Br. 436, 600, **648**, 653
venustus R.Br. 602
venustus (non R.Br.) Mor. 611
venustus (non R.Br.) Nees 601
verticillatus Roxb. 603
viridulus Valck.Sur. 659
vulgaris Kunth 648
 var. *polylepis* Miq. 648
 var. *teretifractus* Miq. 649
weilandii Kük. 605
xanthopus Steud. 610
zollingeri (non Steud.) Clarke 608
 var. *condensatus* Kük. 608
zollingeri Steud. 593, 598, **608**
zollingerianus Koyama 522
 Cyttaria 279
 Dacrydium 294, 663*
 beccarii 269
 elatum 270, 403
 Dacryodes
- sect. *Pachylobus* 822
 sect. *Tenuipyrena* 822
costata (Benn.) H.J.Lam 820
edulis 822
expansa (non H.J.Lam) Kalkm. 820
expansa (Ridl.) H.J.Lam **821**
kingii 821
laxa 821
longifolia 822
macrocarpa (King) H.J.Lam **820**
 var. *kostermansii* (Kalkm.) Kalkm. **821**
 var. *macrocarpa* **821**
 var. *merrillii* H.J.Lam **820**
 var. *patentinervia* Leenh. **820**, **821**
 multijuga Leenh. **821**
 nervosa (H.J.Lam) Leenh. 821
Dapania Korth. 151, 152, 153, 161, 166, 175
grandifolia Veldk. 167 map, 168*
griffithii Knuth 170
macrophylla (King) Knuth 171
monophylla Knuth 172
pentandra 151, 152, 167
racemosa Korth. 167 map
scandens Stapf 167
 Datisceaceae 4: **382-387**; 7: **823**
Decaloba (DC.) Roem. 407
Deidamia 405
 clematoides 406
Delima sarmentosa L. 824
Diaphora cochinchinensis Lour. 733
 Dichapetalaceae 5: **305-316**; **567**; 6: **941-943**; 7: **823**
 Dichapetalum Thou. 87, **823**
 helferianum (Kurz) Pierre 824
 papuanum (Becc.) Boerl. 824
 timoriense (DC.) Boerl. 7
Dichostylis Lestib. 634
 aristata Palla 631
 castanea Palla 630
 cuspidata Palla 630
 nitens Palla 650
 pygmaea Nees 634
 radiata Palla 603
Diellidium Schrader ex Nees 645
 elatum Nees 646
Dilkea 405
Dillenia L. **824**
 borneensis Hoogl. 826
 castaneifolia (Miq.) Diels 826
 celebica Hoogl. 825
 cycloperis Hoogl. 824
 diantha Hoogl. 824, 826
 exima Miq. 826, 827
 fagifolia Hoogl. 826
 grandifolia Wall. ex Hook. f. & Th. 826, 827
 insularum Hoogl. 825, **826**

- luzoniensis Merr. 826
 marsupialis Hoogl. 826
 megalophylla Merr. 825
 montana Diels 825
 nalagi Hoogl. 825, 826
 ovalifolia Hoogl. 825
 var. *ovalifolia* 825
 var. *sericea* Hoogl. 825
 papyracea Merr. 824, 825
 pteropoda (Miq.) Hoogl. 824, 825
 quercifolia (Lane Poole)
 Hoogl. 826
 reifferscheidia Villar 826, 827
 talaudensis Hoogl. 826
Dilleniaceae 4: 141-174; 5: 557;
 6: 933; 7: 824-827
Dimorphantera F.v.M. 827
 alba 827
 anchorifera 827
 brassii 827
 clemensiae 827
 declinata 827
 denticulifera 827
 elegantissima 827
 forbesii 827
 gracilis 827
 kempteriana 827
 splendens 827
 tridens 827
Diorykandra Hassk. 180
Dioscorea sativa L. 95
Dioscoreaceae 4: 293-335; 5:
 557; 7: 806
Diospyros cauliflora Bl. 192
 maritima Bl. 794
Diplacrum R.Br. 722, 724, 726,
 749
 caricinum R.Br. 749
 var. *sumatranum* Miq. 751
 pygmaeopsis Koyama 749
 reticulatum Holtt. 751
 tridentatum Brongn. 751
 zeylanicum Nees 751
Diplazia 451
Diporidium Wendl. f. 99
 decaisnei Tiegh. 101
Dipsacaceae 4: 290-292; 5: 557
Dipterocarpaceae 488
Discladium Tiegh. 99
 Discomycetes 279
Disemma Labill. 409, 411
 adianthifolia DC. 415
 aurantia Labill. 415
 barclayi Seem. 415
 baueri 415
 baueriana Endl. 415
 brachystephanea F.v.M. 415
 caerulescens Seem. 415
 caleyana Roem. 416
 coccinea DC. 415
 herbertiana DC. 416
 var. *caleyana* DC. 416
 horsefieldii Miq. 413
 var. *teysmanniana* Miq. 413
 moluccana Miq. 413
 muelleriana Regel 416
 penangiana Miq. 423
 storckii Seem. 475
 sumatrana Miq. 414
 timoriana Miq. 413
 vitiensis Seem. 415
Distemma 411
 adiantifolium Lemaire 415
 aurantiacum Lemaire 415
 eglandulosum Lemaire 416
Ditepalanthus 787
Dracontomelum papuanum Laut.
 820
Drosera 135
Droseraceae 4: 377-381; 5: 557;
 6: 943; 7: 135
Dryobalanops 482
Dryophyllum 266, 403
Duvaljouvea Palla 592
 babakensis H.Pfeiff. 613
 diluta Palla 640
 maritima Palla 644
 pennata Palla 635
 pilosa Palla 613
 procera H.Pfeiff. 611
Dysosmia (DC.) Roem. 407

Echinolytrum Desv. 590
dipsaceum Desv. 590
Echinoschoenus Nees & Mey. ex
 Nees 715
Efulensia 405
Eichhornia 439
Elaeocarpus integerrimus Lour.
 99
 integrifolius Blanco 31
Elatinaceae 4: 203-206
Elatostema sp.
Eleocharis R.Br. 436, 439, 443,
 446, 447, 452, 454, 455, 521,
 522, 538, 543
 sect. *Aciculares* C.B.Clarke
 535
 sect. *Chaetarieae* C.B.Clarke
 534
 sect. *Leiocarpeae*
 a. *Tenuissimae* C.B.Clarke
 533
 ser. *Aciculares* (Clarke) Svens.
 524, 535
 ser. *Acutae* S.T.Blake ex Kern
 534, 533
 ser. *Intermediae* Svens. 531
 ser. *Maculosae* Svens. 536
 subser. *Rigidae* Svens. 524,
 536
 ser. *Multicaules* Svens. ex
 Kern 524, 531
 ser. *Mutatae* Svens. 523, 525
 ser. *Ovatae* 537
 ser. *Palustriformes* Svens. 535
 subser. *Palustres* (Clarke)
 Svens. 524, 535, 536
 ser. *Pauciflorae* Svens. 523,
 524, 537
 ser. *Tenuissimae* (Clarke)
 Svens. 524, 533
 subser. *Chaetarieae* (Clarke)
 Svens. 524, 534
 subser. *Leiocarpeae* (Clar-
 ke) Svens. 524, 533
 ser. *Tuberculosae* Svens. 531
 subg. *Eleogemus c. Palustres*
 C.B.Clarke 535
 subg. *Limnochloa* C.B.Clarke
 525
 acicularis (L.) R. & S. 437,
 523, 525, 535
 var. *longiseta* Svens. 535
 acuta R.Br. 437, 524, 533
 acutangula (Roxb.) Schult.
 524, 525
 afflata Steud. 532, 534
 alta Boeck. 537
 anceps Ridl. 534
 atropurpurea (Retz.) Presl
 525, 536, 537
 atropurpurea Presl 536
 attenuata (Franch. & Sav.)
 Palla 437, 441, 523, 525,
 532, 533
 f. *laeviseta* (Nakai) Hara
 532
 brainii 534
 brassii S.T.Blake 528
 brevicollis Kern 437, 525, 535
 calocarpa Cherm. 528, 529
 capitata R.Br. 536
 caribaea S.F.Blake 536
 cellulosa Torr. 528
 chaetaria R. & S. 534
 var. *subbiflora* Kunth 534
 confervoides Miq. 505, 534
 congesta D.Don 441, 523,
 525, 532, 534
 var. *congesta* 532
 var. *japonica* (Miq.) Koya-
 ma 532
 costulata Nees & Mey. ex
 Kunth 535
 difformis S.T.Blake 528
 dulcis (Burm. f.) Henschel
 439, 453, 523, 524, 529,
 530*, 531
 equisetina Presl 529
 erythrochlamys Miq. 531
 fistulosa (non Link) Back. 528
 fistulosa (non Schult.) Benth.
 526
 fistulosa Schult. 525
 flaccida Urb. 505
 geniculata (L.) R. & S. 436,
 525, 536, 537
 helenae Busc. & Muschl. 534
 indica Druce 530
 japonica Miq. 532

- kuroguwai Ohwi 531
laeviveta Nakai
 var. *major* Hara 532
laxiflora H. Pfeiff. 528
maculosa (Vahl) R. & S. 536
major Hara 532
microcarpa (non Torr.) Clarke 533
microcarpa Torr. 533
micronulata Nees 533
multicaulis (Sm.) Sm. 531
mutata (L.) R. & S. 525, 527
negrescens (Nees) Steud. 436, 525, 533, 534
nuda C.B. Clarke 527
nuda (non Clarke) Svens. 526, 527
obtusa (Willd.) Schult. 537
ochreatea (non Nees, nec Steud.) Clarke 536
ochrostachys Steud. 523, 524, 527, 528, 529*
ovata R.Br. 537
ovata (Roth) R. & S. 537
palustris (L.) R. & S. 535
parvula (R. & S.) Link ex Bluff 436, 438, 523, 525, 537
pauciflora (Lightf.) Link 537
pellucida (non Presl) S.T. Blake 532
pellucida Presl 532, 533
 f. *attenuata* Ohwi 532
perrieri Cherm. 533
philippinensis Svens. 524, 526*
planticulmis Steud. 525
plantaginea R. & S. 529
plantainoidea W.F. Wight 530
plantainoides Domin 530
plicarhachis (Griseb.) Svens. 527
pusilla R.Br. 535, 537
pygmaea Torr. 534
quinqueflora (Hartm.) Schwarz 537
retroflexa (Poir.) Urb. 436, 439, 505, 524, 534
schweinfurthiana Boeck. 533, 534
setacea R.Br. 534
setacea (non R.Br.) Merr. 534
soloniensis (Dubois) Hara 537
sphacelata (non R.Br.) Benth. 530
sphacelata R.Br. 437, 441, 453 (as *sphacelatus*), 531
spiralis (Rottb.) R. & S. 438, 524, 527, 528
subprolifera Steud. 532
subulata Boeck. 528
subvivipara Boeck. 532
sundaica Kern 437, 524, 527
svensonii Zinserl. 535
tenuissima Clarke 533
tetraquetra Nees 441, 523, 525, 531, 532, 533, 537
 var. *micranthera* Ohwi 531
tristachyos Mor. 514
tuberosa R. & S. 529
tuberosa R. & S. s.s. 530
tumida R. & S. 529
variegata (nec Presl, nec Kunth) Boeck. 525, 528
variegata Kunth 537
variegata (non Presl, nec Kunth) Merr. 527
variegata (Poir.) Presl 436, 524, 528
 var. *laxiflora* Clarke 528
 var. *laxiflora* (non Clarke) Clarke 526
 yokoscensis Tang & Wang 535
Eleogiton Link 502
 curvulus Nees 502
 fluitans Link 502
 f. *curvula* Miq. 502
 f. *tenerior* Miq. 502
 var. *fasciculata* Miq. 502
Ellipanthus tomentosus Kurz 823
 var. *gibbosus* (King) Leenh. 823
Elyna Schrad. 445, 751
Elynanthus Nees 663
Engelhardia 268, 269, 281
Enhydrya aquatica Vell. 828
Epacridaceae 6: 422-444, 943
Epilithes Bl. 246
 coccinea Bl. 246, 248
Epilithos 246
Ericaceae 6: 469-914, 943; 7: 141, 827
Ericales 139
Eriobotrya bengalensis (Roxb.) Hook. f. 192
Eriophorum 444
 latifolium 450
Erythrobalanus O.Schwarz 274, 276, 387
Erythrocarpus Roem. 417, 424
 populifolius Roem. 427
Erythrospermum 212
Erythroxylaceae 5: 543-552
Eucalyptus 588, 710, 794
Eufimbristylis aestivalis 585
Eugenia 268, 375, 805
Eunyriophyllum 249
Euonymus crenulatus Wall. 795
Euphorbiaceae 10, 89, 178
Euphorbiales 274
Euphrasia 151
Euthemis Jack 97, 98, 108
 ciliata Pierson 110
 elegantissima Wall. 104
 engleri Gilg 110
 hackenbergii Diels 110
 leucocarpa Jack 108
 var. *latifolia* Miq. 108
 minor Jack 108, 109*
 obtusifolia Hook. f. 110
 pulcherrima Wall. ex Benn. 104
 robusta Hook. f. 108
Exorhopala Steen. 783, 784, 785, 787, 788, 790
 ruficeps (Ridl.) Steen. 789
 map, 790*
Fagaceae 265-403, 265 map
 subfam. *Castaneoideae* 275, 276
 subfam. *Castanineae* Oerst. 274
 subfam. *Fagineae* Oerst. 274
 subfam. *Fagoideae* 276
 subfam. *Quercineae* Oerst. 274
 subfam. *Quercoidae* 276
 tribe *Castaneae* Prantl 274
 tribe *Fageae* Prantl 274
Fagaster Spach 277
Fagophyllum 266
Fagoxylon 266
Fagraea auriculata Jack
 ssp. *auriculata* 828
 ceilanica Thunb. 828
 resinosa Leenh. 828
Fagus 266, 267, 268, 272, 273, 274, 275, 276, 278 map, 279, 280
 sect. *Eufagus* A.DC. 278
 sect. *Nothofagus* A.DC. 278
 subg. *Calucechinus* Miq. 278
 subg. *Calusparassus* Miq. 278
 argenta Bl. 311
 javanica Bl. 306
 sylvatica 270, 272
Ficinia foliaceo-bracteata Pfeiff. 633
Ficoideaceae, see *Aizoaceae*
Ficus austrocaledonica Bur. 794
 baroni Bak. 803
 occulifolia Bak.
 ssp. *sakalavarum* Bak. 803
 fistulosa Reinw. ex Bl. 788
 lepicaarpa Bl. 798
 prolixa Forst. 794
 religiosa L. 803
 ribes Reinw. ex Bl. 798
 schlechteri Warb. 794
 septica Burm. f. 798
 tinctoria L. f. 803
 villosa Bl. 798
Fimbristylis Vahl 436, 443, 446*, 447, 448, 449, 450, 452, 454, 523, 538, 540, 543, 673
 sect. *Abildgaardia* (Vahl) Benth. 447, 543, 565
 sect. *Actinoschoenus* (Benth.) Kern 447, 543, 591
 sect. *Cymosae* Ohwi 543, 554
 sect. *Dichelostylis* Benth. 543, 572
 sect. *Dichotomae* Ohwi 575

- sect. *Dipsaceae* Ohwi 543, **590**
 sect. *Echinolytrum* Ohwi 590
 sect. *Eufimbristylis* Boeck. 575
 sect. *Ferrugineae* Ohwi 572, 586
 sect. *Fimbristylis* 543, **575**
 sect. *Fuscae* Ohwi 543, 559, **565**
 sect. *Globulosae* Ohwi 550
 sect. *Heleocharoides* Benth. 543, **563**
 sect. *Leptocladae* Ohwi 543, **560**
 sect. *Miliaceae* Ohwi 543, **550**
 sect. *Mischospora* (Boeck.) Camus 543, **589**
 sect. *Neodichelostylis* Camus 543, **586**
 sect. *Nutantes* Ohwi 543, **588**
 sect. *Oncostylis* Benth. & Hook. 537, 540
 sect. *Pogonostylis* (Bertol.) Pax 543, **583**
 sect. *Rigidulae* Kern 543, **580**
 sect. *Signatae* Kern 543, **564**
 sect. *Squarrosae* Ohwi 583
 sect. *Tenerae* Kern 543, **558**
 sect. *Tetragonae* Ohwi 589
 sect. *Trichelostylis* (Lestib.) Boeck. 543, **548**
 sect. *Trichelostylis* A.Gray 548
 ser. *Autumnales* Ohwi 548
 ser. *Cymosae* Ohwi 554
 ser. *Dichotomae* Ohwi 575
 ser. *Echinolytrum* Koyama 590
 ser. *Ferrugineae* Ohwi 572, 586
 ser. *Heleocharoides* Koyama 563
 ser. *Leptocladae* Ohwi 560
 ser. *Miliaceae* Ohwi 550
 ser. *Monostachyae* Ohwi 565
 ser. *Nutantes* Ohwi 588
 ser. *Squarrosae* Ohwi 584
 subg. *Bulbostylis* 540
abjiciens Steud. 590
acicularis R.Br. 542, 546, 564, **589**
actinoschoenus (non) Clarke) Camus 539
actinoschoenus Clarke 591
 var. *chinensis* Clarke 591
 var. *thouarsii* Clarke 591
acuminata Vahl 439, 546, **588**, 589
 var. β 588
 var. *minor* Nees ex Boeck. 589
 var. *pumila* Nees 589
 var. *setacea* Miq. 589
acutifolia
 var. *minor* 589
adenolepis Kern 437, 442, 542, 544, **566**
aestivalis (non Vahl) Clarke 584
aestivalis (Retz.) Vahl 439, 542, 548, **584**, 585
 f. *glabra* Kük. 584
 var. *aestivalis* **584**
 var. *esquarrosa* Koyama 585
 β *glaberrima* Boeck. 584
 var. *macrostachya* Benth. **584**
 var. *squarrosa* Koyama 585
 var. *trichopoda* Kern **584**
affinis Presl 575, 576
alata Camus 575
albescens Steud. 586
albviridis Clarke 547, 548, **580**, **581***
alleizettei Camus 573
ambigua Steud. 575
amblyphylla Steud. 549
anceps Steud. 549
androgyna R.Br. 589
angustifolia Ridl. 566
anisoclada Ohwi 442, 546, **553**
annamica Camus 573
annua (non R. & S.) S.T.Blake 576
annua (non R. & S.) Merr. 575
annua (All.) R. & S. 576, 579
 var. *diphylla* Kük. 575
 var. *gracilis* Back. 579, 583
 var. *pluristriata* Back. 580
 var. *podocarpa* Kük. 577
aphylla Steud. 439, 542, 545, **552**, 553
argentea (Rottb.) Vahl 438, 547, **586**
armerioides Beetle 539
arnottii Thw. 590
arvensis Vahl 572, 573
asperrima Boeck. 554
asperrima (non Boeck.) Ridl. 548
atollensis St.John 557
australica Boeck. 589
autumnalis (L.) R. & S. 548, 550, 553
 var. *complanata* Kük. 549
 var. *microcarya* Kük. 550
autumnalis (non R. & S.) Vidal 549
 var. *gracilis* Boeck. 549
baldwiniana (Schult.) Torr. 576
barbata Benth. 539
benghalensis R. & S. 552
biflora Boeck. 565
bispicata Nees 573
 var. *monostachya* Nees 573
bisumbellata (Forsk.) Bub. 442, 547, **579**, 584
blepharolepis Kern 437, 442, 544, **550**
boninensis Hayata 577
brachyphylla Presl 557
brachyphylla Schult. 557
brevifolia R.Br. 557
brevifolia Presl 557
brizoides Sm.
 var. Nees 575
bursifolia Vidal 589
caesia Miq. 437, 547, 574*
calcolica Kern 437, 440, 542, 544, **572**
calocarpa Steud. 575
capillacea Hochst. ex Steud. 538
capilliculmis Ohwi 437, 545, **549**
capitulifera Merr. 557, 558
cardiocarpa F.v.M. 592
cardiocarpa (non F.v.M.) Kük. 563
celebica Ohwi 438, 546, **587**, **588***
chinensis Tang & Wang 591
ciliolata Steud. 557
cineta Nees 577
cinnamometorum (Vahl) Kunth 442, 544, **565**
circinnata Steud. 575
clavinux Clarke 560
communis Kunth 575
 var. *gracillima* Ridl. 575
complanata (Retz.) Link 436, 439, 545, **548**, 549, 555
 var. *kraussiana* Clarke 549
 var. *kraussiana* (non Clarke) Usteri 549
 var. *laeviculmis* Miq. 548
 var. *microcarpa* 550
 var. *microcarya* Clarke 550
compressa F.-Vill. 565
connectens Thw. 549
consanguinea Kunth 441, 542, 545, **549**, 550
corniculata Merr. 562
cumingii F.-Vill. 539
cylindrocarpa Kunth 590
cymosa R.Br. 436, 438, 443, 546, 548, 554, **557**
 ssp. *umbellato-capitata* Koyama 558
 var. *subcapitata* Clarke 557
cyperoides R.Br. 565, 566, 567
 var. *cinnamometorum* Clarke 565
cyrtophylla Miq. 572
dallachyi F.v.M. ex Benth. 569
dasyphylla Miq. 558
debilis F.v.M. 564
debilis Steud. 564
decora Nees & Mey. 558
densa Koyama & Chuang 538
depauperata R.Br. 576
dichotoma (non Vahl) Camus 584
dichotoma (non Vahl) Kunth 579
dichotoma (non Vahl) Presl 584

- dichotoma* (L.) Vahl 436, 542, 543, 547, 560, **575**, 579, 583, 592
 ssp. *depauperata* (R.Br.) Kern **576**
 ssp. *dichotoma* **576**
 ssp. *longispica* Koyama
 var. *boninensis* Koyama 577
 ssp. *podocarpa* Koyama 577
 var. *villosa* Vahl 579
dictyocolea S.T.Blake 442, 542, 545, **563**
diphylla (non Vahl) Ridl. 549
diphylla (non Vahl) K.Sch. & Laut. 577
diphylla Vahl 575
 f. *malasica* Clarke 579
 var. *depauperata* Clarke 576
 var. *pluristriata* Clarke 575, 580
 var. *podocarpa* Kük. 577
 var. *spirostachya* Clarke 576
dipsacea (Rottb.) Clarke 439, 544, 547, **590**
 var. *verrucifera* Koyama 590
disticha Boeck. 437, 441, 544, **571**
 var. *dallachyi* Clarke ex Domin 569
 var. *kurzii* Clarke 571
disticha (non Boeck.) Camus 560
disticha (non Boeck.) Kük. 569
dura (Zoll. & Mor.) Merr. 440, 543, 546, **554**, 555
efoliata Steud. 543, 551
eragrostis (Nees) Hance 442, 544, 546, **567**
erythradenia Camus 566
exilis R. & S. 560
falcata (Vahl) Kunth 442, 546, **557**
fenestrata Kük. 545, **592**
ferruginea (non Vahl) Decne 572
ferruginea (L.) Vahl 436, 438, 439, 547, **572**, 573, 576
 var. *foliata* Benth. 573
 var. *sieberiana* Boeck. 573
ferruginea (non Vahl) Vidal 582
filiformis Kunth 564
filiformis H.Pfeiff. 591
fimbristylodes (F.v.M.) Druce 442, 544, 559, **569**
flaccida Steud. 551
flaccidula Steud. ex Zoll. 551
fulvescens (Thw.) Thw. 544, **569**, 570*
furva R.Br. 437, 442, 542, 545, **562**
fusca (Nees) C.B.Clarke 442, 542, 544, 565, 566, **567**, 568*, 569, 582
fusca (non Clarke) Merr. 566
 var. *hispidissima* Kük. 566
fuscoides (non Clarke) Camus 571
fuscoides Clarke 440, 544, **566**
fuscoides (non Clarke) Henders. 571
germainii Camus 543, 575
globulosa (Retz.) Kunth 439, 444, 542, 543, 545, 546, **551**, 552
 var. *aphylla* Miq. 551, 552
 var. *foliata* Boeck. 551
 var. *javanensis* H.Pfeiff. 551
 var. *robusta* O.K. 551
 var. *torresiana* Clarke 551
globulosa (non Kunth) Ohwi 553
glomerata Nees ex Kunth 557
gracilenta Hance 548, 580, **585**
 var. *psilopoda* Kern 580, 586
griffithiana Steud. 584
griffithii Boeck. 439, 547, **584**
haenkei Presl ex Dietr. 557
hanceana Boeck. 582
haspaniformis Koyama 553
hispidula (Vahl) Kunth 436, 538, 542, 544, **560**, 561*
horsfieldii Clarke 549
insignis Thw. 442, 546, **555**, 583, 592
intonsa S.T.Blake 439, 542, 544, **571**
juncea (non R. & S.) Boeck. 586
junciformis Kunth 557
 var. *latifolia* (non Clarke) Camus 558
kamphoeveneri Boeck. 565
kraussiana Hochst. ex Krauss 549
lacei Turr. 569
laevissima Steud. 557
lanceolata Clarke 442, 542, 545, **562**, 563
lepidota Camus 567
leptoclada Benth. 545, **560**
 var. *etuberculata* Kern **560**
 var. *leptoclada* **560**
limosa Poepp. 585
lineatisquama Ohwi 438, 547, **577**
littoralis Gaudich. 436, 439, 444, 453, 542, 545, **551**, 553, var. *littoralis* **551**
 var. *macrostachya* (Kern) Kern **552**
longifolia S.T.Blake 573
longispica (non Steud.) Camus 572
longispica (non Steud.) Clarke 575
longispica (non Steud.) Ridl. 555, 592
longispica Steud. 576, 592
 var. *boninensis* Ohwi 577
macassarensis Steud. 438, 442, 545, **562**, 563*
macgillivrayi Clarke 561
makinoana Ohwi 585
malaccana Boeck. 564
malayana Ohwi 438, 440, 542, 544, **571**
marginata Labill. 572
mariama Gaud. 573
 var. *foenea* Kük. 573
maxima K.Sch. 573
merrillii Kern 547, **579**, 585
microcarya F.v.M. 442, 545, **550**, 577
miliacea (L.) Vahl 439, 545, 551, **552**
 f. *tenerrima* Valck.Sur. 551
 var. *macrostachya* Kern 552
 var. *validor* Miq. 551, 552
monostachya 565
monostachya (non Hassk.) Back. 574
monostachyos (L.) Hassk. 565
monticola (non Steud.) Back. 549
nanofusca Tang & Wang 569
nigrobrunnea (non Thw.) Kük. 566
nigrobrunnea Thw. 567
 var. *thorelii* Camus 559
novae-britanniae Boeck. 575
nutans (non Vahl) Naves 573
nutans (Retz.) Vahl 546, 588, **589**
 var. *minor* Camus 588
obtusata (Clarke) Ridl. 545, 546, **559**
onchnidiocarpa Kern 559
ovata (Burm. f.) Kern 442, 544, **565**, 592, 680
oxyrhachis Miq. 590
pacifica Ohwi 573
pallescens Nees 579
paludosa Merr. 553
pauciflora R.Br. 439, 543, 545, **563**, **564**, 567
paucispicata F.v.M. 573
paupercula (non Boeck.) Kük. 549
perlaxa Ohwi 439, 547, **580**, 586
petrogena Ohwi 555
phaeoleuca S.T.Blake 550
piertii Miq. 437, 440, 542, 546, **555**
pilosa (non Vahl) Presl 575
pinetorum Merr. 555
platystachys Boeck. 559, 560

- var. *schultzii* Domin 559
pluristriata Berh. 577
podocarpa Nees & Mey. ex Nees 576
podocarpa (non Nees) Ridl. 573
polymorpha Boeck. 575
 var. *c* 573
polytrichoides (Retz.) R.Br. 438, 546, 586, 587
polytrichoides (non R.Br.) Ridl. 572
preslii Kunth 560
propinqua R.Br. 585
puberula Back. ex Steen. 540
pubescens Link 560
pumila Benth. 564
pycnocephala Hillebr. 557, 558
pyncostachya Hance 567
quinquangularis (non Kunth) Koord. 552
quinquangularis (Vahl) Kunth 552, 553
 f. *abludens* Back. 550
 var. *crassa* Clarke 552
ramosii Kük. 575
recta F.M.Bail. 437, 442, 542, 545, 561
retusa Thw. 560
retzii 557
rhyticarya F.v.M. 588
rigida Kunth 557
rigidifolia Ridl. 567, 569
rigidula (non Nees) Merr. 555
rigidula Nees 548, 580, 582, 583
salbundia (non Kunth) Boeck. 552
salbundia (Nees) Kunth 441, 542, 546, 551, 552, 553
scaberrima Nees 438, 543, 544, 546, 555, 556*
schlechteri Kük. 567
schoenoides (non Vahl) Back. 573, 577
schoenoides (Retz.) Vahl 547, 573
 var. β 573
schultzii Boeck. 437, 442, 542, 543, 545, 546, 559
semarangensis Ohwi 438, 442, 542, 548, 582*, 583
separanda Steud. ex Jard. 592
sericea R.Br. 438, 443, 543, 546, 548, 558, 583
setacea Benth. 589
 var. *setacea* Clarke 589
setacea (non Benth.) Clarke 588
sieberiana Kunth 438, 442, 547, 572
signata S.T.Blake 442, 542, 545, 564
spathacea Roth 557, 558
 var. *umbellato-capitata* Koyama 558
spiralis R.Br. 592
squarrosa (non Vahl) Miq. 575
squarrosa Vahl 436, 547, 584, 585
 var. *esquarrosa* Makino 585
 var. *squarrosa* 585
 var. *velata* Clarke ex Cheesem. 585
squarrosa (non Vahl) Zoll. 577, 584
stellata S.T.Blake 559
stenochlaena Kük. 567, 569
straminea (non Turr.) Ohwi 569
stricticulis Domin 561
subalata Kern 422, 547, 575
subbispicata (non Nees) Clarke 573
 var. *caesia* 573
subbispicata Nees & Mey. ex Nees 573
 var. *caesia* Clarke 574
subbulbosa Boeck. 586
subdura Ohwi 438, 442, 541*, 545, 554
subfusca Camus 567, 569
subtetrastachya Boeck. 567
subtrabeculata (non Clarke) Camus 551
subtristachya Steud. 577
sumbaensis Ohwi 438, 442, 548, 583
taiwanica Ohwi 550
tenera (non Schult.) Clarke 562
tenera R. & S. 558, 559, 563
 var. *obtusata* Clarke 559
tenuicula Boeck. 439, 546, 587
tenuinervia Kern 547, 579
tetragona R.Br. 439, 454, 543, 544, 551, 589, 590
tetragona Dietr. 551
thomsonii Boeck. 437, 439, 454, 545, 548
thorelii Camus 586
thouarsii (Kunth) Merr. 447, 542, 544, 591
thwaitesii Boeck. 555
tomentosa Vahl 547, 576, 577, 578*
torresiana Gaudich. 551
tortispica Turr. 567
trachycarya F.v.M. 550
tricholepis Miq. 584
trichophylla Ridl. 440, 542, 548, 579, 580
 var. *erecta* Holtt. ex Kern 582
 var. *trichophylla* 580
trispicata Steud. 572
tristachya R.Br. 547, 573
urakasiana Kük. 577
utilis Elm. 551
vanoverberghii Kük. 544, 566
velata R.Br. 585
verrucifera Makino 590
warburgii K.Sch. 557
wetarensis Ohwi 438, 442, 548, 587
woodrowii C.B.Clarke 550
xyridis R.Br. 561
 var. *rigidula* Benth. 561
yunnanensis Clarke 543, 591
Flacourtiaceae 5: 1-106, 565; 6: 943-944; 7: 180, 405, 406, 827, 830
Flagellariaceae 4: 245-250; 5: 557
Freeria Merr. 76
repanda Merr. 76
Frutex aquosus femina Rumph. 775
aquosus mas Rumph. 773
Fuirena Rottb. 435, 439, 446, 447, 448, 449, 452, 455, 516
 sect. *Eu-Fuirena* Clarke 518
 sect. *Fuirena* 518
 sect. *Geminae* Clarke 518
ciliaris (L.) Roxb. 517*, 518, 519
glabra Eckl. ex Kunth 519
glomerata Lamk 519
pentagona Schum. 518
pentagona W. & A. ex Nees 518
philippinensis Gand. 518
pubescens 450
quinquangularis 518
rotboellii Nees 519
rubiginosa Spreng. 700
striata Llanos 519
umbellata Rottb. 518
 var. *pentagona* Boeck. 518
uncinata (non Kunth) Camus 518
wallichiana (non Kunth) Camus 519
 Gahnia J.R. & G.Forster 436, 441, 443, 444, 447, 449, 452, 453, 454, 691, 703, 705 map
 sect. *Agglutinatae* Kük. 706, 707
 sect. *Inclusae* Kük. 708
 sect. *Lampocarya* (R.Br.) Benth. 706, 708
 sect. *Lampocarya* Maiden & Betcher 708
aspera (R.Br.) Spreng. 442, 704*, 706, 708
 ssp. *globosa* (Mann) Kern 710
 var. *globosa* (Mann) Benl 710
 var. *rawacensis* Kük. 708, 710

- baniensis* Benl 440, 706, 707
beccheyi Mann 706, 710
boniana Boeck. 710
castanea Ridl. 708
clarkei Benl 708
clarkei Benl p.p. 707
congesta Boeck. 710
globosa Mann 710
japonica Usteri 708
javanica Zoll. & Mor. ex Mor. 440, 441, 453, 706, 708, 709*
 f. *borneensis* Benl 708
 f. *subcapitata* Kük. 708
 f. *sumatraensis* Benl 708
 f. *subcapitata* Kük. ex Benl 708
 var. *castanea* (Ridl.) Kük. 708
 var. *longearistata* Kük. 708
 var. *paupercula* Kük. 708
 var. *penangensis* Clarke 707
 var. *philippinensis* Benl 708
javanica (non Mor.) Ridl. 707
novocaledonensis Benl 707
penangensis Kük. 707
psittacorum (non Labill.) Rendle 707, 708
sieberiana Kunth 706, 707, 708
sp. 707
stricta Boeck. 710
tetragonocarpa Boeck. 707
trifida Labill. 710
tristis Nees 706, 710
wichurii Boeck. 710
Gastrolepis Tiegh. 2, 41
Gaura Lour. 241
 chinensis Lour. 243
 glandulosum Elm. 184
 trifidum Elm. 184
Gelsemium Juss. 828
Geraniaceae 6: 445-449; 7: 153, 160
Geraniales 152, 153
Gestroa Becc. 212
Gevuina Molina 830
Girardinia heterophylla (Vahl) Decne 798
Glischrocaryon 240
Gnetaceae 4: 336-347; 6: 944-949
Gomphandra Wall. ex Lindl. 1, 2, 3, 21, 24 map
 affinis (Miers) Mast. 34
 affinis sensu Ridl. 33
 var. *floribunda* Ridi. 33
 agusanensis (Elm.) Merr. 27
 apoensis (Elm.) Merr. 23, 29
 australiana F.v.M. 23, 28
 var. *celebica* Valet. 29
 axillaris (non Wall.) Becc. 28
 capitulata (Jungh. & de Vr.) Becc. 22, 24
 carolinensis Kaneh. 46
 carrii Sleum. 31
 comosa (non King) Baker f. 28
 cumingiana (Miers) F.-Vill. 23, 27
 dolichocarpa Merr. 23, 30
 flavica (Elm.) Merr. 23, 30
 fuliginea (Elm.) Merr. 22, 24
 fusiformis Sleum. 23, 28
 gamblei (Clarke) van Royen 11
 glabra Merr. 46
 gracilis King 46
 var. *gracillima* Ridl. 46
 javanica (non (Bl.) Valet.) Holth. & Lam 29
 javanica (Bl.) Valet. 23, 26*, 27
 var. *dolichocarpa* K. & V. 28
 var. *lanceolata* K. & V. 28
 lanceolata (Mast.) King 34
 var. *angustifolia* King 33, 46
 var. *ovalifolia* Ridl. 34
 var. *tennifolia* Craib 33
 var. *triplinervis* King 33
 lancifolia Merr. 23, 31
 laxiflora (Miers) Rolfe 46
 luzoniensis (Merr.) Merr. 23, 31
 lysipetala Stapf 22, 25
 maingayi (Mast.) King 34
 var. *pubescens* Ridl. 33
 mappioides Valet. 23, 29
 montana (Schellenb.) Sleum. 23, 31
 nyssifolia King 24
 oblongifolia Merr. 35
 oligantha Sleum. 23, 30
 ophirensis Ridl. 34
 oppositifolia Pierre ex Gagnep. 33
 pallida Sleum. 23, 29
 papuana (Becc.) Sleum. 23, 25
 parviflora (Bl.) Valet. 23, 32
 pauciflora (Merr.) Merr. 30
 penangiana Wall. 33
 polymorpha (non Wight) F.M. Bail. 28
 prasina (Bl.) Becc. 33
 var. *ovalifolia* (Miq.) Valet. 33
 prasina (non (Bl.) Becc.) Warb. 34
 pseudojavanica Sleum. 23, 27
 pseudoprasina Sleum. 23, 34
 puberula Ridl. 33
 pubescens Ridl. 34
 quadrifida (Bl.) Sleum. 23, 32, 35
 var. *angustifolia* (King) Sleum. 33, 34
 var. *maingayi* (Mast.) Sleum. 33, 34
 var. *ovalifolia* (Ridl.) Sleum. 33, 34
 var. *quadrifida* 33
 var. *triplinervis* (King) Sleum. 33
 ranuensis (Schellenb.) Sleum. 28
 salicifolia Ridl. 34
 sawiensis (Birnie) Sleum. 23, 30
 schoepfiifolia Sleum. 23, 34
 scorpioidea Gagnep. 33
 simalurensis Sleum. 23, 25
 sorsogonensis Elm. 33
 sp. 31
 subrostrata Merr. 23, 32
 velutina Sleum. 22, 24
 viridis (Schellenb.) Sleum. 28
 yatesii (Merr.) Howard 46
 zygomorpha (Pulle) Sleum. 25
Gomphia Schreb. 97, 98, 105
 angustifolia Vahl 105
 corymbosa (King) Ridl. 102
 glaberrima Planch. 102
 hookeri Planch. 102
 var. *corymbosa* King 102
 magnoliaefolia Zipp. ex Span. 108
 microphylla Ridl. 107
 oblongifolia Ridl. 107
 serrata (Gaertn.) Kanis 98, 105, 106*
 race *microphylla* 108
 sumatrana Jack 99, 104, 105
 sumatrensis 105
Gomphocarpus gamblei (Clarke) van Royen 11
Gonotocarpus 241
Goniocarpus 241
 rubricaulis Griff. 244
 scaber Kön. & Sims 243
Gonocarpus Thunb. 240
 micranthus Thunb. 244
Gonocaryum Miq. 1, 3, 14, 16 map
 affine Becc. 16
 calleryanum (Baill.) Becc. 15, 20, 21
 cognatum Elm. 15, 19
 crassifolium Ridl. 15, 16
 diospyrifolia 20
 diospyrosifolium Hayata 20
 fusum Hochr. 16
 fusifforme Hochr. 16
 gracile (non Miq.) Kurz 20
 gracile Miq. 15, 17
 grandifolium Merr. 19
 griffithianum (Miers) Kurz 20
 harmandianum Pierre 20
 impressinervium Sleum. 15, 17, 18*
 litorale (Bl.) Sleum. 15, 16, 21
 lobbianum (Miers) Kurz 15, 20
 longeracemosum King 17
 maclurei Merr. 20
 macrocarpum (Scheff.) Scheff.

- ex Warb. 16, 20
macrophyllum (Bl.) Sleum. 15, 19
melanocarpum Hochr. 15, 21
melanocarpum (non Hochr.) Wyatt-Smith 19
minus Sleum. 15, 18
monostachyum K.Sch. & Laut. 21
obovatum Hochr. 16
pavieanum Gagnep. 21
piriforme 16
poilanei Gagnep. 20
pyriforme Scheff. 16
 var. *corrugatum* Hochr. 16
 var. *fuscum* (Hochr.) Hochr. 16
 var. *fusifforme* (Hochr.) Hochr. 16
 var. *genuinum*
 f. *corrugatum* (Hochr.) Hochr. 16
 f. *planifolium* (Hochr.) Hochr. 16
 var. *obovatum* (Hochr.) Hochr. 16
 var. *planifolium* Hochr. 16
pyrospermum 16
selebicum Becc. 16
siamense Warb. 20
sp. 20
sp. 16
subrostratum Pierre 20
tarlacense Vidal 20
teysmannianum Scheff. 20
wallichii Mast. 20
Gonystylaceae, see *Thymelaeaceae*
Gonystylus T. & B.
 affinis Radlk.
 var. *elegans* Shaw 830
 eximius Shaw 830
Goodenia J.E.Smith 827
 sect. *Ebracteolata* 828
 ser. *Foliosae* Krause 828
 armstrongiana De Vriese 828
 purpurascens R.Br. 828
Goodeniaceae 5: 335-344; 6: 949-952; 7: 827
Gouania 89, 91
Gramen capitatum Rumph. 659
polytrichum Rumph. 589
Gramineae 448, 449, 450
Granamdilla (Tournef.) Medik. 407
Grantia Griff. ex Voigt 235
 globosa (Roxb.) Griff. ex Voigt 236
 microscopica Griff. ex Voigt 237
Gunnera L. 239, 240, 259
 subg. *Gunnera* 261
 sect. *Gunnera* 261
 sect. *Panke* 261
 subg. *Milligania* Schindl. 261
 subg. *Misandra* Schindl. 261
 subg. *Ostenigunnera* Matf. 261
 subg. *Panke* Schindl. 261
 subg. *Perpensum* Schindl. 261
 subg. *Pseudogunnera* Schindl. 261
 arenaria 261
 cordifolia Hook. f. 261
 erosa Bl. 262
 macrophylla Bl. 239, 260*, 261, 262*, 263 map
 var. *papuana* Warb. 262
 var. *sumatrana* Miq. 262
 magellanica 261
 reniformis Ridl. 261, 262, 263
Gussonea Presl 540
 cyperoides Presl 567
 pauciflora Brongn. 567
Guttiferales 97
Gymnema sp. 803
Gynaecocephalum 80
Gynoecephala 80
Gynoecephalum 79, 80
Gynoecephalum Bl. 79
 bracteatum (Wall.) Trécul 85
 giganteum (Wall.) Trécul 86
 luzoniense Llanos 86
 macrophyllum Bl. 86
 oblongum (Wall.) Trécul 84
 palmatum (Wall.) Trécul 84
Gyrocephalum 80

Haemodoraceae 5: 111-113
Haloragaceae 239-263, 828
 subfam. *Gunneroideae* 240
 subfam. *Haloragoideae* 240
 tribe *Halorageae* 240
 tribe *Myriophylleae* 240
Haloragis J.R. & G.Forst. 239, 240, 246
 subg. *Haloragis* Schindl. 241
 subg. *Pseudohaloragis* Schindl. 241
 acanthocarpa Brongn. 239, 241, 244, 245 map
 chinensis (Lour.) Merr. 241, 243 map
 var. *yapensis* Tuyama 243
 depressa (A.Cunn.) Walp. 244
 disticha Jack 246
 erecta (Murr.) Schindl. 241, 245
 exalata F.v.M. 245
 fruticosa Went f. 245
 gjellerupii Went f. 245
 halconensis Merr. 239, 241, 245 map
 isomera Parker 242
 leptotheca F.v.M. 244
 micrantha (Thunb.) R.Br. ex S. & Z. 239, 241, 242*, 244 map, 515, 828
 microphyllum Hoogl. 245
 nemorosa Went f. 245
 oligantha Arn. 247, 248
 palauensis Tuyama 245
 paucidentata Hosokawa 244
 philippinensis Merr. 239, 241, 242, 243 map, 244
 sanguinea Merr. & Perry 245
 scabra Bth. 243
 var. *abbreviata* Schindl. 242
 var. *attenuata* 242
 var. *elongata* Schindl. 243
 var. *novaguineensis* Valet. 243
 secunda Ridl. 245
 var. *stokesii* F.Brown 246
 suffruticosa Gibbs 245
 var. *galitoides* Went f. 245
 var. *ramosa* Went f. 245
 tenella Brongn. 244
 tetragyna (non (Labill.) Hook. f.) Bth. 243
 var. *micrantha* Bth. 243
 tetragyna (non Hook. f.) Clarke 242
Halorrhagis 240
Hamelidaceae 5: 363-379; 6: 952
Hanguana 439
Haplobolus H.J.Lam 822
 robustus (non H.J.Lam) H.J. Lam 822
Haplostyleae Kük. 713
Haplostylis Nees 713
 meyenii Nees 717
 wightiana Nees 718
Hartleya Sleum. 1, 2, 3, 41
 inopinata Sleum. 41, 42*, 828
Heleocharis Lestib. 523
Helicopsis Sleum. 830
Helobiae 222
Helosis 784
Helothrix Nees 673, 678
 axillaris Palla 679
 philippinensis Palla 679
 pusilla Nees 678, 679
Hemicarex Benth. 751, 753
 laxa Benth. 753
Herba sentiens Rumph. 162
Heynea *trijuga* Roxb. 782
Hibbertia scandens (Willd.) Gilg 824
Hibiscus tiliaceus L. 794, 802
Hippocrateaceae, see *Celastraceae*
Hippuris 239, 240
 indica Lour. 529
Höllrungia K.Sch. 405, 406, 431
 aurantioides K.Sch. 432*, 433, 434 map
Homalium gilgianum Laut. 91
Humata mecidoides 269
Hybanthus Jacq. 179, 180, 194
 enneaspermus (L.) F.v.M.

- 195*, 196*, 197 map, 831
var. *verbi-divini* Everaarts
831
suffruticosus (L.) Baill. 197
Hydnocarpus 827
Hydrilla verticillata (L.f.) Royle
248, 263
Hydrocaryaceae, see *Trapaceae*
Hydrocharitaceae 5: 381–413,
569; 6: 952; 7: 828
Hydrocotyle vulgaris L. 126
Hydrophace Hall. 226
perpusilla (Torrey) Lunell 230
trisolca (L.) Burani 234
Hydrophyllaceae 4: 207–209
Hydroschoenus Zoll. & Mor.
633, 634
kyllingioides Zoll. & Mor. 633
Hydrospondylus submersus
Hassk. 263
Hymenanthera 179, 180
Hymenochaeta Beauv. ex Lestib.
497
Hypaeyleptum Vahl 489, 519
argenteum Vahl 521
macrocephalum Gaud. 468,
470
microcephalum R.Br. 522
memorum Beauv. 490
Hypolytrum Rich. 435, 439, 445*,
446, 447, 448, 451, 452, 454,
464, 486, 489
sect. *Africana* Chermesz. 494
sect. *Foliigera* Clarke 490
sect. *Latifolia* Chermesz. 490
sect. *Scaposa* Clarke 490, 494
amplectens Valck.Sur. 491, 492
anomalum Domin 491
anomalum Steud. 490
argenteum Kunth 521
borneense Kurz 465
capitulatum Valck.Sur. ex
Clarke 438, 490, 492, 493*
compactum Nees & Mey. 490,
492, 493
costatonux Clarke 491, 492
costatum Thw. 456
diandrum Dietr. 490
giganteum Wall. ex Nees 490
α *normale* O.K. 491
humile (Steud.) Boeck. 438,
474, 490, 494
latifolium L.C. Rich. 490, 492
var. *depauperatum* Ohwi
490
var. *penangense* Ridl. 490
macrocephalum Kunth 470
macrophyllum 470
microcarpum S.T.Blake 491,
492
minus Ridl. 501
myrianthum Miq. 491, 492
memorum (Vahl) Spreng. 465,
490, 491*, 492*
var. *memorum* 491
var. *proliferum* (Boeck.)
Kern 491, 492, 493
nudicaule 486
pandanophyllum 464
parvibractea Clarke 486
parvibracteatum Clarke 486
var. *quadriglumatum* Valck.
Sur. 486
penangense Clarke 491, 492
philippense Clarke 491, 492
proliferum Boeck. 492
purpurascens Chermesz. 492
quadriglumatum Valck.Sur.
486
radians Ridl. 487
scabrum Uittien 491, 492
schoenoides Nees 490
scirpoides Merr. 491
senegalense Rich. 521
sylvaticum Poepp. & Kunth
492
trinervium Kunth 490
viridinix Clarke 491, 492
wightianum Boeck. 491
xerocarpum Clarke 492
Hypoporum Nees 743
annulare Nees 744
capillare Nees 741
capitatum Nees 743
lithospermum Nees 741
pergracile Nees 743
Hypseocharis 153, 160
Hypserpa 87
- Icacinaceae** 1–87, 89, 93, 828
tribe *Icacinaceae* 2
tribe *Iodeae* 2
tribe *Phytocreneae* 2
tribe *Sarcostigmateae* 2
Ilex wightiana Wall. ex Wight
795
Imhofia Zoll. ex Taub. 180
Imperata 571, 587, 751
Indosinia Vidal 97
Indovethia Boerl. 97, 98, 112,
212
beccariana Bartell. 112
calophylla Boerl. 112, 113*
Intsia 309
Iodes Bl. 1, 4, 67, 69 map
sect. *Lasiodes* Baill. 68
brandisii Kurz 70
cirrhuosa Turcz. 68, 69, 70, 71*,
828
cirrosa 70
ferruginea K.Sch. & Laut. 73
floribunda Merr. 70
hookeriana Baill. 68, 73
horsfieldii Baill. 68, 70
oblonga Planch. ex Mast. 68
var. *moluccana* Hochr. 71
ovalis (non Bl.) Baill. 71
ovalis Bl. 68
var. *genuina* Baill. 68
ovalis (non Bl.) Hassk. 70
var. *cochinchinensis* Pierre
ex Gagnep. 70
var. *genuina* Baill. 70
var. *miquelii* Baill. 70
philippinensis Merr. 68, 69,
71*
reticulata King 68, 69
var. *glabrescens* Ridl. 69, 73
thomsoniana Baill. 73
tomentella (non Miq.) Becc. 71
tomentella Miq. 70
velutina King 68, 72
var. *subvillosa* Sleum. 72
var. *velutina* 72
vitiginea Hance 69
yatesii Merr. 68, 69
var. *glabrescens* (Ridl.)
Sleum. 69
var. *yatesii* 69
Iodes 67
Ionidium Vent. 179, 194
enneasperma L. 197
frutescens Bl. 197, 198
frutescens Roem. & Schult.
198
heterophyllum Vent. 197
molle Turcz. 197
thymifolium Presl 197
zippelii Oudem. 197
Iria Hedw. 540
Iriha O.K. 540
acicularis O.K. 589
acuminata O.K. 588
aestivalis O.K. 584
autumnalis α *normalis* O.K.
549
barbata O.K. 539
bispicata O.K. 573
bisumbellata O.K. 579
cinnamometorum O.K. 565
consanguinea O.K. 549
cymosa O.K. 557
debilis O.K. 564
disticha O.K. 571
eragrostis O.K. 567
falcata O.K. 557
ferruginea O.K. 572
fimbristylloides O.K. 569
furva O.K. 562
fusca O.K. 567
globulosa O.K. 551
glomerata O.K. 557
insignis O.K. 555
junciformis O.K. 557
leptoclada O.K. 560
microcarya O.K. 550
miliacea O.K. 553
monandra O.K. 586
monostachya O.K. 565
nutans O.K. 589
pauciflora O.K. 564
piertii O.K. 555

- platystachys* O.K. 559
polymorpha O.K. 575
polytrichodes O.K. 586
pycnocephala O.K. 557
quinqangularis O.K. 553
 β *maxima* O.K. 552
retusa O.K. 560
salbundia O.K. 553
scaberrima O.K. 555
schoenoides O.K. 573
sericea O.K. 558
subtetrastachya O.K. 567
tenuicula O.K. 587
tetragona O.K. 590
thomsonii O.K. 548
velata O.K. 585
 Irvingbaileya 1
Isachne clementis Merr.
 var. *vulcanica* (Merr.) Jan-
 sen 515
 miliacea 529
 pangerangensis 441
Isolepis R.Br. 515, 538
 sect. *Trichelostylis* Endl. 548
 ambigua Steud. 514
 armerioides Miq. 539, 540
 var. β 539
 articulata (L.) Nees 514
 aucklandica Hook. f. 515
 barbata R.Br. 539
 capillaris
 f. *indicae* Kunth 538
 cochleata Steud. 589
 complanata R. & S. 549
 crassiuscula Hook. f. 503
 cumingii Steud. 539
 curvata 502
 curvula Kunth 502
 dipsacea R. & S. 590
 dura Zoll. & Mor. 554
 exilis Kunth 560, 561
 fluitans R.Br. 502
 haenkei Presl 557
 inundata R.Br. 515
 involutellata Steud. 539
 juncooides Miq. 514
 miliacea Presl 551, 552
 oryctorum 514
 oryztorum Steud. 514
 prolongata Nees 513, 514
 puberula Kunth 540
 senegalensis Hochst. ex Steud.
 514
 squarrosa R. & S. 516
 trichocolea Steud. 538, 539
 trichokolea 538
 trifida Nees 538
 uninodis Delile 514
 uninodis (non Delile) Miq. 514
 verrucifera Maxim. 590
 willdenowii R. & S. 549

Jenkinsia Griff. 76
 Juglandaceae 6: 143-154, 953;
- 7: 272
 Juncaceae 4: 210-215; 5: 557;
 6: 953; 7: 448, 449
 Juncaginaceae 4: 57; 5: 554
Juncellus C.B. Clarke 592, 593
 alopecuroides Clarke 603
 kükenthalii Back. 661
 pygmaeus Clarke 634
Juncus 653
Jürgensia Spreng. 180

Kaden Pullu Rheede 740
Kadsura blancoi Azaola 86
Katu-Tsjolam Rheede 733
 Kermadecia 830
Killinga triceps 660
Kobresia Willd. 435, 445, 447,
 452, 453, 751
 kobresioidea (Kük.) Kern
 438, 441, 455, 752, 753*
 laxa Nees 752, 753
 pseudolaxa Benth. 753
 Kobresiaceae 451
Kyllinga Rottb. 653
 alata Nees 659
 albescens Steud. 521
 aromatica Ridl. 656
 bifolia Miq. 656
 brevifolia (non Rottb.) Mor.
 660
 brevifolia Rottb. 653, 655, 656
 var. *stellulata* Ohwi 658
 bulbosa Beauv. 659
 caespitosa Nees
 var. *robusta* Boeck. 656
 cephalotes Druce 660
 colorata Druce 656
 cruciformis Schrader ex R. &
 S. 656
 cylindrica (non Nees) Clarke
 659
 var. *subtriceps* Nees 659
 cyperina Retz. 641
 elata Steud. 656
 fuscata Miq. 658
 gracilis Kunth 656
 var. *capitulo globosa* Nees
 660
 gracilis (non Kunth) Zoll. 660
 intermedia (non R.Br.) Merr.
 658
 longiculmis Miq. 656
 melanosperma Nees 655
 mindorensis Steud. 660
 monocephala Rottb. 660
 var. *mindorensis* Boeck. 660
 var. *subtriceps* Kunth 660
 monocephala (non Rottb.)
 Zoll. 656
 multinervia Steud. 643
 odorata Vahl
 var. *cylindrica* Kük. 659
 panicea Rottb. 643
 pierreana Camus 632
- polyphylla* Willd. ex Kunth
 656
pumila (non Steud.) Naves 661
pumila Steud. 659
pumilio Steud. 656
pungens (non L.) Clarke 655
rigidula Steud. 656
sesquiflora Torr. 658
sororia Kunth 656
squamulata (non Vahl) Camus
 634
squarrosa Steud. 522, 656
sumatrensis Retz. 642
triceps (non Rottb.) Blanco
 660
triceps Rottb. 659
umbellata Rottb. 642
 var. *sumatrensis* Willd. 642
vaginata (non Lamk) Zoll. 655
 var. *major* Hassk. 655
Kyllingia (sphalm.) = *Kyllinga*
- Lamiales 240
Lampocarya R.Br. 705, 708
 aspera R.Br. 708
 rawacensis Steud. 708
 Langsdorffia Mart. 783, 784,
 785, 804
 hypogaea Mart. 804
 indet. 805
 indica Arn. 794
 malagastica (Fawc.) Hansen
 804
 papuana Geesink 785, 789
 map, 804*, 805*
 Langsdorffiaceae 784
Lasianthera (non P. Beauv.) Miq.
 21, 56
 apicalis (Thw.) Benth. 60
 capitulata (Jungh. & De Vrie-
 se) Miq. 24
 javanica (Bl.) Miq. 28
 var. *pauciflora* (Bl.) Miq. 28
 var. *quadrifida* (Bl.) Miq. 33
 lanceolata Mast. 34
 litoralis (Bl.) Miq. 16
 litoralis (non Miq.) F.v.M. 25
 macrocarpa (Bl.) Miq. 20
 macrophylla (Bl.) Miq. 19
 maingayi Mast. 34
 malaccensis Mast. 60
 ovalifolia Miq. 33
 papuana Becc. 46
 parviflora (Bl.) Miq. 32
 prasina (Bl.) Miq. 33
 secundiflora (non (Bl.) Miq.)
 King 58
 secundiflora (Bl.) Miq. 59
 f. *sumatrana* Miq. 59
 var. *sumatrana* Miq. 59
 umbellata (Becc.) King 62
 var. *ovalifolia* (Becc.) Merr.
 62
 Lauraceae 10, 268, 270

- Laurembergia* Berg. 239, 240, 246, 247 map
 subg. *Indolaurembergia* Schindl. 247 map, 248
 subg. *Laurembergia* 247 map
 subg. *Serpiculastrum* A. Rayn. 247 map
agastyamalayana Henry 247, 248
brevipes (W. & A.) Schindl. 247
coccinea (Bl.) Kan. 239, 246, 248*
 var. *coccinea* 247
 var. *zeylanica* (Arn. ex Clarke) Meijden 248
glaberrima Schindl. 247
grandifolia Schindl. 247
hirsuta (W. & A.) Schindl. 247
 var. *angustifolia* Schindl. 247
 var. *hirsuta* 247
 var. *rotundifolia* Schindl. 247
 var. *typica* Schindl. 247
indica (Thw.) Schindl. 247
javanica (Miq.) Schindl. 247
wangerinii Schindl. 247
zeylanica (Arn. ex Clarke) Schindl. 247, 248
 var. *minor* (Thw. ex Clarke) Schindl. 247
Laurus caesia Reinw. ex Bl. 820
lucida Wall. 318
Leea van Royen ex L. 755, 756 map, 757*, 758*
aculeata (Blanco) Blanco 773
aculeata Bl. ex Spreng. 756, 761, 773 map, 782
 var. *moluccana* Miq. 773
aculeata (non Bl.) Kurz 772
acuminata Wall. 777, 779
acuminatissima Merr. 760*, 764 map, 765
aequata L. 756, 762, 764 map, 774*, 775*, 782
agusensis Elm. 764
amabilis Veitch ex Masters 761, 765, 766* map
 var. *splendens* Linden & Rodigas 765
anacolona Miq. 775
angulata Korth. ex Miq. 756, 761, 772 map, 773
angulata (non Korth.) Kurz 773
arborea Telf. ex W. & A. 777
aurantiaca Zoll. & Mor. 777, 779
banahaensis Elm. 762
biserrata Miq. 780
biserrata (non Miq.) Naves 773
boerlageana Koord. 781
brunoniana Clarke 776
brunoniana (non Clarke) Engl. 780
brunoniana (non Clarke) Laut. 778
bulusanensis Elm. 778
capitata Merr. 765
catanduanensis Quis. 762
celebica Clarke 780
coccinea (non Planch.) Kurz 776
coccinea Planch. 759
compactiflora 760*
congesta Elm. 761, 765, 777 map
cordata Wall. 782
coryphantha Laut. 756, 760*, 762, 767, 777 map
cumingii Clarke 777, 779, 781
curtisii King 761, 771 map, 773
dentata Craib 778
divaricata T. & B. 780
erecta Voll. & Brade 782
euphlesia Merr. 778
expansa Craib 780
forbesii Baker f. 766
fuliginosa Miq. 780
gigantea Griff. 780
gigantea K.Sch. & Laut. 767
gonioptera Laut. 761, 766
gracilis Laut. 780
guineensis G. Don 756, 759, 760, 762, 777, 778 map, 781, 782
heterodoxa K.Sch. & Laut. 762, 767, 771 map
hirsuta Bl. ex Spreng. 775
hirta Roxb. ex Hornem. 775
hispida Gagnep. 775
horrata T. & B. 772
humilis Hassk. 782
indica (Burm. f.) Merr. 765, 759, 760*, 762, 778, 779, 780*, 782
javanica Bl. ex Spreng. 782
javanica (non Bl.) King 780
javanica (non Bl.) Koord. 773
javanica (non Bl.) Miq. 777
krukoffiana Ridsdale 761, 769, 770*, 771* map
kurzii Clarke 775
laetae Wall. 777
laevis Heyne ex Wall. 782
linearifolia Clarke 776
longifoliola Merr. 780
longipetiolata Merr. 764
luzonensis Elm. 778
macropus (non K.Sch. & Laut.) Baker f. 769
macropus K.Sch. & Laut. 756, 759, 761, 771* map
magnifolia Merr. 760*, 762, 763*, 766 map
manillensis Walp. 777, 779
micholitzii Sanders 767
monophylla Laut. 767
naumannii Engl. 780
negrosense Elm. 778, 779
nitida Merr. 765
novoguineensis Val. 780
odontophylla Wall. 782
otillis (Gaertn.) DC. 780
palawanensis Elm. 778
palembanica Miq. 780
pallidifolia Kaneh. 778
papillosa Merr. 778
papuanum Merr. & Perry 761, 768*, 769*, 773 map
parva Elm. 778
parvifoliola Merr. 778
pauciflora Elm. 765
pauciflora King 766
 var. *ferruginea* Craib 766
philippinensis Merr. 756, 761, 765, 772 map
 var. *pauciflora* (Elm.) Merr. 765
platyphylla Merr. 764
polyphylla Miq. 776
pubescens Zipp. ex Miq. 780
pycnantha Quis. & Merr. 762
quadrifida Merr. 761, 762, 764, 765, 771 map
ramosii Merr. 780
robusta Bl. 780, 782
robusta (non Roxb.) Ridl. 778
rodatzii Laut. 767
roehrsiana Sanders ex Masters 780
rubra Bl. ex Spreng. 759, 761, 762, 776*, 777 map
 f. *celebica* Koord. 776
 var. *apiifolia* Zipp. ex Miq. 776
 var. *polyphylla* (Miq.) Miq. 776
sambucifolia Salisb. 779
sambucina (non Willd.) Baker f. 772
 var. *intermedia* Ridl. 772
sambucina Willd. 759, 779, 782
 var. *biserrata* (Miq.) Miq. 779
 var. *heterophylla* Miq. 779
 var. *occidentalis* Clarke 779
 var. *robusta* Miq. 779
 var. *roehrsiana* (Sanders) Chittenden 779
 var. *simplex* Miq. 779
 var. *sumatrana* (Miq.) Miq. 779
sandakanensis Ridl. 773
sanguinea (non Wall.) Kurz 776
sanguinea Wall. 777
saxatilis Ridl. 761, 773 map, 777

- scabra* Roxb. ex Roem. & Schultes 775
schomburgkii Craib 778
serrulata Miq. 773
setuligera Clarke 777
simplicifolia Zoll. & Mor. 760, 761, 766 map
smithii Koord. 762, 772 map, 781
solomonensis Merr. & Perry 772
spinosa Spreng. 782
staphylea Roxb. 779
staphylea (non Roxb.) Wight 777
stipulosa Gagnep. 773
suaveolens Merr. & Perry 772
sumatrana Miq. 780
sundaica Miq. 780, 782
 var. *fuliginosa* (Miq.) Miq. 780
 var. *pilosiuscula* Miq. 780
 var. *subsessilis* Miq. 780
tetramera Burtt 756, 759, 761, 771 map, 772
tuberculata Laut. 767
umbraculifera Clarke 780
unifoliata Merr. 760, 764 map
viridiflora Planch. 780
wightii Clarke 777
wrightii 777
zippeliana Miq. 761, 766 map, 767
 var. *ornata* Laut. 767
- Leeaceae 755-782**
Leersia hexandra 529
Legnephora minutiflora (K. Sch.) Diels 828
Leguminosae 153
Lemna L. 219, 220, 222, 223, 226
 sect. *Spirodela* Peterm. 223
 subg. *Lemna* 226
 subg. *Staurogeton* Rechb. 228
aequinotialis Welw. 230, 231
angolensis Welw. ex Hegelm. 230, 231
arrhiza (non L.) Back. 236
arrhiza L. 237
bisulca C.A.Meyer 234
blatteri McCann 230
cruciata Roxb. 234
disperma Hegelm. 231
eleanorae McCann 230
gibba (non L.) Blanco 225, 226
 231
gibba L. 221, 230, 231, 232*
globosa Roxb. 236
intermedia Ruthe 234
major (C.A.Meyer) Griff. 224
maxima Blatter & Hallb. 224
melanorrhiza F.v.M. ex Kurz 226
minima Blatt. & Hallb. 230
 minor L. 230, 231, 232*
 minor (non L.) Lour. 230
 obcordata Winberg 237
 oligorrhiza Kurz 226
 orbicularis Kit. ex Schultes 224
 orbiculata Roxb. 224
 paucicostata Hegelm. 226, 230, 231
 var. *membranacea* Hegelm. 230
 perpusilla Torrey 220, 221, 222, 225, 226, 228, 229*, 230
 231, 235, 237
 var. *trinervis* Austin 230, 231
 pleiorrhiza F.v.M. 226
 polyrhiza L. 224
 punctata G.F.W.Meyer 225
 sp. 235
 tenera Kurz 230, 234*, 235
 thermalis Beauv. 224
 trinervis (Austin) Small 230, 231
 trisolca L. 220, 230, 231, 233*, 235
- Lemnaceae 219-237**
 subfam. Lemnoideae 222
 subfam. Wolffioideae 219, 222
Lentibulariaceae 135
Lenticula (Hill.) Boehmer 226
 polyrhiza (L.) Lamk 224
 ramosa Lamk 234
 trisolca Scop. 233
Lenticularia Montandon 228
Lenticularia Séguier 223, 228
Leonia glycocarpa R. & P. 179
Leontice leontopetaloides 809
Leontopetaloides Boehmer 806
Lepidopteron 307
Lepidosperma Labill. 436, 447, 448, 452, 453, 668, 669 map, 670, 700
 chinense Nees & Meyen 441, 455, 668, 669* map, 670*, 700
 var. *alpinum* Ridl. 672
 neesii Kunth 668
 striatum R.Br. 668
 striatum (non R.Br.) Ohwi 668
 waigiense Steud. 668, 698
 zeylanicum Lindl. ex Boeck. 672
Lepironia L.C. Rich. 436, 439, 447, 451, 452, 453, 460
 sect. *Macrolepironia* Miq. 468
 sect. *Pandanophyllum* Miq. 468
 articulata (Retz.) Domin 454, 461*, 462, 480, 505
 bancana Miq. 465
 conifera Druce 462
 cuspidata Miq. 473
 enodis Miq. 468, 480
 foliosa Miq. 480
 humilis Miq. 473
 macrocephala Miq. 470
 mucronata L.C. Rich. 462, 480
 mucronulata 462
 palustris Miq. 477
 squamata Miq. 479
 sumatrana Miq. 464
Lepistachya praemorsa Kurz 473
Leptospermum 680
 flavescens 269 ..
Leucocorema Ridl. 87
Libocedrus 281
Limnanthaceae 161
Limnobium laevigatum (H.B. ex Willd.) Heine 828
 stoloniferum (G.Meyer) Gri-seb. 828
Limnochoila Nees 525
Limnophila 256, 259
 aromatica 627*
Linaceae 160
Linociera sp. 794
Lipocarpha R.Br. 435, 445*, 447, 448, 452, 455, 490, 519
 sect. *Acutae* Cherm. 521
 sect. *Obtusae* Cherm. 521
 sect. *Lipocarpha* 521
 argentea R.Br. ex Nees 521
 chinensis (Osb.) Kern 439, 520*, 521
 debilis Ridl. 521
 foliosa Miq. 644
 laevigata Nees ex Wight 521
 microcephala (R.Br.) Kunth 442, 516, 521, 522, 591
 senegalensis Th. & Hél. Durand 521
 triceps (non Nees) Camus 521
 zollingeriana Boeck. 522
Lithocarpus Bl. 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 281, 283, 295, 296, 309, 318, 319 map, 325 map
 sp. 328*
abendanonii (Valet.) A.Camus 373
aculeata (Markgr.) Rehd. 374
andersonii Soepadmo 323, 365
apoensis (Elm.) Rehd. 322, 354
argentea (Korth.) Merr. 389
argyrocarpa A.Camus 384
aspericupula (Markgr.) Rehd. 325, 382
atjehensis Hatus. ex Soepadmo 322, 349
bancana (non Rehd.) A.Camus 344
bancanus (Scheff.) Rehd. 323, 360*
beccariana 329
beccarianus (Benth.) A.Camus 320, 329
bennettii (Miq.) Rehd. 322, 356

- blumeana* (non Rehd.) A. Camus 336
blumeanus (Korth.) Rehd. 321, 339
boholensis (Merr.) Rehd. 335
borneensis (Merr.) Rehd. 379
brachyclada (von Seemen) A. Camus 374
brassii Soepadmo 321, 348
buddii (Merr.) A. Camus 325, 383
bullatus Hatus. ex Soepadmo 322, 356
bulusanensis (Elm.) A. Camus 351
burkillii A. Camus 320, 329, 331
cagayanensis (Merr.) A. Camus 377
cantleyanus (King ex Hook. f.) Rehd. 322, 352
castellarnauianus (Vidal) A. Camus 324, 377
caudatifolius (Merr.) Rehd. 322, 350, 356, 385
celebicus (Miq.) Rehd. 269, 324, 374
clathrata (von Seemen) Rehd. 331
clementianus (King ex Hook. f.) A. Camus 323, 365
clementis 379
confertus Soepadmo 322, 356
confragosus (King ex Hook. f.) A. Camus 320, 335
conocarpa
 ssp. *euconocarpa* 349
 ssp. *malaccensis* A. Camus 349
conocarpus (Oudem.) Rehd. 322, 349
cooperta 335
coopertus (Blanco) Rehd. 272, 320, 335, 337*
copelandii (Elm.) Rehd. 354
costata (Bl.) Rehd. 325, 327
 var. *convexa* (Bl.) A. Camus 325, 327
 var. *kingii* A. Camus 327, 340
 var. *scutigera* (Oudem.) A. Camus 325, 327
 var. *typica* A. Camus 325, 327
crassinervius (Bl.) Rehd. 324, 371
cratophora (Fischer) A. Camus 344
crateriformis Merr. 379
curranii (Merr.) Rehd. 331
curtisii (King ex Hook. f.) A. Camus 324, 380
cyathiformis A. Camus 362
cyclophorus (Endl.) A. Camus 321, 345, 369
cyrtopoda (Miq.) A. Camus 384
cyrtorhyncha (Miq.) Rehd. 362
d'albertisii (F.v.M.) Rehd. 374
daphnoideus (Bl.) A. Camus 322, 352, 385
dasystachyus (Miq.) Rehd. 267, 322, 350
debaryana (Warb.) Markgr. 384
diepenhorstii (Miq.) Barnett 362
dolichocarpa (von Seemen) Rehd. 353, 385
echinifer (Merr.) A. Camus 320, 332*, 333
echinifera 333
echinulatus Soepadmo 324, 382
eichleri (Wenzig) A. Camus 321, 341
elegans (Bl.) Hatus. ex Soepadmo 267, 323, 366
encleisacarpus (Korth.) A. Camus 272, 321, 338, 339
 var. *typica* A. Camus 338
encleisocarpa 338
 var. 338
eriolepis A. Camus 380
erythrocarpus (Ridl.) A. Camus 323, 369
ewyckii (Korth.) Rehd. 322, 351, 389
falconeri (Kurz) Rehd. 324, 371
ferrugineus Soepadmo 324, 370
glutinosus (Bl.) Soepadmo 322, 354, 385
gracilis (Korth.) Soepadmo 323, 362
grandifrons (King ex Hook. f.) A. Camus 376
hallieri (von Seemen) A. Camus 320, 327
hatusimae Soepadmo 267, 322, 358
havilandii (Stapf) Barnett 269, 324, 373*
heliciformis (von Seemen) Rehd. 343
hendersonianus A. Camus 320, 328
henryi 368
hypophoenicea (von Seemen) Barnett 305
hystrix (Korth.) Rehd. 325, 384
imperialis (von Seemen) Markgr. 346
indutus (Bl.) Rehd. 321, 344
jacobsii Soepadmo 323, 368
javanensis Bl. 272, 320, 325, 326*, 331
jordanae (Laguna) Rehd. 325, 382
kingianus (Gamble) A. Camus 324, 373*, 381
koordersii (von Seemen) Markgr. 354
korthalsii (Endl.) Soepadmo 321, 342*, 343*
kostermansii Soepadmo 320, 336, 340
kunstleri (King ex Hook. f.) A. Camus 324, 372
lampadarius (Gamble) A. Camus 269, 323, 368
lampionga (Miq.) Rehd. 375
lappacea
 var. *perakensis* A. Camus 334
lauterbachii (von Seemen) Markgr. 269, 321, 348, 384
leptogyne (Korth.) Soepadmo 324, 378*, 379
lipacon (Elm.) Rehd. 374
llanosii (A. DC.) Rehd. 374
loheri A. Camus 358
longispinus Barnett 320, 334, 337*
lucidus (Roxb.) Rehd. 321, 341
luteus Soepadmo 267, 321, 345
luzoniensis (Merr.) Rehd. 324, 381
mabesae (Merr.) A. Camus 375
macphailii (Henders.) Barnett 321, 339, 340
maingayi (Benth.) Rehd. 272, 320, 331
mariae Soepadmo 321, 338
megacarpus Soepadmo 269, 321, 346, 361, 368, 377
menadoensis (Koord.) Soepadmo 351, 385
merritti (Merr.) Rehd. 377
meijerii Soepadmo 322, 352
microcalyx (Korth.) A. Camus 367
minahassae (Koord. ex Elm.) Rehd. 351
mindanaensis (Elm.) Rehd. 322, 350, 355
moluccus (Rumph. ex L.) Soepadmo 385
monticola (King) Rehd. 369
neorobinsonii A. Camus 320, 336, 337*
nieuwenhuisii (von Seemen) A. Camus 324, 379
nitida (Bl.) A. Camus 353
nodosus Soepadmo 322, 357
nymmanniana (Markgr.) Rehd. 385

- obliquinervia* (Merr.) A.Camus 377
obtusifolius Soepadmo 323, 370
ochracea (Schottky) A.Camus 379
oligocarpa A.Camus 353
omalokos (Korth.) Rehd. 341
oogyne (Miq.) A.Camus 385
orbicularis Soepadmo 271, 323, 362, 363*
oreophilus Soepadmo 271, 323, 369
ovalis (Blanco) Rehd. 323, 361
pallidus (Bl.) Rehd. 322, 348
papillifer Hatus. ex Soepadmo 323, 370
papuana (O.Warb.) Rehd. 374
pattaniensis Barnett 321, 336
perakensis Soepadmo 321, 327, 340
perclusa Markgr. 346
philippinensis (A.DC.) Rehd. 322, 353
pinatubensis (Elm.) A.Camus 377
platycarpus (Bl.) Rehd. 267, 321, 340
plumbea (Bl.) Soepadmo 385
poeciliformis (von Seemen) A.Camus 353
porcatus Soepadmo 320, 327
pruinosa (Bl.) Rehd. 375
pseudokunstleri A.Camus 324, 372
pseudolamponga A.Camus 351
pseudomoluccus (Bl.) Rehd. 324, 376
pseudoplatycarpus A.Camus 345
pulcher (King) Markgr. 320, 333
pulchra 333
pusillus Soepadmo 323, 362
pyriformis (von Seemen) Rehd. 331
rajah (Hance) A.Camus 361
rangeriana A.Camus 364
rassa (Miq.) Rehd. 323, 364, 366, 377
 var. *suffruticosa* (Ridl.) A.Camus 366
reflexa (King) A.Camus 335
reinwardtii (Korth.) A.Camus 323, 359
revolutus Hatus. ex Soepadmo 321, 346, 347*
rhioensis (Hance) A.Camus 367
ridleyana A.Camus 364
rigidus Soepadmo 322, 357
rizalensis (Merr.) Rehd. 353
robinsonii Merr. 383
rotundata 331
 rotundatus (Bl.) A.Camus 320, 331
rufa (von Seemen) A.Camus 370
rufovillosus (Markgr.) Rehd. 269, 325, 383
ruminatus Soepadmo 272, 320, 328
sarawakensis E.F.Warb. 353
schlechteri Markgr. 269, 321, 346
scortechinii (King ex Hook. f.) A.Camus 267, 324, 373*, 380
scutigera Oudem. 325, 327
sericobalanus E.F.Warb. 321, 340
smitinandiana A.Camus 380
sogerensis (S.Moore) Markgr. 324, 374
solanicaarpa Markgr. 348
solerianus (Vidal) Rehd. 322, 355, 356, 360
sootepensis (Craib) A.Camus 384
spicata (Sm.) Rehd. & Wils. 367
 var. *elegans* (Bl.) A.Camus 367
 var. *glaberrima* (Bl.) A.Camus 367
 var. *gracilipes* (Miq.) Rehd. 367
 var. *placentaria* (Bl.) Rehd. 367
submonticolus (Elm.) Rehd. 324, 370, 377
subnuclifera A.Camus 331
suffruticosus (Ridl.) Soepadmo 323, 366
sultitii Soepadmo 323, 356, 359
sundaicus (Bl.) Rehd. 266, 324, 375, 385
symingtoniana A.Camus 364, 365
teysmannii (Bl.) Rehd. 343
turbinatus (Stapf) Forman 269, 272, 320, 329, 330*
urceolaris (Jack) Merr. 321, 344, 361
vidalii (F.-Vill.) Rehd. 323, 358
vinkii Soepadmo 323, 365
wallichianus (Lindl. ex Hance) Rehd. 323, 368
wenzelii (Merr.) Rehd. 353
wenzigiana (King ex Hook. f.) A.Camus 364
winkleriana (Schottky) A.Camus 350
woodii (Hance) A.Camus 322, 358
wrayi (King) A.Camus 272, 320, 334, 337*
 zschokkei (Elm.) Rehd. 354
Litsea 289
Loganiaceae 6: 293-387, 953-960; 7: 828-829
Longetia 274
Lophocarpus Boeck. 673
tonquinensis Boeck. 677
Lophophytum leandri Eichl. 784
Lophopyxidaceae 89-91
Lophopyxis Hook. f. 89
 combretocarpa (Boerl.) Engl. 91
 maingayi Hook. f. 90*, 91
 map
 pentaptera (K.Sch.) Engl. 91
 pierrei Boerl. 91
 schumannii Boerl. 91
Lophoschoenus Stapf 664
urvilleanus Stapf 666
Lophozonia Turcz. 278
Lotus 453
Loudonia 240
Lytogomophus Jungh. 785
 stilbiferus Jungh. ex Goepf. 787
Macaranga sp. 799
 tanarius (L.) Muell.Arg. 788, 794
Machaerina Vahl 436, 447, 448, 452, 453, 454, 455, 672, 688, 690, 706
 angustifolia (Gaud.) Koyama 696
 arfakensis Koyama 700
 aromatica Koyama 678
 articulata (R.Br.) Koyama 441, 453, 693, 700
 aspericaulis (Kük.) Koyama 438, 440, 693, 696
 borneensis Koyama 688
 brevipaniculata Koyama 701
 crassa Koyama 701
 crinita Koyama 694
 cyperoides Koyama 566
 disticha (Clarke) Koyama 439, 693, 699
 map, 717
 falcata (Nees) Koyama 440, 441, 693, 694, 695*
 gaudichaudii Koyama 699
 glomerata (Gaud.) Koyama 439, 670, 693, 698, 699
 gunnii (Hook. f.) Kern 437, 441, 668, 693, 701
 iris Koyama 694
 juncooides Koyama 698
 lamii (Kük.) Kern 438, 441, 693, 696, 697*
 latifolia Koyama 694
 maingayi (Clarke) Koyama 437, 441, 693
 malesiaca Koyama 694
 mariscoides (Gaud.) Kern 437, 439, 693, 698

- micranthes* Koyama 699
philippinensis Koyama 699
pulchra Koyama 672
robinsonii Koyama 694
rubiginosa (Spreng.) Koyama 439, 441, 693, 700, 702*, 703*
sinclairii (Hook. f.) Koyama 439, 692*, 693, 694
sinuata Koyama 698
teretifolia (R.Br.) Koyama 437, 441, 693, 700
tetragona (Labill.) Koyama 700
undulata Koyama 672
Macrobalanus O.Schwarz 274, 276, 387
Macropanax dispermus (Bl.) O. K. 798
Malpighiaceae 5: 125–145, 566; 6: 960
Mangifera xylocarpa Laut. 50
Mapania Aublet 435, 439, 445*, 448, 449, 451, 452, 455, 464, 466, 468 map, 486
 sect. *Cephaloscirpus* (Kurz) B. & H. 464, 468
 sect. *Halostenma* Clarke 468, 474, 480
 sect. *Macrolepironia* (Miq.) Kern 468
 sect. *Pandanophyllum* (Hassk.) B. & H. 468
 sect. *Pandanophyllum* (non B. & H.) Clarke 468, 480
 sect. *Thoracostachyum* (Kurz) Koyama 464
 subg. *Cephaloscirpus* Clarke 468
 subg. *Halostenma* Clarke 468, 475
 subg. *Pandanophyllum* Clarke 468
 subg. *Pandanoscirpus* Uittien 468
affinis Merr. 477
albescens Clarke 477
alpina Elm. 479, 484
andamanica Clarke 477
angustifolia Uittien 438, 469, 478
archboldii Uittien 481
baccifera Clarke 466, 469, 484
banahaensis Elm. 477
bancana B. & H. ex Jacks: 465
borneensis Merr. 470, 475, 479, 484
caudata Kük. 474, 475
cuspidata (Miq.) Uittien 466, 468, 469, 473*, 475, 480, 484
 var. *angustifolia* (Uittien) Uittien 474, 475
 var. *cuspidata* 474
 var. *petiolata* (Clarke) Uittien 474
 var. *pumila* (Uittien) Uittien 474, 475, 476*
debilis Clarke 438, 469, 475
dictyophlebia S.T.Blake 479
enodis (Miq.) Clarke 438, 470, 475, 480
flagellaris Uittien 475, 477
foxworthyi Merr. 438, 469, 478
geelvinkensis Ohwi 470, 471
gracilipes Merr. 475, 477
gracillima Kük. & Merr. 488
graminea Uittien 438, 469, 470, 482
 var. *stipitata* Uittien 482
grandiceps Kük. 477
grandiceps (non Kük.) Ohwi 484
heterocephala Merr. 479
heyneana Back. 465
holtumii Kern 438, 468, 469, 472*
humilis F.-Vill. 473, 484
 var. *petiolata* Ridl. 474
inopinata Uittien 474
javana Uittien 477
kurzii Clarke 470, 478, 481
kurzii (non Clarke) Merr. 477
lactea Kük. 470, 471
latifolia Uittien 438, 467*, 468, 469, 472
ledermannii Kük. 471
longa Clarke 480
longiflora Clarke 438, 468, 469, 475
 var. *sessilis* Uittien 475, 481
longiflora (non Clarke) Pfeiff. 477
longifolia Clarke 470
longirostris Kük. 488
longispica Ridl. 478
lorea Uittien 438, 470, 480
lucbanensis Elm. 486, 488
lucida N.E.Brown 473, 474
macrocephala (non K.Sch.) Merr. 456
macrocephala (non K.Sch.) Ridl. 477
macrocephala (Gaud.) K.Sch. 438, 466, 468, 469, 470, 471 map, 477
margaritae Ohwi 470, 471
maschalina Kern 438, 469, 482, 483*
micropandanus Holtt. 438, 469, 482
monostachya Uittien 438, 470, 482
montana Laut. & K.Sch. 486
montana Ridl. 472
moseleyi Clarke 466, 468, 469, 471 map
 f. *latifolia* Uittien 470
multispicata (non Ridl.) Clarke 494
multispicata Clarke ex Ridl. 478
palauensis Hosokawa 470, 471
palustris (Hassk. ex Steud.) F.-Vill. 438, 466, 470, 471, 477, 478
pandancea Ridl. 470, 471
pandanophylla K.Sch. 464
papuana Ridl. 484
parvibractea Koyama 487
petiolata Clarke 468, 474
 var. *angustifolia* Uittien 474
 var. *cuspidata* Uittien 474
 var. *pumila* Uittien 475
platyphylla Merr. 474
radians Clarke 487
radulosa Ridl. 484
richardsii Uittien 468, 469, 475
rostrata Elm. 488
sessilis Merr. 438, 470, 481
silhetensis Clarke 468, 477
spadicea Uittien 438, 469, 470, 481
squamata (Kurz) Clarke 438, 469, 470, 475, 479
stolonifera Uittien 474
sumatrana Benth. 464
sylvatica Aubl. 468
tenuiscapa Clarke 470, 480, 481
tenuiscapa (non Clarke) Ridl. 480
thoreliana Camus 492
triquetra Ridl. 473, 474
tunida Uittien 480
valida Ridl. 478, 480
versicolor Becc. 481
wallichiana 479
wallichii Clarke 438, 470, 479
wallichii (non Clarke) Ridl. 479
yapensis Hosokawa 470, 471
zeylanica (non Clarke) Merr. 480
zeylanica (non Clarke) Ridl. & Winkl. 480
 var. 475
Mappia 2
Mappia Jacq.
 sect. *Nothapodytes* (Bl.) O.K. 54
 sect. *Trichocrater* Miers 53
montana (Bl.) Miers 55
philippinensis Merr. 49
Mappianthus Hand.-Mazz. 2, 67
borneensis Merr. 73
hookerianus (Bail.) Sleum. 73
Mariscopsis Cherm. 593, 654
hyalinus Ballard 655
suaveolens Cherm. 655
Mariscus Gaertn. 592
Mariscus Vahl 641

- Mariscus* Zinn 688
 sect. *Flabelliformes* Clarke 638
 sect. *Turgiduli* Clarke 635
 subg. *Bulbocaulis* Clarke 643
albescens Gaudich. 635
angustatus Clarke 638
aristatus Cherm. 631
aromaticus Fern. 678
articulatus O.K. 700
asper O.K. 708
borneensis Fern. 668
capillaris Vahl 641
capitatus Steud. 644
cladium O.K. 688
colpodes Fern. 698
compactus Boldingh 640
concinuus Schrader 642
crassus O.K. 701
cyperinus Vahl 641
 var. *maximus* Clarke 642
cyperoides Urb. 642
delicatulus Fern. 678
diétrichiae Clarke 640
dilutus Nees 640
distichus Fern. 699
dregeanus Kunth 643
dubius Kük. ex Fischer 643
falcatus Fern. 694
fallax Fernald 566
ferax Clarke 646
flabelliformis (non Kunth) Clarke 640
fulvus Clarke 638
 var. *confusus* Clarke ex Domin 638
gaudichaudii Fern. 698
geniculatus Fern. 699
globiceps Fern. 698
glomeratus O.K. 701
holoschoenus Clarke 637
irroratus Nees 643
javanicus O.K. 708
javanicus Merr. & Metc. 635
lucidus Clarke 637
maingayi Fern. 693
marianum O.K. 698
maritimus Miq. 643
merrillii Clarke 643
meyenii O.K. 698
micranthes Fern. 699
microcephalus Presl 638
 var. *pauciflorus* Pfeiff. 642
niveus Merr. 643
panicus Vahl 643
 var. *roxburghianus* Clarke 643
pennatus Domin 635
philippensis Steud. 642
platyphyllus Fern. 694
pullu Steud. 643
pungens Steud. 644
rechingeri Palla 642, 643
riparius
 var. *crassus* Fern. 701
sieberianus Nees ex Clarke 642
 var. *evolutior* Clarke 643
 var. *evolutior* (non Clarke) Ridl. 601, 646
 var. *microstachys* Kük. 643
 var. *subcompositus* Valck. Sur. 642
squarrosus Clarke 631
stuppeus Merr. 635
sundaicus Miq. 641
tennifolius (non Nees) Clarke 640
teretifolius O.K. 700
tetragonocarpus O.K. 707
tristis O.K. 710
umbellatus (non Vahl) Mor. 641
 f. *contractus* Miq. 641
umbellatus Vahl 642
 var. *cyperinus* Camus 641, 642
 var. *panicus* Camus 643
 var. *panicus* Clarke 642
 var. *procerior* Zoll. 717
wichuriae O.K. 710
Martyniaceae, see *Pedaliaceae*
Medusa Lour. 180
anguifera Lour. 183
Medusanthera Seem. 1, 2, 3, 45
carolinensis (Kaneh.) Howard 47
coriifolia (Sleum.) Sleum. 47
glabra (Merr.) Howard 47
gracilis (King) Sleum. 43 map, 46
laxiflora (Miers) Howard 43 map, 45*, 46
merrittii (Merr.) Sleum. 43
ovata Howard 43 map
papua (Becc.) Howard 47
peckelii (Sleum.) Sleum. 47
samoensis (Reinecke) Howard 43 map (numbers interchanged)
vitiensis Seem. 43 map (numbers interchanged)
Meesia Gaertn. 105
serrata Gaertn. 105
Melaleuca 562, 724, 732, 741, 748
Melicytus 179, 180
Meliosma pinnata (Roxb.) Walp. 805
Menispermaceae 80, 87
Merremia aniseifolia Ooststr. 823
quinata (R.Br.) Ooststr. 823
steinisii Ooststr. 823
Merrilliodendron Kaneh. 1, 2, 3, 49
megacarpum (Hemsl.) Sleum. 50*, 51 map
rotense Kaneh. 50
Metrosideros eugenioides (Schltr) Steen. 805
Microblepharis (W. & A.) Roem. 417, 419
acuminata Roem. 426
cordifolia Roem. 430
heterophylla Roem. 426
macrophylla Roem. 428
obtusata Roem. 430
Microdracoides 435, 451
Millettia sp. 795
Miquelia Meisn. 1, 2, 3, 4, 76
cancellata Kurz 84
caudata King 77*, 78 map
celebica Bl. 77*, 78 map, 79
cingii Baill. 79
philippinensis Merr. 77, 78 map
reticulata Merr. 78 map
rostrata Merr. 79
Mischospora Boeck. 589
efoliata Boeck. 589
Mitostemma 405
Mitreola L. 828, 829
pedicellata Bth. 829
sphaerocarpa (Leenh.) Leenh. 829
Modecca (Rheede) Lamk 406, 417
 sect. *Microblepharis* Endl. 419
 subg. *Erythrocarpus* Miq. 424
 subg. *Microblepharis* W. & A. 419
 subg. *Modeccae verae* Miq. 424
acuminata Bl. 426
australia R.Br. ex DC. 427
kardiophylla (non Mast.) F.-Vill. 426
celebica Koord. 427
coccinea Blanco 426
cordifolia Bl. 430, 431
dubia Roxb. 428
formosana Hayata 426
heterophylla Bl. 426
kardiocarpa Hassk. 426
lobata (non Jacq.) Hassk. 426
macrophylla Bl. 428
nicobarica Kurz ex Trim. 423
oblonga Hassk. 426
obtusata Bl. 430, 431
palmata (non Lamk) Kurz 428
palmata (non Lamk) F.-Vill. 426
parviflora Blanco 426
populifolia Zipp. ex Bl. 427
populifolia (non Bl.) K.Sch. & Holtr. 426
quintuplinervia Miq. 428
singaporeana Mast. 429
sp. 428
triloba 426
trilobata (non Roxb.) Blanco 426
Molluginaceae, see *Aizoaceae*
Momordica sp. 426

- Monactineirna* Bory 407
 Monimiaceae 830
 Monotropastrum 827
Montia L. 121, 122, **125**
 fontana L. 121, 122*, 125*,
 126
 lamprosperma Cham. 126
 Moringaceae 4: 45–46; 5: **554**;
 6: **960**
Morisia wallichii Nees 717
Murucua, see *Murucuja*
Murucuja (Tourn.) Medik. 407
 adiantifolia Sweet 415
 aurantia Pers. 415
 baueri Lindl. 415
 herbertiana Sweet 416
 Myoporaceae 4: **265–266**
 Myrica 370
 Myricaceae 4: **276–279**
 Myriophyllum L. 239, 240, 246,
248
 sect. *Pentapteris* DC. em. O.
 K. 249
 sect. *Tessaronia* Schindl. 249
 subg. *Brachythea* Schindl.
 249
 subg. *Myriophyllum* 249
 subsect. *Pelonastes* Hook. f.
 249
 aquaticum (Vell.) Verdcourt
 828
 axilliflorum Baker 250, 259*
 bonii Tard.-Blot 250, 258*
 brasiliense Cambess. 240, 250,
 253, 256*, 828
 coronatum Meijden 239, 250,
 252 map, **257**, 258*
 dicocum F.v.M. 239, 249,
 250, 254* **257**
 exalbescens Fern. 253, 255
 humile Morong 257
 humile (non Morong) Schindl.
 257
 indicum Griff. 256
 indicum (non Willd.) Prain 255
 ssp. *tetrandrum* (Roxb.)
 Meijden 255
 indicum Willd. 249, 250, 256*,
 257, 259
 intermedium DC. 259
 intermedium (non DC.) Clarke
 252
 intermedium (non DC.) Tard.-
 Blot 257
 longibracteolatum Schindl. 251
 mezianum Schindl. 250, 258*
 var. *siamense* Craib 257
 oliganthum (W. & A.) F.v.M.
 250, 256*, 257
 pedunculatum Hook. f. 239,
 249, 250, **251***, 255 map
 propinquum Cunn. 250, 251*,
 252 map, 255
 proserpinacoides Gill. ex
 Hook. & Arn. 253
 pusillum Bl. 253, 259
 pygmaeum Matf. 239, 249,
 250, 251*, 252 map
 siamense (Craib) Tard.-Blot
 250, 255 map, **257**, 258*
 spathulatum Blatt. & Hallb.
 256
 spicatum (non L.) Gaertn. 255
 spicatum L. 249, 250, **253**,
 254* map
 var. *muricatum* Maxim. 253
 tetrandrum (non Roxb.) Grah.
 256
 tetrandrum Roxb. 249, 250,
 252 map, **255**, 256*, 257, 259
 tuberculatum Roxb. 250, 255
 map, **256***
 ussuriense (Regel) Maxim. 252
 variaefolium Hook. f. 252
 verticillatum L. 249, 250, 253,
 255, 256*
 β *ussuriense* Regel 252
 Myristicaceae 10
 Myrtales 239, 240

 Najadaceae 6: **157–171**; 7: 222
Nalagu Adans. 755
 Natsiatum 2
 oppositifolium Planch. 70
Neckia Korth. 97, 98, **110**, 212
 distans Ridl. 110
 grandifolia Ridl. 110
 humilis Hook. f. 110
 klossii Ridl. 110
 var. *borneensis* Airy Shaw
 110
 laucifolia Hook. f. 110
 f. *major* (Ridl.) Airy Shaw
 110
 malayana Ridl. 110
 f. *major* Ridl. 110
 f. *minor* Ridl. 110
 var. *angustifolia* Ridl. 110
 obovata Airy Shaw 110
 ovalifolia Capit. 110
 parviflora Ridl. 110
 philippinensis Merr. & Quis.
 110
 serrata Korth. **110**, 111*
Neoleretia foetida (Wight) Baeh-
 ni 55
 philippinensis (Merr.) Baehni
 49
Neolophocarpus Camus 673
 tonquinensis Camus 677, 690
 Nepenthes 135
Nephrocodium malaccense Walp.
 820
Nephrocoelium malaccense
 Turcz. 820
 Nostoc 221, 261
 Nothapodytes Bl. 1, 2, 3, 4, 53
 foetida (Wight) Sleum. **55** map
 montana Bl. 54*, **55** map
 obtusifolia 55 map
 philippinensis (Merr.) Sleum.
 49
 pittosporoides (Oliv.) Sleum.
 55 map
 Nothofagaceae 274
 Nothofagus Bl. 266, 267, 268,
 269, 270, 271, 272, 273, 274,
 275, 276, **277**, 278 map, 279,
 280, 281, 296, 309, 444
 sect. *Calucechimus* Krasser 278
 sect. *Calusparassus* (Homb.
 & Jacq.) Krasser 278, **280**
 subsect. *Bipartitae* Steen.
 273, 279, **280**
 ser. *Triflorae* Steen. 273,
 280, 281
 ser. *Uniflorae* Steen. 273,
 280, 281
 subsect. *Quadrupartitae*
 Steen. **278**
 subsect. *Tripartitae* Steen.
 278
 sect. *Deciduae* Steen. 278
 sect. *Nothofagus* **278**
 subsect. *Antarctica* Steen.
 278
 subsect. *Pumiliae* Steen. **278**
 sect. *Planae* Steen. 278, 280
 sect. *Plicatae* Steen. 278
 sect. *Sempervirentes* Steen.
 278, 280
 subg. *Lophozonia* Krasser 278
 subg. *Molischia* Krasser 278
 aequilateralis (Baum.-Bod.)
 Steen. 287
 alessandrii Espinosa 279
 balansae (Baill.) Steen. 285
 bernhardii Steen. 292, 294
 brassii Steen. 273, 279, 281,
 282, 283, **287**, 288*, 294
 carrii Steen. 270, 281, 282,
 283, 287, **291**
 cornuta Steen. 289, 290
 crenata Steen. 281, 282, 283,
 287*, 290
 decipiens Steen. 292, 294
 discoidea (Baum.-Bod.) Steen.
 285
 dura Steen. 292
 eymae Steen. 292, 294
 flaviramea Steen. 269, 280,
 281, 282, 283, 285, 290, **291**,
 292, 294
 fusca 273, 279
 grandis Steen. 270, 281, 282,
 283, 284*, 289, **291**, 293*,
 294
 menziesii 273, 279
 nuda Steen. 282, 283, **285**, 286*
 perryi Steen. 270, 281, 282,
 283, 285*, 289, 293*
 pseudoresinosa Steen. 281,

- 282, 283, 290, 293*
 var. *microphylla* Steen. 287
pullei Steen. 268, 270, 271,
 281, 282, 283, 289
recurva Steen. 287, 289
 var. *microphylla* Steen. 287,
 289
resinosa Steen. 281, 282, 283,
 290, 293*
resinosa (non Steen.) Steen.
 291
rubra Steen. 269, 270, 281,
 282, 283, 292*, 294
starkenborghii Steen. 269,
 270, 280, 281, 282, 283, 285,
 291
womersleyi Steen. 293*, 294
Notochnella Tiegh. 101, 104
 Nyctaginaceae 6: 450-468; 7:
 829
Nyssa sessiliflora (non Hook.)
 Koord. 24
 Nyssaceae 4: 29-31
 Ochna L. 97, 98, 99, 105
angustifolia (Vahl) O.K. 105
crocea Griff. 99
decaisnei Tiegh. 101
fascicularis Blanco 104
foxworthyi Elm. 102, 103
grandis Ridl. 99
hookeri (Planch.) O.K. 102
integerrima (Lour.) Merr. 98,
 99, 100*
mauritiana Lamk 101
sumatrana (Jack) O.K. 105
wallichii Planch. 99
 Ochnaceae 97-119
 subfam. Ochnoideae 97, 98
 tribe Elvasieae 97
 tribe Ochneae 97
 subtribe Ochninae 97
 subtribe Ouratinae 97
 subfam. Sauvagesioideae 97,
 98
 tribe Euthemideae 97
 tribe Lophireae 97
 tribe Sauvagesieae 97, 212
 subtribe Luxemburgiinae
 97
 subtribe Sauvagesiinae 97
Olus sanguinis Rumph. 96
Olyra malaccensis Wall. 751
orientalis Lour. 733
 Onagraceae 240
Oncostylis Nees 537
barbata Nees 539
Oreobolus R.Br. 435, 441, 446,
 447, 449, 452, 453, 455, 680,
 682 map
 ambiguous Kük. & Steen. 441,
 455, 684, 685 map, 686*,
 688, 687*
clemensiae Kük. 687, 688
distichus Kük. & Steen. 685
kükenthallii Steen. 681*, 683*,
 684*, 685* map
pumilio R.Br. 437, 441, 684,
 685 map, 687
 sp. 688
Oreobolus 680
Ottilis Gaertn. 755
zeylanica Gaertn. 779
 Ouratea (non Aubl.) Baill. 97,
 105
angustifolia (Vahl) Baill. ex
 Laness. 105
arcta Craib 107
beccariana Bartell. 105
borneensis Bartell. 105
crocea (Griff.) Burk. 99, 107
hookeri (Planch.) Burk. 102
megacarpa Ridl. 107
microphylla (Ridl.) Craib 107
mindanaensis Merr. 104
neerifolia 105
nerifolia Bartell. 105
sumatrana (Jack) Gilg 105
 var. *nervosa* Craib 107
Ouvirandra undulata Edgew. 213
 Oxalidaceae 151-178, 829
 Oxalis L. 151, 152, 153, 160
 sect. *Acetosellae* 151, 153, 154,
 155, 157 map
 sect. *Biophytum* Endl. 160
 sect. *Corniculatae* 155
 sect. *Heterophyllum* 155
 sect. *Jonoxalis* 155
 sect. *Polyoxalis* 155
 sect. *Thamnoxys* 155
acetosella (non L.) Blanco 156
acetosella L. 157, 158
 ssp. *acetosella* 157 map, 158
 ssp. *griffithii* (Edgew. &
 Hook. f.) Hara 152, 154*,
 155, 157 map
 ssp. *montana* Hultén 157
 map
albiflora F.v.M. 166
apodiscias Turcz. 161
articulata Savigny 159
barrelieri L. 153, 154*, 155
blumei Zucc. 166
boridiensis Knuth 156
cernua Thunb. 152
corniculata L. 151, 152, 153,
 154, 155
 ssp. *repens* (Thunb.)
 Masam. 156
 var. *atropurpurea* Planch.
 155, 156
 var. *javanica* (Bl.) Back. 156
 var. *papuana* Knuth 156
 var. *repens* Thunb. 156
 var. *repens* (Thunb.) Zucc.
 155
 var. *sericea* Knuth 156
 var. *trichocaulon* Lévl. 156
 var. *villosa* Hohen. 156
 var. *villosa* Hook. f. ex
 Ridl. 156
corymbosa DC. 152, 154*,
 155, 159
cumingiana Turcz. 162
dendroides H.B.K. 162
deppoi Lodd. 152, 154, 155,
 158, 829
fruticosa Raddi 155
griffithii Edgew. & Hook. f.
 157
intermedia (non A.Rich.?)
 Back. & Bakh. f. 158
intermedia A.Rich. 159
javanica Bl. 156
lactea Hook. 157
latifolia H.B.K. 152, 154, 155,
 158
magellanica Forst. f. 152,
 154*, 155, 156
martiana Zucc. 159
obtriangulata Forst. f. 157
 map
oregana Nutt. 157 map
papuana F.v.M. 166
petersianum (Klotzsch) C.
 Muell. 161
purpurata Jacq. 152
reinwardtii Zucc. 164
repens Thunb. 156
rusciformis Mikán 155
sensitiva L. 162
sepium St.Hil. 155
 var. *picta* Progel 155
sessilis Buch.-Ham. ex Wall.
 161
tetraphylla (non Cav.) Back.
 & Sloot. 158
tetraphylla Cav. 158, 829
 var. *tetraphylla* 829
violacea (non L.) Hall. f. 159
violacea L. 159
 Pandanaceae 479
 Pandanales 450
Pandanophyllum Hassk. 466,
 468, 489
angustifolium Kurz ex Clarke
 480
costatum Kurz 456
humile Hassk. ex Steud. 473,
 494
humile (Steud.) Oudem. 473,
 474
hypolytroides F.v.M. 464
longifolium Boeck. 470
macrocephalum Boeck. 470
miquelianum Kurz 480
palustre Hassk. ex Steud. 468,
 477
 var. *malesica* Kurz 477
 var. *silhetana* Kurz 477
palustre (non Hassk. ex Steud.)

- Kurz 479
squamatum Kurz 479
weindlandi Hort. 473, 474
zeylanicum (non Thw.) Kurz 477
zippelianum Kurz 473
 Pandanus 482
acaulis Martelli 456
caricosus (Rumph.) Spreng. 456
helicopus 505
odoratissimus 615*
pumilus Moon 456
 Pangieae 406
Papaveraceae 5: 114–117
Pappianthus iodoides Hand.-Mazz. 73
Parafagus Oliv. 278
Paramapania Uittien 435, 439, 445*, 447, 448, 451, 452, 455, 484
amboinensis Uittien 487
attenuata S.T.Blake 488
flaccida Uittien 438, 486, 488
gracillima (Kük. & Merr.) Uittien 438, 468, 484, 488, 489
johorensis Uittien 487
longirostris (Kük.) Uittien 438, 486, 488, 489
longirostris Uittien p.p. 488
longistyla Uittien 487
lucbanensis Uittien 487, 488
montana Uittien 487
parvibractea (Clarke) Uittien 485*, 486
radians (non Uittien) Kern 488
radians (Clarke) Uittien 438, 486, 487
rostrata Uittien 438, 486, 487, 488, 489
simplex (Ridl.) Uittien 438, 486, 489
Paropsia 406, 827, 829
vareciformis (Griff.) Mast. 191
Pasania (Miq.) Oerst. 274, 276, 318, 327
 sect. *Pseudocastanopsis* 318
 subg. *Chlamydobalanus* 318
 subg. *Cyclobalanus* 327
aculeata Markgr. 374
acuminatissima Oerst. 309
aspericupula Markgr. 382
bancana (Scheff.) Markgr. 361
beccariana (Benth.) Prantl 329
bennettii (Miq.) Gamble 356
blumeana 339
cantleyana (King ex Hook. f.) Gamble 352
clementiana (King ex Hook. f.) Gamble 365
clementis (Merr.) Schottky 379
compagnoana (Vidal) Markgr. 374
confragosa (King ex Hook. f.) Schottky 335
conocarpa (Oudem.) Schottky 349
costata (Bl.) Gamble 340
crassinervia (Bl.) Oerst. 371
craterophora Fischer 344
curtisii (King ex Hook. f.) Gamble 380
cyclophora (Endl.) Gamble 345
cyrtorhyncha (Miq.) Gamble 362
d'albertisii (F.v.M.) Markgr. 374
daphnoidea (Bl.) S. Moore 353
dasystachya (Miq.) Schottky 350
discocarpa (Hance) Gamble 306
eichleri (Wenzig) Gamble 341
enclisacarpa (Korth.) Gamble 338
 var. *aperta* Gamble 338
erythrocarpa Ridl. 369
ewyckii (Korth.) Gamble 351
 var. *latifolia* 351
falconeri (Kurz) Schottky 371
glomerata (Roxb.) Oerst. 367
glutinosa (Bl.) Oerst. 354
grandifrons (King ex Hook. f.) Gamble 375
hystrix (Korth.) Gamble 384
induta (Bl.) S.Moore 344
javensis (Miq.) Prantl 325
kingiana Gamble 381
korthalsii (Bl.) Oerst. 375
kunstleri (King ex Hook. f.) Gamble 372
lampadaria Gamble 368
lamponga (Miq.) Gamble 375
 var. *ewyckiioides* Gamble 351
lappacea (non Oerst.) Gamble 334
litoralis (Bl.) Oerst. 398
lucida (Roxb.) Gamble 341
macphailii Henders. 339
maingayi (Benth.) Schottky 331
molucca (Rumph. ex L.) Oerst. 385
neurophylla (Miq.) Oerst. 376
nymmaniana Markgr. 385
ochracea Schottky 379
oligoneura (Korth.) Oerst. 344
omalokos (Korth.) Schottky 341
pallida (Bl.) Oerst. 349
papuana (O.Warb.) Markgr. 374
placentaria (Bl.) Oerst. 367
plumbia (Bl.) Oerst. 385
pruinosa (Bl.) Oerst. 375
pseudomolucca (Bl.) Oerst. 376
rajah (Hance) S.Moore 361
rasa (Miq.) Gamble 364
 var. *lanuginosa* Ridl. 364
 var. *suffruticosa* Ridl. 366
reinwardtii (Korth.) Prantl 359
robinsonii (Ridl.) Gamble 336
rotundata (Bl.) Oerst. 331
rufivillosa Markgr. 383
scortechinii (King ex Hook. f.) Schottky 380
sogerensis S.Moore 374
spicata (Wall.) Oerst. 367
 var. *gracilipes* (Miq.) Schottky 367
 var. *microcalyx* (Korth.) Gamble 367
 var. *placentaria* (Bl.) Schottky 367
sundaica (Bl.) Oerst. 375
teysmannii (Bl.) Prantl 343
urceolaris (Jack) Oerst. 344
wallichiana (Lindl. ex Hance) Gamble 369
wenzigiana (King ex Hook. f.) Gamble 364
winkleriana Schottky 350
wrayii (King) Gamble 334
 Passiflora L. 405, 406, 407, 434
 sect. *Anomopanthus* Harms 409, 412
 sect. *Decaloba* DC. 407, 409, 411
 group I 407
 group II 409
 group III 409
 subsect. *Anomopanthus* (Harms) Cusset 412
 subsect. *Eudecaloba* Mast. 409, 411
 subsect. *Octodranthus* (Harms) Cusset 412
 subsect. *Polyanthea* (DC.) Endl. 409, 411
 sect. *Hollrundiella* Harms 412
 sect. *Octandranthus* Harms 409, 412
 sect. *Polyanthea* A.P.DC. 409
 subg. *Plectostemma* 411
adiantifolia Ker-Gawl. 415
adiantum Willd. 415
alata Dryand. 407, 410
alato-caerulea Lindl. 411
antioquiensis Karst. 410
assamica Chakravarty 414
aurantia Forst. f. 409, 410, 415
 var. *aurantia* 408*, 415, 416
 map
 var. *banksii* F.M.Bail. 415
 var. *pubescens* F.M.Bail. 416 map

- var. *samoënsis* (Exell) de Wilde 416 map
baileyana Domin 416
banksii Benth. 415
 var. *brachystephanea* Domin 415
barclayi Mast. 415
baueriana Mast. 415
biflora Lamk 411
biglandulosa Caley 416
burmanica Chakravarty 414
caerulea L. 411
caeruleo-racemosa Sabine 411
calcarata Mast. 407
capsularis L. 411
celata Cusset 414
cinnabarina Lindl. 409, 410, 416 map
coccinea Aubl. 415
coccinea Blanco 426
cochinchinensis Spreng. 409, 412, 413
distephana F.v.M. ex Harms 416
edulis Sims 407, 409, 410
foetida L. 405, 409, 410
glabra Wendl. 415
gracilis Jacq. 411
hainanensis Hance 413
herbertiana Ker-Gawl. 409, 416 map
 var. *caleyana* Mast. 416
hollrungii K.Sch. 408*, 409, 410, 413 map, 417
holosericea L. 411
horsfieldii Bl. 412, 413
 var. *elbertiana* Hall. f. 413
horsfieldii (non Bl.) King 414
 var. *distans* Craib 414
Impératrice Eugénie 411
incarnata L. 406, 411
jugorum W.W.Smith 414
kermesina Link & Otto 411
laurifolia L. 407, 410
leschenaultii 409
ligularis Juss. 410
ligulifolia Mast. 413
maliformis L. 410
mascarensis Presl 407
mauritania Thouars 407
minima Blanco 410
minima L. 410
mixta 405, 409, 410
mollissima (H.B.K.) Bail. 409, 410
moluccana Reinw. ex Bl. 407, 409, 412
 var. *moluccana* 412, 413 map
 var. *teysmanniana* (Miq.) de Wilde 412, 413 map
 var. *timorensis* Bl. 413
moluccana (non Bl.) Merr. & Perry 433
muelleriana Mast. 416
nitida H.B.K. 410
octandra Gagn. 409, 414
pallida (non L.) Lour. 413
parviflora Blanco 426
penangiana Wall. ex G.Don 423
perakensis Hall. f. 408*, 409, 413 map, 414
philippinensis Elm. 413
quadrangularis L. 407, 410
racemosa Brot. 406, 411
samoënsis Exell 416
samoënsis (non Exell) Yuncker 415
serrulata Blanco 410
serrulata Jacq. 410
siamica Craib 414
singaporeana Wall. ex G.Don 429
storkii Drake del Castillo 415
suberosa L. 409, 411
subpeltata Ortega 407, 411
sumatrana Bl. 409, 413 map, 414
timoriana Span. 413
trifasciata Lem. 411
verrucosula 416
verruculosa Weinm. 416
vitensis Mast. 415
vitifolia H.B.K. 411
wilsoni Hemsley 414
zucca Blanco 426
Passifloraceae 405–434, 829
 tribe *Pariopsieae* 405, 406
Pedaliaceae 4: 216–221; 5: 557; 7: 829
Peckeliodendron Sleum. 49
missionariorum Sleum. 50
Pennantia 1, 3
Pentaloba Lour. 180, 182
corylifolia Turcz. 183
fasciculata Turcz. 184
lanceolata (Wall.) Arn. 187
semigrata Turcz. 184, 185
Pentaphragmataceae 4: 517–528
Pentaphylacaceae 5: 121–124, 566
Pentaphyllum indicum Clusius 814
Pentastira Ridl. 87
Peripterygiaceae 93
Peripterygium Hassk. 93
moluccanum (Bl.) Sleum. 96
platycarpum (Gagnep.) Sleum. 95
Perissandra Gagnep. 212
Petasites 263
Phacellanthus Steud. ex Zoll. 705
multiflorus Steud. 708
Phaeocordylis Griff. 785
areolata Griff. 787
Phaleria Jack 830
longituba Stevens 830
nisidai Kaneh. 830
okapensis Stevens 830
piliistyla Stevens 830
Phylidraceae 4: 5–7; 7: 829
Philydrum lanuginosum Banks & Sol. ex Gaertn. 829
Phlebocalymna Griff. ex Miers 14
alleryana Baill. 20
griffithiana (Miers) Mast. 20
lobbiana (Miers) Mast. 20
Phyllanthus acida (L.) Skeels 178
Phyllocladus 268, 289, 292
hypophyllum 269
Physkium natans Lour. 828
Phytocrene Wall. 1, 2, 3, 4, 79, 80, 81 map
 anomala Merr. 80, 81
blancoi (Azaola) Merr. 86
borneensis Becc. 81, 84, 85
bracteata Wall. 81, 85
calcarata Griff. 86
caudigera Sleum. 87
crinipes Baill. ex Bureau 85
dasycarpa (non Miq.) Dahl 86
dasycarpa Miq. 86, 87
forbesii Baker f. 86
gigantea Wall. 86
hirsuta Bl. 81, 85
hirsuta (non Bl. 1849) Teysm. & Binn. 87
interrupta Sleum. 80, 83
loheri Merr. 87
luzoniensis (Llanos) Baill. 86
macrocarpa Griff. 85
macrocarpa (sphalm.) 86
macrophylla (Bl.) Bl. 81, 86, 828
 var. *caudigera* (Sleum.) Sleum. 87
 var. *dasycarpa* (Miq.) Sleum. 87, 828
 var. *macrocarpa* 828
 var. *macrophylla* 86, 87, 828
malacothrix Sleum. 80, 83, 828
minahassae Koord. 85
oblonga Wall. 81, 84
obovoidea Merr. 86
ovalifolia Koord. 87
palmata Wall. 81, 84, 85
porphyrea Stapf 84
racemosa Sleum. 80, 81, 82*
stylocarpa Griff. 85
tinoporifolia Koord. 87
trichura Ridl. 81, 83
Phytolaccaceae 4: 228–232; 5: 557
Pinus 793
Pisonia aculeata L. 829
macrophylla (Bojer) Choisy 829
Pistia 222, 439, 634
Pithecellobium sp. 795
Pittosporaceae 5: 345–362; 6:

- 960-963; 7: 135, 829-830
 Pittosporopsis 2
 Pittosporum moluccanum
 (Lamk) Miq. 192
 Planchonella *gamblei* (Clarke)
 H.J.Lam 11
 Platea Bl. 1, 2, 3, 9, 14
apoensis Elm. 14
bullata Sleum. 10 map
corniculata Becc. 51
excelsa (non Bl. s.s.) Ander-
 son 13
excelsa Bl. 10, 11, 12
 var. *bornæensis* (Heine)
 Sleum. 12, 13*
 var. *excelsa* 12, 13
 var. *kinabaluensis* (Sleum.)
 Sleum. 12, 14
 var. *microphylla* (Sleum.)
 Sleum. 12, 13
 var. *riedeliana* (Becc.)
 Sleum. 12, 13
excelsa (non Bl. s.s.) Koord.
 14
excelsa (non Bl.) Ling 11
fuliginea Elm. 11
griffithiana Miers 20
hainanensis Howard 11
kinabaluensis Sleum. 14
latifolia Bl. 10, 11, 12, 14
 var. *borneensis* Heine 13
 var. *sumatrana* (Bl.) Miq. 11
latifolia (non Bl.) Dahl 14
latifolia (non Bl. s.s.) Merr. 13
laxiflora Miers 46
ledermanni Sleum. 11
lobbiana Miers 20
microphylla Sleum. 13
montana Howard 13
myristicea (R.Br. ex Hook. f.)
 Hall. f. 11
oblonga Korth. 14
papua Becc. 25
parviflora (non K. & V.) Dahl
 11
parviflora K. & V. 13, 14
philippinensis Merr. 14
riedeliana Becc. 13
sclerophylla Sleum. 10, 11
sumatrana Bl. 11
Platea (non Bl.) Miers 21
Platystigma R.Br. 9
myristiceum R.Br. 11
Pleopetalum Tiegh. 99
Pleuropetalon Bl. 4
suaveolens Bl. 6
Ploiarium 663*
Plumbaginaceae 4: 107-112
Pocillaria Ridl. 35
pubescens Ridl. 39
Podocarpus 268, 269, 289
imbricatus 270, 403
Podostemaceae 4: 65-68; 6:
 963-964
Pogonostylis Bertol. 583
squarrosa Bertol. 585
Polemoniaceae 4: 195-196
Polycanthum Tiegh. 99
Polygala frutescens Burm. 198
Polyporandra Becc. 1, 2, 4, 65
junghuhnii Koord. 68
scandens Becc. 66*, 67 map
Polythecium Tiegh. 99
Pontederiaceae 4: 255-261; 5:
 557; 6: 964
Portulaca L. 121, 122, 126
 subg. *Enantiophylla* Legrand
 127
 subg. *Euportulaca* Spegazzini
 127
 subg. *Portulaca* Geesink 127
 sect. *Carinatae* Poelln. 128
 sect. *Catoclasis* Legrand 129
 subsect. *Squamosae* Le-
 grand 129
 sect. *Neossia* Legrand 127
 subsect. *Tuberculatae*
 Poelln. 127
 sect. *Portulaca* 127, 128
 subsect. *Portulaca* 127,
 128
 subsect. *Stellulato-tuber-*
culatae Poelln. 127, 129
 sect. *Portulaphiton* Legrand
 129
 sect. *Pseudohipsoclasis* Le-
 grand 129
 sect. *Rotundatae* Poelln. 129
 subg. *Portulacella* 121, 126,
 127
australis Endl. 131
axilliflora (non Pers.) Blanco
 133
cincta Fenzl 131
diptera Zipp. ex Span. 129
filifolia F.v.M. 131
grandiflora Hook. 131
helianthemoides Zipp. ex Span.
 131
javanensis Poelln. 131
 var. *grisea* Poelln. 131
lutea Forster 121, 127, 129
macrorhiza (Zipp. ex Span.)
 Geesink 121, 127, 130*
meridiana L. f. 127
oleracea L. 121, 126, 127, 129
 ssp. *oleracea* 129
 ssp. *sativa* 129
 ssp. *sylvatica* 129
pachyrhiza (non Gagnep.)
 Merr. 131
paniculatum Jacq. 124
patens L. 125
pilosa L. 121, 126, 127, 131
 ssp. *grandiflora* (Hook.)
 Geesink 131
 ssp. *pilosa* 121, 131
 race *australis* 131
 race *filifolia* 131
 race *pilosa* 131
 race *tuberosa* 121, 131
 ssp. *sundaensis* (Poelln.)
 Geesink 121, 131, 132*
quadrifida L. 121, 126, 127,
 128*
 var. *meridiana* DC. 127
racemosa L. 124
samoensis Poelln. 131
sclerocarpa (non Gray)
 Koord. 131
sundaensis Poelln. 132
teritifolia L. 133
toston Blanco 133
triangularis Jacq. 124
tuberosa Roxb. 131
Portulacaceae 121-133, 122*
Primulaceae 6: 173-192, 964
Prosthesis Bl. 180, 182
javanica Bl. 188
Proteaceae 5: 147-206, 566; 6:
 965; 7: 830
Protium Burm. f. 820
macgregorii (F.M.Baill.)
 Leenh. 820
serratum (Colebr.) Engl. 820
yunnanense (Hu) Kalkm. 820
Protolemma Saporta 222
Prunum stellatum Rumph. 175
Prunus javanica (T. & B.) Miq.
 14
Pseudobotrys Moeser 1, 2, 7
cauliflora (Pulle) Sleum. 7, 8*,
 9 map
dorae Moeser 7, 9 map
Pseudogunnera Ørsted 259
macrophylla (Bl.) Ørsted 262
Pseudowolfia 219, 221, 223
Psilotrichopsis Townsend 820
Psilotrichum 820
Pterolepis Schrad. 508
Ptychocarya R.Br. ex Wall. 456
macrocarpa Steud. 456
Ptychocarym 456
ghaeri H.Pfeiff. 456
Punicaceae 4: 226-227
Pycnarrhena longifolia (Decne.)
 Becc. 108
Pycnonotus bimaculatus 443,
 706
Pycreus Beauv. 593, 646
 sect. *Globosi* Clarke 648
 sect. *Globosus* 648
 sect. *Polystachyi* Clarke 648
 sect. *Vestiti* Clarke 646
angulatus Nees 648
baccha (non Nees) Camus 611
capillaris Nees 648
eragrostis Palla 647
globosus Reichenb. 648
 var. *nilagiricus* Clarke 648
holosericeus Merr. 649, 650
hyalinus Domin 655

- hyalinus* (non Domin) Merr. 650
latespicatus Clarke 653
 var. *fagineicola* Camus 647, 653
nitens Nees 650
odoratus Urb. 649
 var. *holosericeus* Merr. 650
polystachyos Beauv. 649
 var. *laxiflorus* Clarke 649
 var. *paniculatus* Merr. 650
pulvinatus Nees 650
pumilus Nees ex Clarke 650, 655
 var. *punctatus* Domin 651
 var. *substerilis* Camus 656
puncticulatus (non Nees) Ridl. 611
sanguinolentus Nees 646
setiformis B.Schisk. 653
stramineus Clarke 653
substellatus Camus 650
sulcinus Clarke 650
unioloides Urb. 648
Pyrenacantha Wight 1, 2, 4, 76
repanda (Merr.) Merr. 76
sp. 76
volubilis Wight 76

Queenlandiella Domin 593, 654
hyalina Ballard 655
mira Domin 654, 655
Quercus L. 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 331, 340, 385, 386 map, 389 map
 sect. *Androgyne* 385
 sect. *Chlamydoalanus* 385
 sect. *Cyclobalanus* 385
 sect. *Lithocarpus* 385
 sect. *Pasania* 385
 sect. *Synaedrys* 385
 subg. *Cyclobalanopsis* 386
abendanonii Valet. 373
acuminatissima (Bl.) A.DC. 309
acuminatissima Merr. 355
anceps Korth. 367
angustata Bl. 307, 376
annulata Korth. 343
antiquata 266
arbutifolia Hickel & A.Camus 394
arcaula Buch.-Ham. ex Spreng. 366
 var. *microcalyx* (Korth.) Bl. 367
 var. *racemosa* (Jack) Bl. 367
argentata Korth. 387, 388, 389, 390*
 var. *concolor* Bl. 389
bancana Scheff. 360, 361
bancana (non Scheff. 1870) Scheff. 344

beccariana Benth. 329
bennettii (non Miq.) Merr. 359
bennettii Miq. 356
blancoi A.DC. 361
blumeana K. & V. 336
blumeana Korth. 339, 385
boholensis Merr. 335
borneensis Merr. 379
brachyclada von Seemen 374
brevipetiolata Scheff. 384
brevistyla A.Camus 392
buddii Merr. 383
bulusanensis Elm. 351
cagayanensis Merr. 377
cantleyana King ex Hook. f. 352
caraballoana F.-Vill. 353
castaneifolia A.Camus 274
castellarnauiana Vidal 377
caudatifolia Merr. 350
celebica Miq. 374
celebica (non Miq.) von Seemen 355
chrysostricha A.Camus 388, 394
clathrata von Seemen 331
clementiana King ex Hook. f. 365
clementiana (non King ex Hook. f.) Merr. 355
clementis Merr. 379
companoana Vidal 374
concentrica (non Lour.) Blanco 355
confragosa King ex Hook. f. 335
conocarpa (non Oudem.) Merr. 379
conocarpa Oudem. 349
cooperta Blanco 335
copelandii Elm. 354
costata Bl. 325, 327
 var. β Bl. 325
 var. *convexa* Bl. 325, 327
 var. *subrecurvata* Bl. 325
costata (non Bl.) Hook. f. 340
 var. *convexa* (non Bl.) King 340
 var. *convexa* (non Bl.) Naves 355
crassilamellata (Gamble) A.Camus 396
crassinervia Bl. 371
cuneata Roxb. ex A.DC. 341
curranii Merr. 331
curtisii King ex Hook. f. 380
cyclophora Endl. 345
cyrtopoda Miq. 384
cyrtorhyncha Miq. 362
dalbertisii F.v.m. 374
daphnoidea Bl. 352
dassinervia 371
dasystachya Miq. 350
debaryana O.Warb. 384

depressa Bl. 366
depressa Roxb. 345
diepenhorstii Miq. 362
disocarpa Hance 306
dolichocarpa von Seemen 353
echinifera Merr. 333
eichleri Wenzig 341, 344
elegans Bl. 366
elmeri Merr. 388, 389, 398
enclisacarpa Korth. 338, 385
 var. *aperta* King ex Hook. f. 338
 var. *divergens* Bl. 338
ewyckii Korth. 351
 var. *latifolia* King ex Hook. f. 351
fagiformis Jungh. 309
falconeri Kurz 371
fernandesii Vidal 335
fraxinifolia 266
gaharuensis Soepadmo 387, 389, 391
gemelliflora Bl. 266, 388, 395
glaberrima Bl. 366
glabra Blanco 361
glomerata Roxb. 367
glutinosa Bl. 354, 355
gracilipes Miq. 367
gracilis Korth. 362
grandifrons King ex Hook. f. 375, 376
gulliveri F.v.M. 374
guppilii F.v.M. 266
hallierii von Seemen 327
havilandii Stapf 373, 382
heliciformis von Seemen 343
hendersoniana A.Camus 396
horsfieldii Miq. 395
 var. *longifolia* Miq. 396
hypoleuca Miq. 343
hypophoenicea von Seemen 305
hystrix Korth. 384
 var. *longispica* Gamble 369
 var. *mappacea* (Korth.) Merr. 376
imperialis von Seemen 346
induta Bl. 344
 var. β 344
 var. *microcarpa* A.DC. 344
iunghunii 307
javanica Drake 306
javensis (Bl.)Miq. 325
jordanae Laguna 382
junghunii Miq. 307
kerangasensis Soepadmo 267, 388, 389, 395
kinabaluensis Soepadmo 388, 389, 395
koordersii von Seemen 354
korthalsii Bl. 343, 375
 var. *hystrix* (Korth.) Bl. 384
 var. *kajan* Bl. 375
 var. *mappacea* (Korth.) Bl. 375

- var. *pachyphylla* Bl. 375
korthalsii Endl. 343, 375
kunstleri King ex Hook. f. 372
kunstleri (non King ex Hook. f.) von Seemen 370
lampadaria (Gamble) Burk. 368
lamponga (non Miq.) Hook. f. 379
lamponga Miq. 375, 376
lappacea (non Roxb.) Hook. f. 334
laurifolia Miq. 343
lauterbachii von Seemen 348
leptogyne Korth. 379
leucocarpa Hook. f. & Thoms. ex Wenzig 367
lineata Bl. 266, 388, 389, **396**, 397*
 var. *heterochroa* Miq. 396
 var. *merkusii* (Endl.) Wenzig 396
 var. *oxyrhyncha* (Miq.) von Seemen 396
 var. *typical lineata* King 396
lineata (non Bl.) Miq. 307
lineata (non Bl.) S. Moore 393
lipacon Elm. 374
litoralis Bl. 398
llanosii A. DC. 374
lowii King 267, 388, 389, **393**
lucida Roxb. 341
luzoniensis Merr. 381
mabesae Merr. 374
maingayi Benth. 331
maingayii 331
mappacea Korth. 375, 376
 var. *hystrix* (Korth.) Miq. 384
merkusii Endl. 395
merrillii von Seemen 388, **394**
merrittii Merr. 377
mespilifolia
 var. *borneensis* Heine 395
microcalyx Korth. 367
minahassae Koord. ex Elmer 350
mindanaensis Elmer 355
minor Ridl. 371
miqueliana Scheff. 356
molucca (non Rumph. ex L.) Blanco 355
molucca (Rumph.) L. 385
monticola (non King etc.) Elm. 377
monticola King 369
muricata Roxb. 375
neurophylla Miq. 376
nieuwenhuisii von Seemen 379
nitida Bl. 352
 var. *grisea* 352
nivea King 387, 388, **391**
obliquinervia Merr. 377
ochracea (Schottky) Merr. 379
oidocarpa Korth. 387, 389, 391, **392***
oidocarpa (non Korth.) Merr. 393
oligoneura Korth. 344
omalkos 341
omalokos Korth. 341
oogyne Miq. 385
ovalis Blanco 361
oxyrhyncha Miq. 396
pallida Bl. 348
penangensis Miq. 345
percoriacea Soepadmo 267, 388, 389, **394**
petraea 273
philippinensis A. DC. 353
philippinensis (non A. DC.) Merr. 355
pinanga Bl. 389
pinatubensis Elm. 377
piriformis 331
placentaria Bl. 366
platycarpa Bl. 340
plumbea Bl. 385
poculiformis von Seemen 352
polyneura Miq. 396
pruinosa Bl. 375, 376, 788
 var. β 375
 var. *alpina* Jungh. 375
pruinosa (non Bl.) Elm. 335
pseudoannulata Bl. 343
pseudomolucca Bl. 376
 var. *angustata* (Bl.) Bl. 376
 var. *crassinervia* (Bl.) Miq. 371
 var. *incrassata* Bl. 343
 var. *korthalsii* (Bl.) Wenzig 375
 var. *pallida* Bl. 349
 var. *papuana* O. Warb. 374
 var. *pruinosa* (Bl.) Wenzig 375
 var. *rostrata* Bl. 349
 var. *sundaica* (Bl.) Wenzig 375
pseudovorticillata Soepadmo 387, 388, **389**
pulchra King 333
pyrifolia Bl. 367
pyriformis von Seemen 331
racemosa Jack 366
rajah Hance 361
rassa Miq. 364
 var. *lanuginosa* Ridl. 364
 var. *montana* King ex Hook. f. 364
reflexa King 335
reinwardtii Korth. 359
reinwardtii (non Korth.) F.-Vill. 355
rhannifolia Miq. 299
rhoensis Hance 367
rizalensis Merr. 353
robinsonii Merr. 383
robinsonii Ridl. 336
robur 272
rotundata Bl. 331
rubra 273
rufa von Seemen 370
scortechinii King ex Hook. f. 380
scyphigera
 var. *riedelii* King 361
semiserrata (non Roxb.) Hook. f. 396
sericea Scheff. 393
soleriana Vidal 355
sphacelata Bl. 367
spicata Sm. 366
 var. *depressa* (Bl.) King 367
 var. *genuina* Koord. 367
 var. *glaberrima* (Bl.) Miq. 367
 var. *gracilipes* (Miq.) Miq. 367
 var. *latifolia* Scheff. 367
 var. *microcalyx* (Korth.) Miq. 367
 var. *placentaria* (Bl.) Miq. 367
 var. *racemosa* (Jack) Miq. 367
steenii Soepadmo 388, **396**
submonticola Elm. 377
subsericea A. Camus 267, 388, 389, **393**
sumatrana Soepadmo 387, 389, **393**
sundaica Bl. 375
sundaica (non Bl.) Merr. 382
tasystachya (non Miq.) Elm. 355
teysmannii 343
teysmannii (non Bl.) Heine 365
thelecarpa Miq. 376
 var. *angustata* (Bl.) Miq. 376
treubiana von Seemen 388, 389, **398**
turbinata Bl. 395
 var. *crassilamellata* Gamble 396
turbinata Roxb. 395
tysmannii Bl. 343
umbonata Hance 345
urceolaris Jack 344
valdinervosa Soepadmo 388, 395
varingaefolia Miq. 307
vidalii F.-Vill. 358
wallichiana Lindl. ex Hance 368
wenzelii Merr. 353
wenzigiana King ex Hook. f. 364
wenzigiana (non King ex Hook. f.) Merr. 359

- wilhelminae* von Seemen 389
winkleriana (Schottky) Merr. 350
woodii Hance 358
wrayii King 334
zschokkei Elm. 354
- Rafflesia** 783
Rafflesiaceae 783
Rathea Karsten 407
Remirea Aubl. 443, 446, 644
distichophylla Boeck. 644
maritima Aubl. 450, 644
 var. *pedunculata* Benth. 644
pedunculata R.Br. 644, 645
rigidissima Steud. 644
wightiana Nees 644
Restio articularis Retz. 462
pilisepalus Steud. 666
Restionaceae 5: 416-420, 569; 7: 448, 449
Rhamnaceae 91
Rhamnales 755
Rhizophoraceae 5: 429-493; 6: 965-967
Rhododendron L. 827
 retusum (Bl.) Benn. 798
Rhopalocnemis Jungh. 783, 784, 785, 791
 phalloides Jungh. 786*, 787*, 788*, 789* map
 ruficeps Ridl. 790
Rhynchospora Vahl 443, 447, 448, 452, 453, 455, 710
 subg. *Diplostyleae* Kük. 719
 subg. *Distylis* Pax 719
 subg. *Haplostylis* (Nees) Pax 713
 div. *Polycephalae* Clarke 715
 sect. *Calyptrostylis* Benth. 713
 sect. *Capitatae* Kunth 715
 sect. *Echinoschoenus* (Nees) Benth. 712, 715
 sect. *Haplostylis* 712, 715
 sect. *Longirotres* Kunth 712, 713
 sect. *Pauciflorae* Kük. 715
 sect. *Polycephala* Clarke 715
 sect. *Sphaeroschoenus* Clarke 715
 ser. *Haplostyleae* Benth 713
 subg. *Rhynchospora* 712, 719
 sect. *Campylorhachis* Benth. 712, 721
 sect. *Glaucacae* Clarke 712, 720
 sect. *Stenophyllae* Kük. 720
 sect. *Tenues* Kük. 721
 ser. *Dichostyleae* Benth. 719
 ser. *Diplostyleae* Clarke 719
alpina Spreng. 666
anomala Steud. 567
- articulata* R. & S. 714
aurea Vahl 713
brownii R. & S. 720
 var. *condensata* Ohwi 720
ceylonica 714
chinensis Nees & Mey. ex Nees 720
corymbosa (L.) Britt. 436, 439, 712, 713, 714
discolor Hochst. ex Steud. 718
exserta C.B. Clarke 718
glauca Vahl 720, 721
 ssp. *chinensis* (Boeck.) C.B. Clarke 721
 var. *chinensis* Clarke 720
 var. *condensatus* Kük. 720
gracillima Thw. 436, 454, 712, 713, 721
 ssp. *subquadrata* (Cherm.) Raynal 722
griffithii Boeck. 720
haenkei Presl 717
heterochaeta S.T. Blake 442, 711*, 712, 718
 var. *irregularis* Kük. 718
hookeri Boeck. 422, 712, 713, 714
japonica Makino 721
kamphoeveneri Boeck. 721
lavarum Gaud. 721
laxa R.Br. 720
longisetis R.Br. 442, 712, 717
 ssp. *exserta* Kük. 718
longisetis (non R.Br.) Uittien 718
malasica Clarke 437, 713, 715
marginata Clarke 718
massiana Camus 717
nipponica Makino 715
parva (Nees) Steud. 717
pterochaeta F.v.M. 718
rubra (Lour.) Makino 442, 700, 712, 715, 716*, 717*, 719
 var. *hirticeps* Kük. 717
rugosa (Vahl) Gale 441, 549, 712, 713, 720*
ruppioides Benth. 505
sikkimensis C.B. Clarke 721
submarginata Kük. 712, 713, 718, 719*
 var. *glabrinux* Kük. 719
subquadrata Cherm. 722
subtenuifolia Kük. 442, 712, 713, 719
tenuifolia Benth. 719
testui Cherm. 722
triflora Vahl 436, 439, 712, 713, 714
 var. *papuana* Kük. 714
wallichiana Kunth 717
wallichii K.Sch. 717
wightiana (non Steud.) Camus 718
- wightiana* (non Steud.) Clarke 718
wightiana (Nees) Steud. 442, 712, 713, 718, 719
zeylanica Kunth 714
Rhyticaryum Becc. 1, 2, 3, 35, 37 map
bullatum Schellenb. 39
elegans Schellenb. 36, 38
elongatum Schellenb. 39
fasciculatum Becc. 36, 39
gracile Schellenb. 36, 38
longifolium K.Sch. & Laut. 36, 39, 40*
lucidum Schellenb. 36, 37
macrocarpum Becc. 36, 37
novoguineense (Warb.) Sleum. 36
oblongum Schellenb. 39
oleraceum Becc. 36, 38
oncocarpum (non K.Sch. & Laut.) Birnie 38
oncocarpum K.Sch. & Laut. 39
ovale Schellenb. 39
oxycarpum K.Sch. & Laut. 36, 38
oxycarpum (non K.Sch. & Laut.) Valet. 39
parviflorum Pulle 38
pubescens (Ridl.) Sleum. 39
pulchrum Schellenb. 38
purpurascens Schellenb. 36, 37
racemosum Becc. 36, 39
racemosum (non Becc.) Schellenb. 39
rotundatum Schellenb. 36, 37 sp. 36
wrophyllum Schellenb. 38
Rhytidocaryum Sleum. 35
Riccia 234
 fluitans 220
Riccioarpus nutans 220
Rinorea Aubl. 179, 180, 182, 188 map
acuminata Merr. 185
amboinensis Merr. 185
anguifera (Lour.) O.K. 183
 var. *nervosa* (Capit.) Merr. 183
astrolabes (K.Sch. & Laut.) Melch. 185, 186
 var. *hirta* Melch. 185
bengalensis (Wall.) O.K. 183, 184, 187
borneensis Merr. 189
brownii (Korth.) O.K. 185
castilloi Merr. 185
celebica Melch. 185
comosa (King) Merr. 183
condensa (King) Merr. 186
copelandii Merr. 185
cymulosa (Miq.) O.K. 187
dasycaula (Miq.) Craib 190

- echinocarpa* Burk. 183
elneri Merr. 185
fasciculata
var. *minor* Elm. 184
fasciculata (Turcz.) Merr. 184
floribunda (King) Merr. 187
formicaria (Elm.) Merr. 188
gaultheriiflora J.J.S. 189
glabra (Burgersd.) O.K. 192
glandulosa (Elm.) Merr. 184
hamelii Merr. 185
haplobotrys (Hassk.) O.K. 188
heteroclitia 182, 183
hirtella (Ridl.) Merr. 185
hirtella Ridl. 185
hookeriana (King) Burk. 188
horneri (Korth.) O.K. 181*,
183, 185, 186*
horsfieldii (Miq.) O.K. 190
iliaspaiei Jacobs 183, 191
javanica (Bl.) O.K. 183, 188
lanceolata (Wall.) O.K. 183,
185, 187
lankawiensis (Ridl.) Craib 184
ledermannii Melch. 185
longiracemosa (Kurz) Craib
183, 189, 191
macrantha Jacobs 183, 188,
191
macrophylla (Decne) O.K.
183, 190
macroxyxis (Capit.) Merr. 189
maingayi (Hook. f. & Th.) O.K.
187
mollis (Hook. f. & Th.) O.K.
187
obtusata (Korth.) O.K. 184
pachycarpa (King) Craib 186
palawanensis Merr. 190
var. *mollis* Merr. 190
paradoxa (Bl. ex Oudem.)
J.J.S. 184
pruinosa (Pulle) Melch. 184
pulgarensis Elm. 192
salomonensis (Rech.) Melch.
184
sclerocarpa (Burgersd.) Jacobs
183, 186
scortechinii (King) Craib 186
strobobas 186
sumatrana Merr. 186
virgata (Thw.) O.K. 182, 183,
190
wallichiana (Hook. f. & Th.)
O.K. 184
wrayi Taub. 188
yatesii Merr. 190
Roridula 135
Roucheria Miq. 168
macrophylla Miq. 174
Rourea Aubl. 152, 169
diversifolia Miq. 170
harmandiana Pierre 178
minor (Gaertn.) Alston 174,
178, 823
pinnata (Merr.) Veldk. 174
Roureopsis acutipetala (Miq.)
Leenh. 823
ssp. *borneensis* (Schellenb.)
Leenh. 823
Rynchospora 710
Ryticaryum 35

Salicaceae 5: 107–110
Salicornia australasica Moq. ex
Schinz 823
Salvadoraceae 4: 224–225
Salvinia 220, 634
laevigata H.B. ex Willd. 828
Samyda macrophylla Willd. 829
Sanicula elata D. Don 830
europaea L.
ssp. *elata* (D. Don) Hultén
830
Santalodes diversifolium O.K.
170
Santiria laevigata Bl. 822
mollis Engl. 822
tomentosa Bl. 822
Sapotaceae 10
Sarcospermataceae 4: 32–34; 6:
967
Sarcospermum petasites Reinw.
262
Sarcostigma W. & A. 1, 2, 3, 4,
73
angustifolia Pierre 75
horsfieldii R. Br. 74
kleinii W. & A. 73, 74 map
paniculata Pierre 73, 74 map,
75*
var. *angustifolia* (Pierre)
Gagnep. 75
philippinensis Merr. 75
surigaoensis Elm. 75
Sarcotheca Bl. 151, 152, 153,
168, 170 map, 175
acuminata Hall. f. 170
celebica Veldk. 169, 172
diversifolia (Miq.) Hall. f. 168,
169, 170
ferruginea Merr. 169, 173
glabra (Ridl.) Knuth 171
glaucata (Hook. f.) Hall. f. 168*,
169, 172, 173
glomerula Veldk. 169, 170,
174
griffithii (Planch. ex Hook. f.)
Hall. f. 169, 170
laxa (Ridl.) Knuth 169, 171
var. *hirsuta* Veldk. 171
var. *laxa* 171
var. *sericea* (Ridl.) Veldk.
171
macrophylla Bl. 169, 170, 174
macrophylla (non Bl.) Knuth
171
monophylla (Planch. ex Hook.
f.) Hall. f. 169, 172, 173
oblongifolia Merr. 173
ochracea Hall. f. 169, 173
paniculata Ridl. 174
philippica (F.-Vill.) Hall. f.
174
pinnata Merr. 174
rubrinervis Hall. f. 169, 171,
172, 173
sericea (Ridl.) Knuth 171
simplicifolia (Ridl.) Knuth 171
subtriplinervis Hall. f. 170
varians (Craib) Knuth 174
Satyria 827
Saururaceae 4: 47–48
Sauvagesia L. 97, 212
erecta L. 118, 119
jaheriana Capit. 110
Schaenoides brevifolius Rottb.
656
panicus Rottb. 643
triceps Rottb. 659
Schefflera aromatica (Bl.) Harms
798
Schima 268
wallichii (DC.) Korth. 270
ssp. *noronhae* (Reinw. ex
Bl.) Bloemb. 788, 797
Schizocapsa 806
breviscapa Limpr. 813
plantaginea Hance 806
Schlechteria 405
Schoenoplectus Palla 508
grossus Palla 498
Schoenoxiphium Nees 435, 445,
751, 752, 753
cobresioideum 752
gracile Cherm. 752
kobresioideum Kük. 752
Schoenus L. 446*, 447, 452, 453,
454, 455, 670, 672, 721
sect. *Calostachyi* (Benth.)
Clarke 673, 675
sect. *Helothrix* (Nees) Kük.
672, 674, 678
sect. *Nudicaules* Kük. 673,
675, 680
sect. *Paniculati* (Benth.)
Clarke 673, 674, 677
sect. *Repentes* Kük. 674, 680
sect. *Scrobiculati* Kük. 677
ser. *Calostachyi* Benth. 675
ser. *Laterales* Benth. 680
ser. *Microcarpi* Benth. 678
ser. *Paniculati* Benth. 677
apogon (non R. & S.) Clarke
678, 679
apogon (non R. & S.) Ridl.
679
apogon R. & S. 447, 679
articulatus Roxb. 714
axillaris Poir. 679
calostachyus (R.Br.) Poir. 440,
674, 675, 676*

- coloratus* L. 656
confervoides Willd. ex Kunth 505
curvulus F.v.M. 438, 441, 672, 674, 678, 680
curvulus (non F.v.M.) Kük. 677
delicatulus (Fern.) Kern 438, 674, 678
distichus Ridl. 685
elatus Boeck. 677
erythrosiphon Ohwi 679
falcatulus R.Br. 442, 672, 674, 677, 678
 var. *borneensis* Kük. 678
falcatulus (non L.) Merr. 678
ferrugineus L. 673
foliatus S.T.Blake 679
fusco-guttatus Ohwi 675
halconensis Kük. 676
hasskarlii Steud. 708
kinabaluensis Stapf 678
laevinux (Kük.) Ohwi 674, 676
lithospermus L. 741
longibracteatus Kük. 438, 441, 674, 679
longisetis Poir. 717
mariscus L. 688
maschalinus R. & S. 441, 674, 678
melanostachys R.Br. 437, 441, 674, 675, 676
 var. *laevinux* Kük. 676
nemorum Vahl 490, 491
neoguineensis Kük. 679
nigricans L. 673
nitens (R.Br.) Poir. 437, 441, 455, 673, 674, 680
niveus Murr. 643
paniculatus Burm.f. 733
paniculatus Hassk. 708
philippinensis Kük. ex Merr. 679
 var. *kinabaluensis* Kük. 678
 var. *pachystylus* Kük. 679
punctatus R.Br. 442, 674, 677, 701
rhynchosporoides (Steud.) Kük. 668
ruber Lour. 717
rubiginosus Sol. ex Forst. 700
rugosus Vahl 720
setiformis S.T.Blake 441, 674, 679
sp. 688
sparteus R.Br. 437, 442, 674, 675
 var. *paucispiculatus* Kük. 675
subaxillaris Kük. 679
tendo (Hook. f.) Hook. f. 677
 var. *laevinux* Kük. 677
 f. *ebarbatus* Kük. 677
 var. *triander* Kük. 677
 triangularis Volkens 675
 tuberosus Burm. f. 604
Schuurmansia Bl. 97, 98, 115, 212
 angustifolia Hook. f. 114
 bamleri K.Sch. & Laut. 117
 var. *longifolia* Laut. 117
 borneensis Ridl. 115
 coriacea A.C.Smith 118
 crassinervia Gilg 118
 elegans Bl. 115
 gilgiana Laut. 117
 grandiflora A.C.Smith 118
 henningsii K.Sch. 115, 116*, 117*, 118*
 longifolia (Laut.) Gilg 118
 lophiroides Gilg 118
 microcarpa Capit. 118
 montana A.C.Smith 118
 oreophila Gilg 118
 parviflora Ridl. 115
 parvifolia Merr. 116
 pseudopalma Hall. f. 118
 rauwolfioides Hall. f. 118
 schlechteri Gilg 118, 119
 theophrasta Hall. f. 118
 vidalii (F.-Vill.) Merr. 115, 116
Schuurmansiella Hall. f. 97, 98, 113
 angustifolia (Hook. f.) Hall. f. 114*
Schyzocapsa breviscapa Limpr.
Scirpidium nigrescens Nees 533
Scirpodendron Zipp. ex Kurz 436, 438, 442, 443, 445*, 446, 448, 452, 453, 456
 costatum Kurz 456
 ghaeri (Gaertn.) Merr. 454, 456, 457*
 pandauiforme Zipp. ex Kurz 456
 sulcatum Miq. 456
Scirpoides paradoxus Rottb. 518
Scirpus L. 443, 444, 445*, 446*, 447, 449, 451, 452, 454, 455, 494, 518, 521, 523, 537, 538, 542, 593
 b. *Euscirpus* α *Phyllanteli* Beurl. 499
 sect. *Actaeogeton* Rchb. 508
 sect. *Actinoscirpus* Ohwi 496, 497
 sect. *Anthelophorum* Ohwi 505
 sect. *Baeothryon* (A.Dietr.) B. & H. 496, 505
 sect. *Bolboschoenus* Beetle 499
 sect. *Cernui* Cherm. 515
 sect. *Confervoidei* Cherm. 496, 504
 sect. *Dichostylis* Fiek 634
 sect. *Eleogiton* (Link) Pax 496, 502
 sect. *Euscirpus* B. & H. 499, 501
 sect. *Euscirpus* Clarke 508
 sect. *Fluitantes* Cherm. 502
 sect. *Hymenochaeta* Beetle 497
 sect. *Isolepis* (R.Br.) Griseb. 496, 515
 sect. *Lacustres* Beetle 508
 sect. *Littorales* Cherm. 508
 sect. *Maritimi* Cherm. 496, 499
 sect. *Micranthi* C.B.Clarke 496, 515, 521
 sect. *Microstyli* Clarke 515
 sect. *Monostachyi*** *Caespitosa* Clarke 505
 sect. *Monostachyi** *Fluitantes* Clarke 502
 sect. *Mucronati* Cherm. 508
 sect. *Oncostylis* Boeck. 537
 sect. *Paucispicata* Beetle 505
 sect. *Phylloscirpus* Pax 501
 sect. *Pterolepis* Beetle 508
 sect. *Schoenoplectus* Rchb. 496, 508
 sect. *Scirpus* 496, 501
 sect. *Scirpus* Clarke 508
 sect. *Seidlia* Clarke 501
 sect. *Setacei* Cherm. 515
 sect. *Squarrosi* Cherm. 515
 sect. *Sylvatica* Clarke 501, 502
 sect. *Taphrogeton* Rchb. 501
 sect. *Trichophorum* (Pers.) A. Gray 496, 502
n. 78 Rottb. 625
acicularis L. 535
acutangulus Roxb. 525
acutus Presl. 510
ameulans Steud. 498
aestivales Retz. 584
affinis Roth 500
afflatus Benth. 532
anceps Poir. 694
anceps Willd. 549
anomalus Retz. 490
aphyllus Hassk. 655
argenteus Rottb. 586
articulatus L. 439, 497, 513*
articulatus sensu Nees 514
 var. *major* Boeck. 514
arvensis Retz. 572
asiaticus Beetle 502
atropurpureus Retz. 536
attenuatus Franch. & Sav. 532
aucklandicus (Hook. f.) Boeck. 437, 441, 497, 515
autumnalis L. 548, 625
barbatus Rottb. 539
 var. β 539
beccarii Boeck. 438, 440, 496, 497, 503*
benghalensis Pers. 552, 553
bispicatus Roxb. 573
bisumbellatus Forsk. 579
borneensis H.Pfeiff. 516
capillaris (non L.) Boeck. 538

- capitatus* L. 536
caribaeus Rottb. 536
cephalotus Jacq. 659
cespitosus (non L.) F.v.M. 505
cespitosus L. 505
chinensis Munro 501
chinensis Osb. 521
chinensis (non Osb.) Raymond 516
ciliaris L. 519
cinnamometorum Vahl 565
clarkei Stapf 505, 507
 var. *pakapakensis* Beetle 505
clemensiae 512
clemensii Ohwi 512
complanatus Retz. 549
confervoides Poir. 439, 447, 496, 497, 504*, 505, 534
coniferus Poir. 462
corymbosus L. 713
crassiusculus (Hook. f.) Benth. 437, 440, 497, 503
cyperinus (L.) Kunth 502
cyperoides L. 642
debilis Pursh, non Lamk 513
densus Wall. 538
dichotomus L. 575
dichotomus (non L.) Rottb. 579
diphyllus Retz. 575
epsaceus Rottb. 590
erectus (non Poir.) Clarke 512
 var. *triangulatus* Honda 513
 var. *wallichii* Beetle 513
eriophorum (non Michx) Clarke 502
eriophorum Michx 502
falcatus Llanos 575
falcatus Vahl 557
ferrugineus L. 572
fistulosus Poir. 525
fluitans (non L.) Clarke 503
fluitans L. 440, 496, 497, 502 503
 ssp. *pseudo-fluitans* Koyama 503
fluviatilis (Torr.) A.Gray 499
fohaiensis Tang & Wang 512
foliatus Hook. f. 679
geniculatis L. 536
globulosus Retz. 551
glomeratus L. 659
grossus L. f. 439, 453, 496, 498*
 f. *kysoor* Beetle 499
 f. *minor* Miq. 498
 var. *kysoor* (Roxb.) Clarke 498, 499
hispidulus Vahl 560, 561
incurvatus Roxb. 513
inundatus (R.Br.) Poir. 437, 441, 496, 497, 503, 515
javanus Nees 510
junciformis Nees 512
juncoides Roxb. 439, 453, 496, 497, 512, 513
 var. *ohwianus* (Koyama) Koyama 512
 var. *triangulatus* (Honda) Ohwi 513
juncoides × *preslii* 513
junghuhnii Miq. 438, 441, 495*, 496, 497, 500*
 var. *minor* Kük. 500, 501
kysoor 498
kysoor (non Roxb.) Llanos 498
kysoor Roxb. 499
lacustris L. 439, 453, 497, 508
 ssp. *glaucus* (Smith) Hartm. 510
 ssp. *lacustris* 510
 ssp. *validus* (Vahl) Koyama 508
 var. *tabernaemontani* (Gmel.) Doell 510
 var. *validus* Kük. 508
lacustris (non L.) Merr. 508, 510
lateralis Retz. 514
lateriflorus Gmel. 439, 497, 514
laxiflorus Thw. 528
lithospermus L. 740
litoralis Schrad. 438, 453, 455, 497, 510
litoralis s.s. 510
 var. *subulatus* (Vahl) Chiov. 510
luzonensis Presl 512
macrothyrsus Miq. 516
maritimus L. 443, 444, 496, 497, 499
 var. *aemulans* Miq. 498
 var. *digynus* Godr. 499
 var. *fluviatilis* Torr. 499
medianus Cook 499
michelianus L. 634
miliaceus L. 551, 552
mindorensis Beetle 539
monander Rottb. 586
mucronatus L. 439, 453, 496, 497, 510, 511*
 ssp. *clemensii* Kük. 496, 497, 512
 var. α Decne 512
 var. *planoconvexus* Koyama 510
mucronatus s.s. 512
mutatus L. 527
nanus (non Poir.) Spreng. 537
niloticus (non Gmel.) Blanco 551
nitens Boeck. 680
nutans Retz. 588, 589
obtusus Willd. 537
ochrostachys O.K. 528
ohwianus Koyama 512, 513
oryzotorum Ohwi 514
pakapakensis Stapf 505, 507
pallescens Roxb. 579
parvulus R. & S. 537
planiculmis Fr.Sch. 499, 500
plantagineus Retz. 529
plantaginoides Rottb. 529
polytrichoides 586
polytrichoides Retz. 586
preslei 510
preslii Dietr. 510
presslii 510
prolongata Poir. 514
pseudo-fluitans Makino 503
pterolepis Kunth 510
puberulus Poir. 540
pulogensis Merr. 507
purshianus Fern. 513
pusillus Vahl 537
pygmaeus Lamk 534
quinquangularis Vahl 552
radicans Schk. 501
retroflexus (non Poir.) Llanos 536
retroflexus Poir. 534
rubricosus Fern. 502
ruppioides Thw. ex Sauv. 505
schoenoides Retz. 573
senegalensis Lamk 521
setaceus (non L.) Camus 540
setaceus L. 515
setaceus (non L.) Rendle 515
spiralis Rottb. 527
squarrosus L. 447, 496, 516, 522
squarrosus (non L.) K.Sch. 522
subcapitatus Thw. 441, 497, 505, 506*, 507*, 508*
 f. *rigidus* Kük. 505
 ssp. *celebicus* Kern 507, 509*
 ssp. *pulogensis* (Merr.) Kern 507
 var. *triangularis* Kük. 505
submersus Sauv. 505
subtilissimus (Boeck.) S.T. Blake 437, 441, 496, 497, 515
subulatus Vahl 510
subvivarum O.K. 532
sundanus Miq. 510
supinus L. 503
 var. *elatior* Boeck. 512
supinus (non L.) F.-Vill. 514
 var. *uninodis* Clarke 514
sylvaticus L. 501
tabernaemontani Gmel. 510
tabernaemontani (non Gmel.) Kük. 508
ternatensis 501
ternatanus Reinw. ex Miq. 438, 496, 501
tetragonus Poir. 551

- tetraqueter* Thw. 531
tetraquetrus 531
thermalis Trab. 510
timorensis Kunth 512
timoriensis 512
trialatus Boeck. 621
triangulatus Roxb. 510
triqueter
 var. *segregatus* Clarke 508
tristachyos Rottb. 514
tristachyos Zoll. ex Steud. 514
tuberosus Roxb. 529
tumidus Roxb. 529
validus (non Vahl) Beetle 510
validus Vahl 508
varians Boeck. 503
variegatus Poir. 528
wallichii Nees 437, 497, 513
wichuraj Boeck. 437, 496, 502
yokosucensis Franch. & Sav. 535
zollingeri O.K. 532
Scleria Berg. 436, 443, 447, 448, 449, 451, 452, 453, 455, 722, 726
C. Corymbosae Boeck. 740
 sect. *Browniae* (Clarke) Kern 727, 729
 sect. *Carphiformes* Kern 727, 741
 sect. *Corymbosae* Boeck. ex Pax 727, 740
 sect. *Diplacrum* (R.Br.) Kern 727, 749
 sect. *Elatae* Clarke 732
 sect. *Hypoporum* (Nees) Endl. 727, 743
 sect. *Lithospermeae* Clarke 740
 sect. *Scleria* 727, 732
 sect. *Sphaeropus* (Boeck.) Kern 727, 749, 751
 sect. *Tessellatae* Clarke 727, 743
 subg. *Browneae* 729
 subg. *Browniae* Clarke 729
 subg. *Hypoporum* Clarke 726, 743
 subg. *Scleria* 726
 subg. *Tessellatae* Clarke 743
alta Boeck. 724*
alta (non Boeck.) Camus 735
androgyna Nees 740
annularis (non Steud.) Clarke 746
annularis (Kunth) Nees ex Steud. 436, 726*, 728, 744
approxinata Hassk. 751
aquatica Cherm. 736
bancana Miq. 733, 734, 735, 751
 var. *nana* Ridl. 734
benthamii (non Clarke) S.T. Blake 748
benthamii Clarke 722, 724*, 728, 732
biflora Roxb. 724, 726*, 727, 728, 743, 745*, 746 map
 ssp. *biflora* 744
 ssp. *ferruginea* (Ohwi) Kern 726*, 728, 744
bracteata (non Cav.) Brongn. 734
brownei 731
brownii Kunth 437, 722, 724*, 728, 731
 var. 731
capillaris R.Br. 741
caricina (R.Br.) Benth. 724, 726*, 727, 749, 751
carphiformis Ridl. 725*, 727, 730 map, 741, 742*, 743
chinensis Kunth 734
 var. *biauriculata* Clarke 733
 var. *luzonensis* Uitt. 734
 f. *pilosa* Uitt. 734
ciliaris Nees 440, 724*, 729, 733, 734
cochinchinensis Druce 734
corymbifera Boeck. 740
corymbosa (non Roxb.) Ridl. 733
corymbosa Roxb. 725*, 729, 738 map, 740
cyathophora Holtt. 438, 722, 724*, 728, 731
densispicata (Clarke) Kern 438, 723*, 724*, 729, 730 map, 731
distans R.Br. 731
elata Thw. 733
 var. *decolorans* Clarke 733, 734
 var. *latis* Clarke 733, 734
exaltata Boeck. 724*, 733
fenestrata Franch. & Savat. 746
ferruginea Ohwi 744
filiformis Sw. 741
filipendula S.T.Blake 748
flaccida Clarke 749
foveolata (non Cav.) Llanos 739
glabroreticulata De Wild. 744
glaucescens Presl. 741
gonocarpa Ridl. 730
graeffeana Boeck. 738
haematostachys Boeck. 724*, 733, 734
hasskarliana Boeck. 733
hebecarpa Nees 732
 f. *pilosa* Valck.Sur. 732
 var. *pubescens* Clarke 732
hirsuta Boeck. 733, 734
hookeriana Kük. 734
japonica Steud. 732
junghuhniana Boeck. 422, 722, 725*, 729, 735
junghuhnii 735
keyensis K.Sch. 739
khasiana Clarke 732
kuntzei Boeck. 733, 734
lacustris Wright ex Sauvalle 736
laevis (non Retz.) Miq. 714, 733
lateriflora Boeck. 749
laxa R.Br. 722, 726*, 729, 748
levis Retz. 440, 724*, 729, 732
 f. *villosa* Valck.Sur. 738
levis (non Retz.) Willd. 733
 f. β 733
lithosperma (L.) Sw. 436, 440, 722, 725*, 728, 732, 740
 var. β Miq. 740
 var. *linearis* Benth. 725*, 741
 var. *lithosperma* 741
 var. *roxburghii* Clarke 741
luzonensis Palla 733
macrocarpa Wall. 456
macrophylla Presl 751
malaccensis Boeck. 735
margaritifera Willd. 736
melanostoma Nees ex Boeck. 733, 734
merrillii Palla 746
mikawana Makino 436, 726*, 728, 744
motleyi (non Clarke) S.T. Blake 731
motleyi Clarke 724*, 729, 731, 732
 ssp. *motleyi* 730
 ssp. *rostrata* Kern 724*, 729, 730 map
 var. *densi-spicata* Clarke 729, 730
multifoliata Boeck. 739
 var. *pilosula* Clarke 739
neesii Kunth 437, 725*, 727, 730 map, 741, 748
neesii (non Kunth) Ridl. 741
 var. *borneensis* Clarke ex Ridl. 741
 var. *hirsutissima* Camus 741
novae-hollandiae Boeck. 437, 726*, 746, 747*
oblata S.T.Blake 440, 724*, 729, 733
onoei Franch. & Savat. 749
 var. *pubigera* Ohwi 749
orizoides 736
oryzoides Presl 736
pallidiflora Boeck. 731
papuana Kern 438, 724*, 728, 730 map, 731, 732
parvula Steud. 436, 726*, 728, 746
pergracilis (Nees) Kunth 725*, 727, 743
ploemii Boeck. 733

- poaeformis* Retz. 439, 725*, 727, 729, 736, 737*
polycarpa Boeck. 437, 725*, 728, 738 map, 751
propinqua Steud. 743
psilorrhiza Clarke 442, 722, 724*, 729, 735
pubescens Steud. 732
pubigera Makino 749
purpurascens Steud. 440, 725*, 728, 733, 739, 740 map
 var. *viridensis* (Clarke) Kern 740 map
purpureovaginata Clarke 739
pygmaea R.Br. 726*, 749
pygmaeopsis Kern 438, 722, 726*, 727, 749, 750*
radula Hance 724*, 733, 734
reticulata (Holt.) Kern 437, 724, 726*, 727, 751
ridleyi Clarke 740
rinkiana Boeck. 733, 734
roxburghii Domin 741
rugosa R.Br. 439, 726*, 727, 728, 748, 749, 751
scrobiculata Nees & Mey. ex Nees 440, 725*, 728, 738, 751
 ssp. *discocarpa* Kern 725*, 727, 739
 ssp. *scrobiculata* 739
 var. *purpurascens* Steud. 739
setifera Boeck. 679
sorsogonensis Elm. 730
sphacelata F.v.M. 722
stuedeliana Miq. 743
sumatrensis Retz. 440, 724, 725*, 727, 736, 738 map, 751
 var. *pubescens* Miq. 732
tenuis Retz. 741
terrestris (L.) Fass. 440, 722, 724*, 729, 733, 735
 var. *decolorans* Fass. 733
 var. *latior* Fass. 733
tessellata (non Willd.) Benth 732
 var. *debilis* Benth. 748
tessellata (non Willd.) Boeck. 744, 746
tessellata (non Willd.) Decne 739
tessellata (non Willd.) Nees 743
tessellata Willd. 726*
thwaitesiana Boeck. 437, 726*, 729, 748
timorensis Nees 739
trialata (non Poir.) Brongn. 739
tricuspidata S.T.Blake 437, 722, 726*, 728, 733, 748
trigona Merr. 730
trigonocarpa Ridl. 730
uliginosa Hochst. ex Boeck. 746
waigiouensis Steud. 739
wichurui Boeck. 732
wightiana Steud. 741
zeylanica (non Poir.) Clarke 749
zeylanica Poir. 732
Scolopia Schreb. 827
kernodei (non Fischer) Steen. 827
luzonensis (Presl) Warb. 827
macrophylla (W. & A.) Clos 827
nitida C.T.White 827
novo-guineensis Warb. 827
steensiana Sleum. 827
Scyphellandra Thw. 180
virgata Thw. 190
Scyphostegiaceae 5: 297-299; 6: 967; 7: 830
Seguieria asiatica Lour. 824
Seidlia Opiz 501
Serpicula L. 246
brevipes W. & A. 246
epilithes Bl. 247, 248
hirsuta W. & A. 246
 var. *incisa* Miq. 246
indica Thw. 247, 248
javanica Miq. 247
veronicaefolia (non Bory) Miq. 247
verticillata L. f. 248
zeylanica Arn. ex Clarke 247, 248
 var. *minor* Thw. ex Clarke 247
Sesamum indicum L. 829
orientale L. 829
Shorea albida 58, 609
materialis 60
sp. 291
Sideroxylon gamblei C.B.Clarke 11
Simaroubaceae 6: 193-226, 968-972
Sinapistrum Rumph. 91
Sinia Diels 97
Sioja Buch.-Ham. ex Lindl. 93
Sleumerodendron 830
Solea Spreng. 194
Sonneratiaceae 4: 280-289, 513; 5: 557; 6: 973
Sorghum nitidum 627*
Sorostachys Steud. 632
kyllingioides Steud. 632
Sparganiaceae 4: 233-234
Spathium undulatum Edgew. 213
Sphaeromarsicus Camus 593
microcephalus Camus 640
Sphaeropus Boeck. 722, 749
Sphaeroschoenus W.-A. & Nees ex Nees 715
Sphagnum 703, 732
Sphenocleaceae, see *Campanulaceae*
Spigelia anthelmia L. 829
Spirodela Schleid. 219, 220, 222, 223, 231
atropurpurea Montand. 224
javanica Hegelm. 226
maxima (Blatter & Hallb.) McCann 224
melanorrhiza Hegelm. 226
oligorhiza Hegelm. 226
 var. ϵ *javanica* Hegelm. 226
 var. β *melanorrhiza* (F.v.M. ex Kurz) Hegelm. 226
 var. δ *pleiorrhiza* (F.v.M. ex Kurz) Hegelm. 226
 var. γ *pusilla* Hegelm. 226
pleiorrhiza Hegelm. 226
polyrhiza (L.) Schleid. 220*, 221, 224, 225*, 237
 var. *masonii* Daubs 224
punctata (G.F.W.Meyer) Thompson 220, 221, 225, 227*, 231
pusilla Hegelm. 226
Spraguea 121
Stackhousiaceae 4: 35-36
Staphylea indica Burm. f. 779
Staphyleaceae 6: 49-59
Stauranthera Benth. 76
Stauvogeton Rehb. 228
trisulcus (L.) Schur 234
Stemonura 56
Stemonurus Bl. 1, 2, 3, 4, 21, 56, 58 map
affinis Miers 34
agusanensis Elm. 27
ammui (Kaneh.) Sleum. 57, 60
apoensis Elm. 29
australianus (F.v.M.) O.K. 28
capitatus Becc. 60
capitulatus (Jungh. & De Vriese) O.K. 24
celebicus Valet. 56, 59
corniculatus (Becc.) Ridl. 51
cumingianus Miers 27
dolichocarpus (Merr.) Howard 30
dolichophyllus Merr. 57
ellipticus (Schellenb.) Sleum. 61
evenius Stapf 62
flavicarpus Elm. 30
foetidus Wight 55
fulgineus (Elm.) Howard 24
gitingensis (Elm.) Sleum. 57, 61
gracilis Schellenb. 29
grandifolius Becc. 57
hallieri (Merr.) Merr. 62
intercedens Heine 62
javanicus Bl. 27
 var. 27

- labuanensis* Stapf 60
lanceolatus Becc. 60
lancifolius (Merr.) Howard 31
laxiflorus Miers 46
littoralis Bl. 16
luzoniensis (Merr.) Howard 31
lysiptetalus (Stapf) Merr. 25
macrocarpus Bl. 20
macrophyllus Bl. 10
maingayi (Mast.) Valet. 34
malaccensis (Mast.) Sleum. 57, 60, 61*, 62, 828
mappiodes (Valet.) O.K. 29
megacarpus Hemsl. 50
merrittii Merr. 43
montanus Schellenb. 31
monticola 62
microcolus (Schellenb.) Sleum. 57, 62
nyssifolius (King) Howard 24
oblongifolius (Merr.) Howard 35
oppositifolius (Pierre ex Gagnep.) Howard 33
papuanus (Becc.) Schellenb. 25
parviflorus Bl. 32
pauciflorus Bl. 28, 59
pauciflorus Ridl. 59
penangianus Miers 33
prasinus Bl. 33
prasinus (non Bl.) K.Sch. & Laut. 34
puberulus K.Sch. & Laut. 25
quadrifidus Bl. 32
ramuensis Laut. 28
ridleyanus Sleum. 59
salicifolius (Ridl.) Howard 34
sawiensis Birnie 30
scorpiodes 58
scorpioides Becc. 57, 58*
scorpiurus 58
secundiflorus Bl. 57, 59
 var. *hosei* Sleum. 59, 60
 var. *lanceolatus* (Becc.) Sleum. 59, 60
 var. *secundiflorus* 59, 60
 var. *valetonii* Hochr. 59
secundiflorus (non Bl.) Merr. 61
secundiflorus (non Bl.) Ridl. 58
subrostratus (Merr.) Howard 32
tomentellus Valet. 34
umbellatus (non Becc.) Anders. 60
umbellatus Becc. 57, 62*, 63*
 var. *ovalifolius* Becc. 62
viridis Schellenb. 28
yatesii (Merr.) Howard 46
zygomorphus Pulle 25
Stenophyllus Raf. 537
 barbatus Cooke 539
 capillaris (non Britt.) Back. 538
 puberulus Killip 540
Sterculia sp. 803
Strobilanthes sp. 798
Stychnos L. 828
 ignatii Berg. 828, 829
 lanceolaris Miq. sensu Hill 828, 829
 ovata Hill 829
Styliidiaceae 4: 529-532; 5: 564; 6: 976
Styracaceae 4: 49-56; 6: 976
Suregada glandulosa (Elm.) Croizat 184
 trifida (Elm.) Croizat 184
Synaedrys Lindl. 276, 318
 sect. *Chlamydobalanus* 318
 acuminatissima (Merr.) Koidz. 355
 bancana (Scheff.) Koidz. 361
 beccariana (Benth.) Koidz. 329
 bennettii (Miq.) Koidz. 356
 blumeana (Korth.) Koidz. 339
 brachyclada (von Seemen) Koidz. 374
 cantleyana (King ex Hook. f.) Koidz. 352
 castellarnauiana (Vidal) Koidz. 377
 caudatifolia (Merr.) Koidz. 350
 celebica (Miq.) Koidz. 374
 clathrata (von Seemen) Koidz. 331
 clementi (Merr.) Koidz. 379
 clementiana (King ex Hook. f.) Koidz. 365
 conocarpa (Oudem.) Koidz. 349
 cooperta (Blanco) Koidz. 335
 costata (Bl.) Koidz. 325
 crassinervia (Bl.) Koidz. 371
 curranii (Merr.) Koidz. 331
 curtisii (King ex Hook. f.) Koidz. 380
 cyclophora (Endl.) Koidz. 345
 cyrtorhyncha (Miq.) Koidz. 362
 d'albertisii (F.v.M.) Koidz. 374
 daphnoidea (Bl.) Koidz. 353
 dasystachya (Miq.) Koidz. 350
 debar yana (O.Warb.) Koidz. 384
 diepenhorstii (Miq.) Koidz. 362
 discocarpa (Hance) Koidz. 306
 dolichocarpa (von Seemen) Koidz. 353, 385
 eichleri (Wenzig) Koidz. 341
 enclisacarpa (Korth.) Koidz. 338
 ewyckii (Korth.) Koidz. 351
 fagiformis Koidz. 309
 falconeri (Kurz) Koidz. 371
 grandifrons (King ex Hook. f.) Koidz. 375
 gulliveri (F.v.M.) Koidz. 374
 hallierii (von Seemen) Koidz. 327
 heliciformis (von Seemen) Koidz. 343
 hystrix (Korth.) Koidz. 384
 imperialis (von Seemen) Koidz. 346
 induta (Bl.) Koidz. 344
 javensis (Bl.) Koidz. 325
 jordanae (Laguna) Koidz. 382
 kingiana (Gamble) Koidz. 381
 kuinstleri (King ex Hook. f.) Koidz. 372
 lampadaria (Gamble) Koidz. 368
 lamponga (Miq.) Koidz. 375
 lauterbachii (von Seemen) Koidz. 348
 llanosii (A.DC.) Koidz. 374
 luzonensis (Merr.) Koidz. 381
 maingayii (Benth.) Koidz. 331
 merrittii (Merr.) Koidz. 377
 monticola (King) Koidz. 369
 nieuwenhuisii (von Seemen) Koidz. 379
 omalkos (Korth.) Koidz. 341
 ovalis (Blanco) Koidz. 361
 pallida (Bl.) Koidz. 349
 philippinensis (A.DC.) Koidz. 353
 platycarpa (Bl.) Koidz. 340
 poculiformis (von Seemen) Koidz. 353
 pruinosa (Bl.) Koidz. 375
 pseudomolucca (Bl.) Koidz. 376
 pulchra (King) Koidz. 333
 pyriformis (non Seemen) Koidz. 331
 rajah (Hance) Koidz. 361
 rassa (Miq.) Koidz. 364
 reflexa (King) Koidz. 335
 reinwardtii (Korth.) Koidz. 359
 robinsonii (Merr.) Koidz. 383
 rotunda (Bl.) Koidz. 331
 rufa (von Seemen) Koidz. 370
 scortechinii (King ex Hook. f.) Koidz. 380
 sericea (Scheff.) Koidz. 393
 soleriana (Vidal) Koidz. 355
 spicata (Sm.) Koidz. 367
 sundaica (Bl.) Koidz. 375
 teymani (Bl.) Koidz. 343
 wallichiana (Lindl. in Wall.) Koidz. 369
 wenzelii (Merr.) Koidz. 353
 wenzigiana (King ex Hook. f.) Koidz. 364
 wilhelminae (von Seemen) Koidz. 389

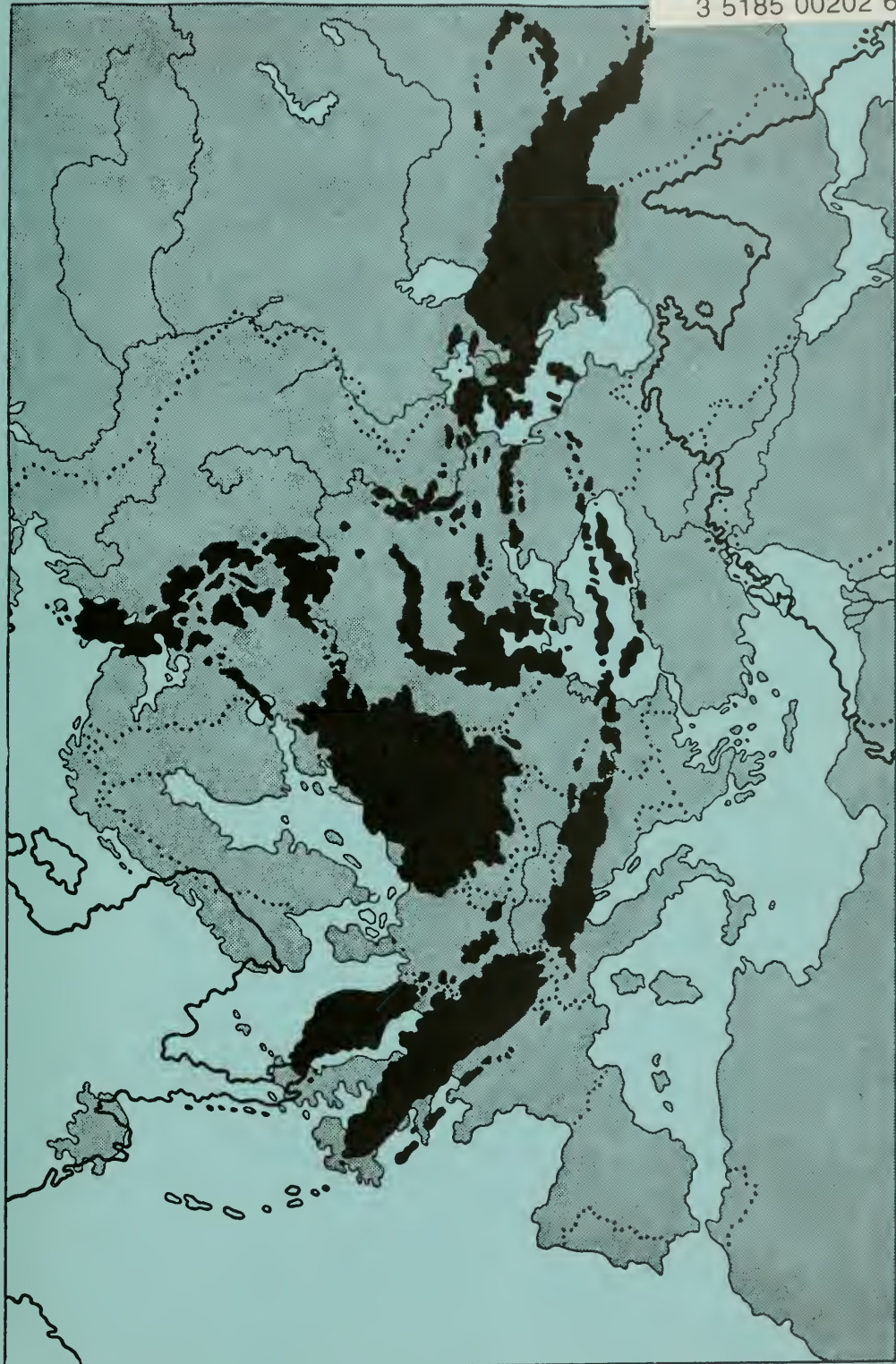
- woodii* (Hance) Koidz. 358
wrayii (King) Koidz. 334
Syngamma hookeri 269
Syzigianthus Steud. 705
multiflorus Steud. 708
Syzgium cumini (L.) Skeels 795
- Tacca* J.R. & G.Forst. 806, 807
 map
angustilobata Merr. 814
artocarpifolia Seem. 809
aspera Roxb. 811
bibracteata Drenth 806, 808, 814, 815*, 816 map
borneensis Ridl. 811
breviloba Warb. ex Limpr. 816
brownii Seem. 809
celebica Koord. 808, 809, 818*, 819
chantrieri André 806, 808, 809, 813* map, 815*
f. garrettii (Craib) Limpr. 813
f. macrantha (Limpr.) Limpr. 813
var. vespertilio (Ridl.) Limpr. 813
chantrieri (non André) Ridl. 811
chaudhuriana Deb 811
cristata Jack 808, 811
cristata (non Jack) Velenovsky 813
dubia Schult. 809
ebeltajae Drenth 808, 809, 816 map, 817*
elmeri Krause 814
esquirolii (Lévl.) Rehder 813
fatsifolia Warb. ex Limpr. 814
flabellata J.J.Smith 816
gaogao Blanco 809
garrettii Craib 813
hawaiiensis Limpr. 809
integrifolia Ker-Gawl. 808, 809, 811, 812* map, 813*, 814
var. pseudolaevis Limpr. 811
integrifolia (non Ker-Gawl.) Schrank 814
involutata (Limpr.) Schum. & Thonn. 809
laevis Roxb. 811
var. angustibracteata Limpr. 811
var. latibracteata Limpr. 811
var. minor Ridl. 811
lancaefolia Zoll. & Mor. 811
var. laeviformis Limpr. 811
lancifolia
var. breviscapa Ostenfeld 813
leontopetaloides (L.) O.K. 806, 807, 808, 809, 810 map
- littorea* Rumph. 809
macrantha Limpr. 813
maculata Seem. 809
maculata Zipp. ex Span. 809
minaha(s)sae Koord. 819
minor Ridl. 813
montana Rumph. ex Schultes 814
palmata Bl. 807, 808, 809, 814, 816 map
var. borneensis Limpr. 814
palmatifida Baker 808, 809, 816 map
parkeri Seem. 808
paxiana Limpr. 813
phallifera Rumph. 809
pinnatifida J.R. & G.Forst. 809
ssp. involucrata Limpr. 809
var. 809
var. brownii (Seem.) Baill. 809
pinnatifolia Gaertn. 809
plantaginea (Hance) Drenth 808, 815*
rafflesiana Jack ex Wall. 811
roxburghii Limpr. 813
rumphii Schauer 814
samoensis Reinecke 809
sativa Rumph. 809
sumatrana Limpr. 811
ssp. ovalifolia Limpr. 811
vesicaria Blanco 814
vespertilio Ridl. 813
viridis Hemsl. 809
weberi Elm. 814
wilsonii Limpr. 813
- Taccaceae 806–819**
Tacsonia (Tourn.) Juss. 407
Talinum Juss. 121, 122, 123
paniculatum (Jacq.) Gaertn. 121, 122*, 123, 124
patens (L.) Willd. 125
racemosum (L.) Rohrb. 124
triangulare (Jacq.) Willd. 121, 122*, 123, 124*
- Tamara tonga* Rheede 175
Tecticornia australasica (Moq.) P.G.Wilson 822
cinerea (F.v.M.) Bail. 822
Telmatophace Schleid. 228
orbicularis Schur 224
polyrhiza (L.) Godr. 224
Terminalia L. 823
Tetracera L. 824
akara (Burm. f.) Merr. 824
arborescens Jack 824
asiatica (Lour.) Hoogl. 824
indica (Christm. & Panz.) Merr. 824
sarmentosa (L.) Vahl 824
scandens (L.) Merr. 824
Tetrameles nudiflora R.Br. 802, 823
- Tetramerista* Miq. 119
Tetrapathaca 405, 433
Tetrasia Beauv. 436, 449, 452, 661
borneensis Kern 438, 440, 455, 662*, 663*, 664
Tetrastigma sp. 795, 803
Tetrastylis 405
Thonningia 784, 785
Thoracostachys bancana Kurz 465
Thoracostachyum Kurz 436, 438, 448, 449, 452, 455, 464, 486
bancanum (Miq.) Kurz. 438, 464, 465
var. longispica Clarke 465, 466, 492
capitatum Valck.Sur. 465
dichromenoides Ridl. 464
heyneanum Uittien 465
hypolytroides Clarke 464
longistylum Kük. 487
f. parvum Kük. 487
lucbanense Kük. ex Merr. 487, 488
macilentulum Ohwi 487
montanum Valck.Sur. 487
pacificum Hosokawa 464
podanophyllum Domin 464, 465
parvibracte Kük. 487
ridleyi Clarke 465
simplex Ridl. 489
subcapitatum Valck.Sur. 466
sumatranum (Miq.) Kurz 453, 463*, 464, 465*
vitiense Uittien 464
- Thymelaeaceae 4: 349–365; 6: 1–48, 976; 7: 830**
Ticorea Blanco 755
aculeata Blanco 773
Tilecarpus 45
Toddavaddi Rheede 164
Torulium Desv. 593, 645
confertum Desv. ex Hamilt. 646
ferax Hamilt. 646
ferox 646
Trachystylis S.T.Blake 540
Tragia luzoniensis Merr. 76
Trapaceae 6: 982; 4: 43–44
Tremandraceae 135
Trentepohlia Boeck. 633, 634
bifoliata Boeck. 633
Treubia Pierre ex Boerl. 89
combretocharpa Pierre ex Boerl. 91
Trianoptiles 666
Trianthema portulacastrum L. 133
Trichadenia Thw. 87
Trichelostylis Lestib. 542, 548, 555
complanata Nees 549

- filiformis* Nees 564
junciformis Nees 557
miliacea Nees 551, 552
quinquangularis Nees 552
salbundia Nees 553
tetragona Nees 551
Trichilia connaroides (W. & A.) Benth. 782
Trichophorum Pers. 502
Triclanthera corymbosa Raf. 822
Tricostularia Nees 436, 452, 453, 670
borneensis Ridl. 672
fimbristylloides Benth. 672
paludosa (R.Br.) Benth. 670, 672, 678
undulata (Thw.) Kern 440, 455, 670, 671*, 672
Trigonella foenum-graecum L. 655
Trigoniaceae 4: 58-60
Trigonobalanus Forman 267, 268, 271, 272, 273, 274, 276, 277, 280, 398, 403 map
doichangensis (A.Camus) Forman 267, 271, 403 map
verticillata Forman 267, 268, 270, 399*, 400*, 401*, 402*, 403 map
Trigonopleura malayanum Hook. f. 192
Trilepis 451
Triodon L.C.Rich. 712
Trisyngyne Baill. 274, 276, 278
Tryphostemma 405
Tunga Roxb. 489, 519
diandra Roxb. 490
laevigata Roxb. 521
Turneraceae 4: 235-238
Tylecarpus Engl. 45
carolinensis (Kaneh.) Kaneh. & Hatus. 47
coriifolius Sleum. 47
merrittii (Merr.) Sleum. 43
papuanus (Becc.) Engl. 46
peekelii Sleum. 47
sp. 46
Tylocarya Nelmes 540
Typhaceae 4: 242-244; 6: 982
Umbelliferae 4: 113-140, 595; 5: 555; 6: 983-984; 7: 830-831
Uncinia 435, 443, 444, 446, 447, 449, 452, 453, 455, 456, 823
riparia 440
rupestris 440
Urandra Thw. 2, 56
ammui Kaneh. 61
brassii Howard 62
capitata (Becc.) O.K. 60
celebica (Valel.) Howard 59
corniculata (Becc.) Foxw. 51
dolichophylla (Merr.) Howard 57
elliptica Schellenb. 60
evenii (Stapf) Howard 62
fuliginea Elm. 24
gitingensis (Elm.) Sleum. 61
grandifolia (Becc.) O.K. 57
hallieri Merr. 62
lanceolata (Becc.) O.K. 60
luzoniensis Merr. 31
maingayi (Mast.) O.K. 34
monticola Schellenb. 62
nitida Howard 60
pauciflora (Merr.) Merr. 30
scorpioides (Becc.) O.K. 58
scorpioides (non (Becc.) O.K.) Pulle 62
secundiflora Dahl 60
secundiflora (Bl.) O.K. 59
sp. 51
umbellata (Becc.) O.K. 62
umbellata (non Becc.) Pulle 62
umbellata (non (Becc.) O.K.) Walker 65
Urceolaria Huth 261
Uromyces 458
Utricularia 135
Vaccinium 793
sect. Pachyanthum Sleum. 827
laurifolium (Bl.) Miq. 798
lucidum (Bl.) Miq. 798
sp. 805
Valerianaceae 4: 253-254
Vallisneria gigantea Graebn. 828
natans (Lour.) Hara 828
spiralis L. 828
Vareca Roxb. 180
lanceolata Roxb. 187
moluccana Roxb. 192
Vatica 212
Villaresia R. & P. 4
latifolia Merr. 6
macrocarpa Scheff. 16
philippinensis Merr. 7
scandens Hassk. 7
suaveolens (Bl.) Valet. 6
Vincentia Gaud. 691
anceps Hook. f. 694
crinita Stapf 694
falcata Stapf 694
maingayi Stapf 693
malesiaca Stapf 694, 696
robinsonii Merr. 694
Viola L. 179, 180, 198, 199*
sect. Dischidium Ging. 198
sect. Erpetion (Sweet) Becker 198
sect. Melanum Ging. 198
sect. Nominium Ging. 198
sect. Viola 198
adenothrix Hayata 210
alata Burgersd. 205
apoense (Elm.) D.M. Moore 202
arcuata Bl. 200, 205, 206*, 207 map
arcuata (non Bl.) Miq. 206
arcuata (non Bl.) Ooststr. & H.J. Lam 210
betonicifolia J.E. Smith 200, 202, 203, 204, 205
ssp. australis Becker 203
ssp. betonicifolia 203 map
ssp. nepalensis Becker 203
ssp. nova-guineensis D.M. Moore 203 map
biflora L. 198, 200, 201
burgersdijkii Oudem. 208, 209
f. nodosa Boissieu & Capit. 208
var. timorensis Ridl. 208
caespitosa D. Don 203
canescens (non Wall.) Boissieu & Capit. 208
celebica Beck. 208, 209
confusa (non Champ.) Boissieu & Capit. 208
confusa Champ. ex Benth. 203, 204
curvistylis Boissieu & Capit. 201, 209, 210 map
diffusa Ging. 201, 202
ssp. apoensis (Elm.) D.M. Moore 202 map
ssp. diffusa 202 map
ssp. tenuis (Benth.) Becker 202
distans Wall. 205
edanoi Becker 204
effusa Becker 210
enneasperma L. 197
glaucescens Oudem. 208
hamiltoniana D. Don 208
hederacea Labill. 198, 200, 211 map
herbivaga Ridl. 206
hossei Becker 209
inconspicua Bl. 200, 203, 204 map
japonica (non Langsd.) Korth. 205
javanica Becker 200, 201, 206, 207 map
jugalis Ridl. 209
kjellbergii Melch. 200, 209, 210 map
klossii Ridl. 211
korinchensis Ridl. 209
lagaipensis D.M. Moore 210
lecomteana Beck. ex Gagnep. 210
lunata Ridl. 206
malvina Ridl. 210
mearnsii Merr. 200, 201, 205, 209 map
merrilliana Becker 200, 205 map, 210
mirabilis L. 179
odorata L. 180, 200, 201

- ovalifolia* Becker 210
palmaris Buch.-Ham. 207
papilionacea Pursh 180
papuana Beck. & Pulle 200, 209, 211 map
patrinii (non DC.) Boissieu & Capit. 203
patrinii DC. 203
 var. *caespitosa* Ridl. 203
 var. *napaulensis* DC. 203
patrinii (non DC.) Merr. 203
philippica Cav. 200, 203, 204 map, 212
 ssp. *malesica* Becker 204
 ssp. *munda* Becker 204
pilosa Bl. 200, 201, 205 map, 207*, 208*, 209, 211
ramosiana Becker 212
robinsonii Ridl. 209
rupicola Elm. 201, 205, 210 map
sarmentosa Burgersd. 208, 209
selkirkii (non Pursh) Boissieu & Capit. 204
semilunaris (Maxim.) Becker
 var. *philippinarium* Becker 205, 206
serpens (non Wall.) Ridl. 203, 209, 210
serpens Wall. ex Ging. 207
sikkimensis Becker
 var. *acuminatifolia* Becker 209
sumatrana Miq. 201, 209 map
 var. *caerulescens* Boissieu & Capit. 209
 tenuis Benth. 202
 toppingii Elm. 205
 tricolor L. 180, 198, 199*, 200, 201
 trinervis Korth. 203
Violaceae 179–212, 831
Vitaceae 755, 759, 760
Vitex cofassus Reinw. ex Bl. 794
Vitis sp. 782
Websteria S.H.Wright 447, 504
 limnophila S.H.Wright 505
 submersa Britten 505
Weinmannia 281, 289
Whitmorea Sleum. 1, 2, 4, 63
 grandiflora Sleum. 64*, 65
Wirtgenia 827
Wolffia Horkel ex Schleid. 219, 220*, 221, 222, 223, 235
 sect. *Uniflorae*
 subsect. *Estipitatae* Hegelm. 235
 arrhiza (non Wimmer) Martens 220, 236
 arrhiza (L.) Horkel ex Wimmer 235, 236*, 237
 var. *australiana* Benth. 236*, 237
brasiliensis 221
cylindracea Hegelm. 236
delilii (non Schleid.) Naves 236
delilii Schleid. 237
 var. *schleidenii* (Miq.) Kurz 236
globosa (Roxb.) Hartog & Plas 220, 235, 236*, 237
michelii Schleid. 237
microscopica (Griff.) Kurz 220, 221, 235, 236*, 237
microscopica (non Kurz) Mat-sam. & Hayata 236
 schleideni Miq. 236, 237 sp. 237
Wolffiella 219, 221, 222, 223
Wolffiopsis 219, 221, 223
Wormia Rottb. 826
 luzonensis Baill. 826
 luzonensis Vidal 827
 papyracea Gilg. & Werderm. 825
 pteropoda Miq. 825
Xanthomyrtus 289
Xyridaceae 4: 366–376, 598; 5: 557
Zizania terrestris L. 733
Zygothylaceae 4: 64



3 5185 00202 6944



FLORA MALESIANA

under the Auspices of
Lembaga Biologi Nasional (Botanic Gardens of
Indonesia), Bogor, Indonesia,
and the Rijksherbarium, Leyden, Holland,
executed by Foundation Flora Malesiana

Scientific Communications
concerning the Flora Malesiana should be addressed to
the General Editor, Dr. C. G. G. J. VAN STEENIS

SUBSCRIPTION REQUESTS AND RELATED CORRESPONDENCE
SHOULD BE DIRECTED EXCLUSIVELY TO
NOORDHOFF INTERNATIONAL PUBLISHING
P.O. Box 26, Leyden, The Netherlands

For sale only - Not for exchange

Series I - Spermatophyta (Flowering Plants)

- Volume 1. Cyclopaedia of collectors & collections. 1950. pp. clii + 639
- Volume 2. Malesian vegetation (In preparation)
- Volume 3. Malesian plant geography (In preparation)
- Volume 4. General chapters and revisions. 1948-1954. pp. ccix + 631
- Volume 5. Bibliography, specific delimitation & revisions. 1955-1958. pp. cccxlii + 596
- Volume 6. Systematic revisions. 6 parts. 1960-1972. pp. 20 + 1023
- Volume 7. Systematic revisions. Parts 1-4. 1971-1976. pp. 18 + 876
- Volume 8. Cyclopaedia of Collectors, Suppl. 2. Systematic revisions. Part 1

NOORDHOFF INTERNATIONAL PUBLISHING, LEYDEN, THE NETHERLANDS

PRINTED IN THE NETHERLANDS

ISBN 90 286 0615 7