

J.G. LAMBERT
Ir. A.I.Gx.

Cacti of Argentina

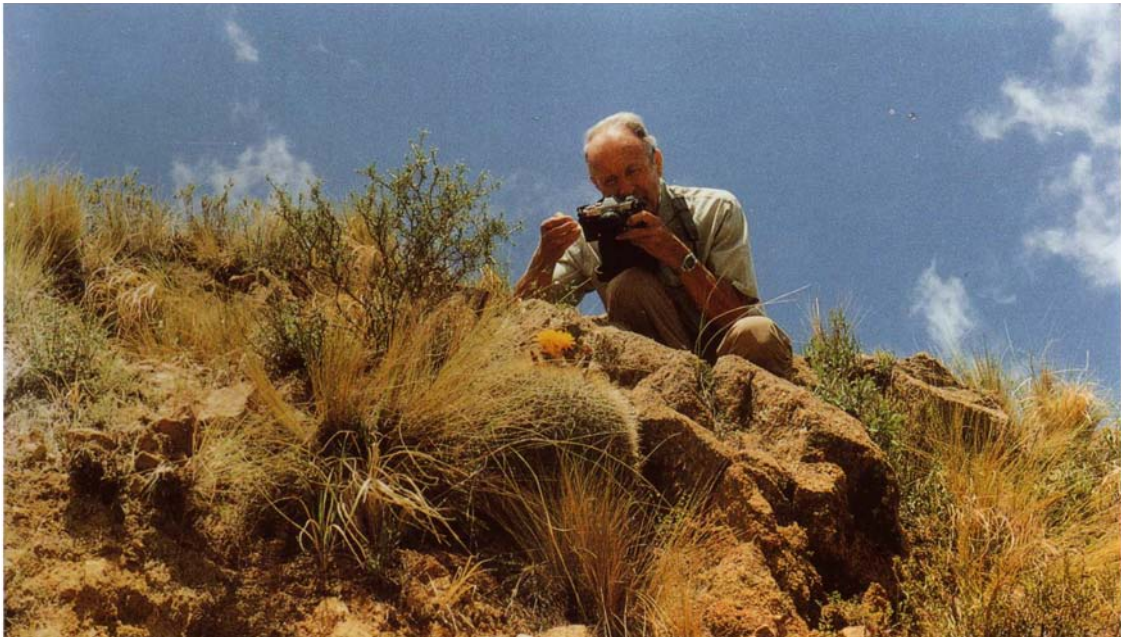
2nd edition
Revised and supplemented



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File Creation Note

This file was created by scanning the book to PDF, passed through OCR (Scansoft) to create a text file, and (very roughly) translated from French to English by computer (Systran). Both processes produced thousands of errors, sometimes resulting in the opposite meanings, that have been laboriously corrected in Word 2007, by myself and Daniel Schweich. (and this file was corrupted and recovered with Open Office)

So if a few (or many) errors remain, or if errors have been introduced, don't be too surprised, but let one of us know anyway.

Roy Price 2010

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Daniel Schweich 2010

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Thanks

I would like to express briefly here my thanks to all those who made possible the realisation of this work. Let me quote, in order:

- My excellent friend Maximo Navarro, whose knowledge of the Argentinean road network and control of the wheel enabled me to visit many places with difficult access, even perilous, by saving me from the obstacles met by chance on our journeys.
- Dr. Roberto Kiesling, great specialist in the Argentinean cacti, who I frequently consulted, not only his excellent publications, but with whom I also had many most instructive discussions.
- Mr. Omar Ferrari (La Plata) and Mr. Dietrich Herzog (Cafayate), informed prospectors and cactophiles, of whom I could visit their collections for reference, and who liberally gave me gifts of plants intended to supplement our study material.
- My European correspondents cactophiles, far too many to quote them all by name, with whom I exchanged thoughts and most useful documentation.
- Lastly, I would not like to finish without a loving thought for my dear wife, who agreed to play Penelope each time when on our remote expeditions.

WARNING

This is not just a monograph, it is by no means an exhaustive inventory of all the species of known cacti of Argentina to date.

I preferred, with this kind of work which inevitably comprises a great part of compilation, to write here of the species which I observed personally, in the wild, as well as in culture.

Having indeed crossed most of Argentina, in all directions and on six occasions, I brought back from there an invaluable harvest of observations, notes and documents, which were used by me as base to the development of the present volume.

The latter thus places at the disposal of many amateur botanists, a mass of information quickly gleaned, and of which some was still new.

In order to make the consultation of it as easy as possible, I followed the method adopted by Backeberg in his "Lexikon", i.e. the classification of the genera, as well as that of the species within a given genus, in alphabetical order. This should allow amateurs not familiar with the phylogenic classification to find them there without any problem.

Conversely, with regard to the description of each species, I did not want to stop at the rather brief summaries in the "Lexikon", but rather chose in this case to follow the way of Ritter ("Kakteen in Südamerika"), enumerating a maximum number of characteristics in order to facilitate identification.

By doing this, I was of course brought to use a minimum of technical terms, which I consider to be within the range of the average amateur, so that I did not consider it necessary to attach a glossary¹.

In addition, not to weigh down descriptions for each species, I did not list again the sometimes tiresome list of the old synonyms. Nevertheless, the synonyms still used nowadays are usually found in the lists of species, with reference to the names retained by me.

The choice the latter is by far not always easy. After the period of Backeberg and company, which was the golden age of "splitting", one assists in the inevitable return of the balance, the current tendency is straightforwardly to "lumping", and one observes a drastic reduction in the number of the genera as well as that of the species. All recent recommendations of the I.O.S. go in this direction. As an example, the last proposals of the working group on the genera of Cacti do not retain any more than 93 genera out of the 412 described during the long systematic history of the family. It is necessary to note that it is not a question of making a decree, for these recommendations are not constraining, many of them not even having achieved unanimity within the very working group.

Let me not lose sight of the fact, indeed, that if the only criteria retained for the definition or the separation of the genera are well defined and indisputable characteristics, the importance that one grants to them at the taxonomic level that they are used to differentiate, remains a subjective appreciation. This fact holds all the more at the species level! Which then results in the divergent opinions between botanists.

¹ However, the translators added a short glossary at the end of the book.

A field worker or laboratory researcher, confronted with this kind of problem, is often brought to think according to his own observations, especially if he is not limited to one or the other specimen, but includes whole populations, and takes into account elements such as the geographical distribution, genetic isolation. Etc...

This is why I followed only partially the recommendations of the I.O.S., by using my personal impressions, and trying in each case to forge my own opinion as honestly as possible. When I deviate from certain points of view stated by others, I briefly state my explanation in the text. It is well known that no one is infallible, and there remains always a share of subjectivity in the present conclusions, however, an in-depth analysis of the motivations followed would let me go too far, and is outside the framework of this work.

Lastly, as regards the illustration of the texts, I have amply drawn from the rich iconography that I have gathered. I indeed share the opinion of those who believe that a small drawing, – or a good photo – is often better than a long essay.

Passendale, October 1st, 1992.



Provincial Park Ischigualasto (San Juan): “Aladin’s Lamp”.
Since taking this photograph, in 1989, erosion has perfected its work, and the
“lamp” has collapsed and no longer exists.

PREFACE TO THE SECOND EDITION

Any work of a somewhat scientific connotation contains only the current knowledge of the author at the time of its writing. If he pursues his observations and his researches, it is obvious that each later edition will be modified and supplemented. Of course I have not escaped this rule, and this is why I present today a book that is re-examined, supplemented and, – hopefully – improved.

I, of course, corrected the few mistakes which had escaped the vigilance of the editor.

Certain descriptions in addition have been rectified or supplemented, following further study of the plants.

In some cases, I revised my opinion to the light of new observations, whether in the wild or in culture. As the great naturalist Buffon said, only imbeciles never change an opinion.

I also took account of changes that occurred in the nomenclature, following the work of various specialized botanists; in this case, the old names, now fallen in synonymy, have been maintained in the alphabetical list of the species, with a reference to the new names under which the detailed description can be found.

Lastly, a botanist friend advised me that my new combinations, as previously published, were not valid, having failed to mention the basionym. This gap is now filled, and thus reconciles the suggested names to the international rules of nomenclature.

I hope that the reader will appreciate the efforts offered to him in the text updated as far as possible, and let me wish him a pleasant and profitable reading of it.

ACANTHOCALYCIUM Backbg.

The condensed definition of the genus can be stated as follows: “Plants globular to elongated, with white flowers, pink, red or yellow, funnel-shaped; scales on the ovary and on the tube becoming thorny at their end; presence of a woolly ring (internal) at the base of the receptacle.”

This woolly ring, of staminoide origin, partly closes the nectar chamber. It is an anatomical device which is found again also in other genera, but it is more developed with *Acanthocalycium*.

The spiny or mucronate scales, are very characteristic, and they should not be confused with the spines that one finds contained at the axils of the scales, for example in some *Lobivias* and *Rebutias*, or in some *Notocactus*. Note however that some *Echinopsis* can also have scales more or less mucronate on the tube.

The genus *Acanthocalycium* is exclusively Argentinean, its area of distribution being limited to the North of the country. One can distinguish two groups, as follows:

- a) The southernmost group, or “spiniflorum”, with a floral bud that looks like a rough cone;
- b) The northern group, or “thionanthum”, with a more woolly and rounded floral bud, more reminiscent of a lobivioide bud.

Some authors wanted to see in each of these groups only one species, with more or less differentiated varieties or local forms. This is undoubtedly to push the “Lumping” a little too far, and I will treat below the species according to our personal concept, resulting from our observations in the wild as well as in collections.

The fruits and the seeds of *Acanthocalycium* offer great affinities with those of *Pyrrhocactus*. It is of the latter genus that *Acanthocalycium* seems to be the closest, and it is an error, to want to attach them to *Echinopsis* as is still proposed by some authors.

1. Group “spiniflorum”.

A. *klimpelianum* (Weidl. & Werd.) Backbg.

Body flattened spherical, about 10 cm in diameter, leaf-green to dark green; apex depressed, woolly. Ribs straight, high, acute, separated by deep vertical furrows, 15-18-(20). Tubercles confluent, laterally compressed, with slightly inserted areoles. Areoles oval, wider at the upper part (obovate), 6 × 4 mm yellowish-white passing to greyish-white. Spines strong, straight, radiating to erect, up to 15 mm long; Young spines brown with yellowish base, becoming

white with brown point. Radial spines from 7 to 9; centrals from 1 to 4, but more often 2 or 3.



Fig 1: *Acanthocalycium klimpelianum*, Los Patayes (Cordoba).

Flowers in a crown around the apex, 60 mm high and 40 mm in diameter. Globular ovary, 5 × 5 mm, densely covered with thorny straw-yellow scales with a blackish-red base. The spines of the scales of the lower part of the tube, gradually pass, at the top, to a less thorny mucro, with blackish-brown base, the scales becoming, larger and pink.

External tepals spatulate, white with a pink median stripe and a blackish brown mucro. Internal tepals lanceolate, pure white with tiny brown mucro. Throat green. Stamens in only one series, all established over the full length of the receptacle; filaments light green, anthers cream. Ring of white wool close to the base of the receptacle. Style green; Stigma light green, with 11 lobes.

Area of distribution: province de Cordoba.

A. klimpelianum var. macranthum (Rausch) Lambert comb. nov.

Basionym: *Lobivia spiniflora* var. *macrantha* Rausch. *Lobivia* 85, p. 158, 1986.

Variety with larger flowers described by Rausch from province de Catamarca (El Alto).

A. peitscherianum Backbg.: = **A. klimpelianum**.

A. spiniflorum (K. Sch.) Backbg.

Body globular, to short cylindrical, light green. Apex slightly depressed, woolly and thorny. Ribs high, acute, slightly sinuous, 18-20. Areoles wider than with the preceding species, around 5 mm in diameter, dirty yellowish-white. Spines fine, acicular, erect and interlaced, brown when young, becoming straw-yellow with a light reddish-brown base and a short brown point, 10 to 14; the longest measuring up to 35 mm. There is no clear distinction between radials and centrals.

Flowers near the apex; height 40 mm, diameter 50 mm. Tube light green, covered with scales with dark brown edges and median band, and ending in a long light brown mucro. White wool not very abundant in the axils.

External tepals spatulate, mauve with a median green stripe and blackish-brown mucro. Internal tepals spatulate, pale mauve, with a more distinct median band, with a small mucro of the same colour. Green throat, stamens in a single series; filaments yellowish-white, anthers light yellow. Ring of wool white to pale yellow close to the base of the receptacle. Style greenish white; stigma light green, with 10-12 lobes.

The fruit is a berry with a hard wall, of about 10 mm in diameter, with persistent mucronate scales and the dead remainders of the flower attached. With maturity, the dehiscence takes place vertically. The seeds are brown to



Fig. 2: *Acanthocalycium violaceum*, collection of O. Ferrari, La Plata.

blackish, ovoid, with a finely warted testa, and a basal hilum, very small and recessed, such that of *Pyrrhocactus*.

Area of distribution: North of San Luis and province of Cordoba

A. violaceum (Werd.) Backbg: This is only one form of the preceding, with more mauve flowers and with lighter epidermis.

2. Group “thionanthum”.

A. aurantiacum Rausch

Species with orange flowers and yellow stigma, discovered by Rausch close to Minas Capillitas. This form could be a geographically isolated variety of *A. variiflorum*. As I did not have the occasion to observe it, I do not wish to give an opinion on this subject.

A. brevispinum Ritter: = **A. thionanthum**.

A. catamarcense Ritter: = **A. griseum**.



Fig. 3: *Acanthocalycium chionanthum*: origin Campo Largo (Salta).

A. chionanthum (Speg.) Backbg.

This species replaces *A. thionanthum* to the North of Cafayate, the distribution limit seeming to be at the line of San Carlos - San Lucas.

The body is greyish-green, globular to short cylindrical, reaching a diameter of 12 cm and a height of 15 cm. Ribs straight, rounded, relatively high, 15 to 19; confluent tubercles, without transverse furrows. Elliptic areoles, dirty white, 6-7 × 3-4 mm. Spines strong, straight, vertical, 8 to 10, measuring up to 13 mm long. It is possible to distinguish a central spine in some populations only. The young spines are blackish-brown, passing later to pearl-gray with a black point.

Flowers lateral, height 15 mm, diameter 50 mm. Tube funnel-shaped, light green, covered with scales with long black thorny point; greyish wool in the axils at the base of the tube, black at the upper part of that one, passing progressively from scales to external tepals, which are light green with a black mucro. Intermediate tepals white with pink median stripe and black mucro. Internal tepals pure-white, having a small mucro hardly noticeable. Green throat. Stamens in two annular series, white filaments, anthers light yellow. Brown wool ring close to the base of the receptacle. Green style, stigma greenish-white, with 13-14 lobes.

Area of distribution: Molinos, Cachi, La Poma (Salta Province).

A. copiapoides n.n.: = **A. thionanthum**.**A. ferrarii** Rausch.

The prettiest of the species because of the colour of its flowers! Body dark leaf-green, sub-spherical, reaching 12 cm in diameter. Apex flat, slightly woolly, spineless. Ribs straight, round, with the vertical furrows lessening towards the base of the plant, 11 to 15. Tubercles elongated vertically, separated by transverse V shaped furrows. Areoles oval, 7 × 5 mm, furnished with yellowish-white wool passing quickly to greyish, 17 mm apart. Straight radial spines, strong, radiating to slightly erect, 7 to 9, white to greyish-pink with a brown point; central spines of the same aspect, erect, 1 to 2. Maximum length of the spines 20 mm the young spines are blackish-brown with a greenish-yellow base.

Flowers lateral, height 50 mm, diameter 60 mm. Ovary glaucous green, of about 10 mm high; tube olive-green, of about 15 mm long, strongly infundibuliform, passing from 9 mm in diameter at the base to 20 mm at the upper part. The tube is covered with small green scales, ending in a blackish-brown bent spine, and with long white woolly hairs in the axils. External tepals olive-green with an orange edge, with a strong blackish-brown bent mucro. Intermediate tepals orange-red with greenish median stripe and a blackish-brown mucro. Internal tepals red orange with red edges. All the tepals are spatulate. Stamens in two annular series; filaments pink-orange, anthers light



Fig. 4: *Acanthocalycium ferrarii*.

yellow. Wool ring blackish-grey close to the base of the receptacle. Green style; stigma carmine.

Area of distribution: Sierra de Quilmes. (Tucuman Province).

A. glaucum Ritter

Species named particularly well, considering the characteristic grey-blue colour of the skin.

Body green greyish blue (“leaded” aspect), slightly higher than wide, becoming longer with age. (Up to 15 cm in height and 8 cm in diameter). Apex very slightly depressed, slightly woolly and thorny. Ribs slightly sinuous, round, 8 to 14. Tubercles vertically elongated, confluent; transverse furrows rudimentary or absent. Areoles oval, 7 × 4 mm, white. Spines strong, straight, slightly bent, erect, up to 25 mm long. Young spines brown with black point, passing to greyish-pink with dark tip. Radial spines 5-7-9; central spines generally absent, sometimes 1-2.

Flowers lateral, height 60 mm, diameter 60 mm. Ovary olive-green, to around 9 mm in height and wide. Tube olive-green strongly tinted with brownish-pink, largely infundibuliform, furnished with small scales with brown point and black mucro. Tufts of whitish wool, passing to blackish at the top, established in the axils, with three bristles with black at the end. External tepals light yellow with a brownish green median band, red tip and black mucro. Internal tepals bright yellow with red tip and black mucro. All



Fig. 5: *Acanthocalycium glaucum*: origin Hualfin (Catamarca)

the tepals spatulate, external narrower than the internals. Stamens in only one series; yellow filaments, anthers cream. Ring of white wool close to the base of the receptacle. Green style, light green stigma, passing to yellowish-white when opening, 10 lobes.

Area of distribution: Area of Belen-Hualfin. (Province of Catamarca).

A. griseum Backbg.

Species appearing to be more or less intermediate between the two preceding ones, which is confirmed by its geographical origin. In fact, it is not excluded that it is a natural hybrid; if I preserved a specific status here to it, it is rather for respect towards both great cactophiles Backeberg and Ritter, for each one on their part believed to see a distinct species.

Body greyish-green, reaching 12 to 15 cm in height, and 10 cm diameter. Apex flat, woolly and thorny. Ribs rounded from 11 to 15. Large areoles, 9×6 mm, gray. Strong spines, erect, more or less bent, gray-pink with black point; radials 9, centrals 2; about 40 mm long, young spines are black reddish, the base greenish-yellow.

Flowers lateral; height 45 mm, diameter 45 mm. Ovary and tube covered with scales longer and narrower than with the other species; greyish-brown wool in the axils. External tepals spatulate, yellow with a brownish median

stripe and dark mucro. Internal tepals spatulate-mucronate, golden-yellow. Filaments yellow, anthers light yellow. Woolly ring at the base of the receptacle less developed than with other species, brownish. Style yellow, red stigma.

Area of distribution: Punta de Balasto (Province Of Catamarca).



Fig. 6: *Acanthocalycium griseum*, Punta de Balasto (Catamarca).

A. thionanthum (Speg.) Backbg.

Body globular to short cylindrical, green to greyish-green, up to 10 cm in diameter and 12 cm in height. Woolly flattened apex (ochre-yellow wool). Ribs round, straight to very slightly sinuous, 13 to 18. Tubercles elongated and flowing together. Areoles elongated, 6-8 × 4-5 mm, ochre-yellow passing quickly to greyish-white. Spines short, strong, erect; young spines brown with a black point, becoming straw-yellow to greyish-pink with a brown point. One counts to 13 radial spines and 4 centrals; maximum length 15 mm.

Flowers lateral, largely infundibuliform, to 45 mm high and wide. Ovary and tube light green, covered with scales with horny black mucros; greyish-white wool and dark brown bristles in the axils. External tepals pale yellow with a median stripe of greyish-green, extremity reddish and a black mucro. Intermediate tepals light yellow with black mucro. Internal tepals denticulate spatulate, yellow, with a mucro of the same colour. Filaments yellowish white, anthers cream. Brown wool ring at the base of the receptacle. Style white-greenish to olive-green; stigma crimson-red with 12 lobes.



Fig. 7: *Acanthocalycium thionanthum*, Pichao (NW of Tucuman).

Area of distribution: Cafayate, Tolombon, Amaicha del Valle, Santa Maria (Provinces of Salta, Tucuman and Catamarca).

A. thionanthum var. munitum (Rausch) Lambert comb. nov = **A. variiflorum**.

Basionym: *Lobivia thionantha* var. *munita* Rausch, *Lobivia* 85, p. 154, 1986.

A. variiflorum Backbg.

Body globular, lengthening with age, until reaching 15 cm high to 8-10 cm in diameter; epidermis glaucous pale green. Apex slightly depressed, woolly, more or less covered by the spines of the adjacent areoles. Ribs wide, rounded, 15 to 17. Tubercles elongated conical, chinned, more or less separated by transverse furrows. Areoles oval, gray, 5 × 3 mm. Spines strong, erect, (5)-7-9 radials, and 0-1 centrals, longer about 35 mm. The young spines are black with a light brown base, and become grey thereafter.

Flowers around the apex, height 40 mm, diameter 40 mm. Tube olive-green, covered with small light brown scales with black mucro. Greyish wool in the axils. Scales passing gradually to the external tepals, which are initially

olive green, then more and more orange, with a black mucro. Internal tepals red-orange with mucro of the same colour. Throat light yellow. Filaments orange with a yellow base; anthers light yellow. Style green, stigma greenish-white, with 8 lobes

As the name of the species indicates, the colour of the flowers is not constant, and varies from yellow to red through to orange. The red flowers present a yellow stigma; the yellow flowers present a stigma sometimes greenish, sometimes red.

Area of distribution: mountains above 2500 m to the North-West of Tucuman and to the South-West of Salta.

Notes:

- 1) Rausch described, under the name (faulty) *Lobivia thionantha* var. *erythrantha* a form with small red flowers from Arca Yacu (Salta). Not having observed this variety, it is not possible for me to discuss its affinities.
- 2) The species described by Backeberg under the name of *Neochilenia andreaeana*, was initially transferred to the genus *Neoporteria* by Donald and Rowley, and then Donald proposed finally the new combination *Acanthocalycium andreaeanum*, must actually be called *Pyrrhocactus andreaeanus*. The origin is the Sierra of Famatina.



Fig. 8: *Acanthocalycium variiflorum*, Los Corpitos (Tucuman).

Culture

Acanthocalyciums are generally found in arid, stony places and very exposed to sunshine. In culture, one will preferably give them a well drained soil and an exposure to strong sunlight.

Kept quite dry in winter, on the other hand they will appreciate to be occasionally misted in the between-seasons, and regularly watered in summer. From the manure point of view, they appear to be among the fairly demanding species.

Cultivated under good conditions, they are very floriferous plants, not posing any particular problem. The reproduction by seed is easy.

AUSTROCACTUS Br. & R.

The distinctive characteristics generally called upon to separate *Austrocactus* from the *Pyrrhocactus* genus, are the more tender flesh, the column-like form of adult plants, the presence of hooked spines, and the running to red or violet colour of the stigma.

One must admit that the consistency of the flesh is a rather curious characteristic, that forbids to some extent the "non destructive" examination of specimens.

The column-like form is not exclusive, for example, I have observed at Moraves, the plants of *Pyrrhocactus megliolii* which measure 50 to 60 cm in height.

As for the hooked spines, I collected, close to Monzano Historico (province of Mendoza) a *Pyrrhocactus* sp. (JL-89) where some of the spines at least are distinctly hooked.

The two genera thus are narrowly connected, and I will conclude with Spegazzini that the principal merit for the genus *Austrocactus* is to clearly indicate its geographical origin, which is limited to Patagonia.

In the interior of this vast territory, the species also seems to occupy all of the well defined niches; in the North-West, *A. dusenii* and *A. gracilis*; in the East (a great area of distribution, Rio Negro and Chubut, including the coastal islands such as Leones and Tova), *A. patagonicus*, and to the South-East (Comodoro Rivadavia), *A. bertinii*.

It is highly possible, as suggested by Spegazzini, that *A. gracilis* is only a form of *A. dusenii*.

To be complete, let me finally state that a Chilean species was described by Backeberg under the name *A. hibernus*.

We will limit ourselves here to a more detailed description of *A. patagonicus*, the only species of which I could study a plant of well defined origin. (PK 40 between Puerto Madryn and Trelew).

A. patagonicus (Web.) Backbg.

Body cylindrical, reaching up to 50 cm high and 5 to 8 cm in diameter; epidermis dark leaf-green. The older plants become proliferating. Apex fur-

nished with yellow wool, covered by the spines of the adjacent areoles. Ribs 10-12 mm high, strongly tuberculate, 9 to 12. Areoles oval, 3 × 6 mm, 1 cm apart, initially yellowish-white, passing then to greyish-white. Young spines black, base red, passing to light brown, to become finally grey with a black end. Radial spines 7 to 11, fine, straight, radiating, measuring up to 15 mm long. Central spines 1 to 4, very strong, straight, more or less hooked, bulbous at the base, up to 30 mm long.



Fig. 9: *Austrocactus patagonicus*: origin Trelew (Chubut).

Flowers near the apex, height 40 mm, diameter 50 mm. Tube short, light green, scales with a dark median stripe and pinkish extremity, with tufts of dirty white wool, and many white to brownish bristles, stiff and erect. External tepals lanceolate, white with a large blackish-green median stripe and black mucro. Intermediate tepals white with an olive-green median band. Internal tepals wider (7-9 mm), but also terminate by a point, with a white base and upper part pinkish. Stamens in two or more series, white filaments, anthers pale yellow. Style pink; stigma dark crimson-red, with 8-12 lobes.

Fruit ovoid, 15 mm in height and 12 mm in diameter, covered with tufts of bristles. Seeds conch-shaped, around 2.5 mm in diameter, laterally compressed; testa warted, with light brown and black maculae; hilum small and strongly recessed.

Area of distribution: Patagonia.

Note:

In collections one sometimes meets plants under the label *A. patagonicus* var. *dusenii*. It is in reality the distinct species *A. dusenii* (Web). Speg., with fine spines of white colour. Backeberg puts this species in synonymy with *A. coxii* (K. Sch. non Phil.); however, plants distributed in culture under the name *A. coxii* are of different aspect, with the spines definitely more squat, but as I have no material from origin, it is not possible for me to solve this question.

Culture

The species being sensitive to rotting of the roots, it is of primary importance to allow a well drained soil. Do not give too much manure either. The plants flower easily, with a size of 15 to 20 cm.

Considering its geographical origin, it is a species resistant to cold, which can in theory spend the winter outside provided that it is sheltered from the rain. According to our observations, it is an experiment that can be tried if the area lived in has a continental climate, but which on the other hand I do not advise for maritime areas. Much more than the cold, is the effect of moist air, which is likely to damage the plants.

AUSTROCYLINDROPUNTIA Backbg.

Plants cylindrical, more or less elongated, ramified, of which the extreme forms can vary from slender to spheroid. Spines deprived of sheath. Young areoles furnished with leaves; whereas in the majority of Opuntioideae, these leaves are conical, rudimentary and transitional, they are here definitely longer (1 cm and more), and persist for a longer time.

The three Argentinean species meet in the North of the country, and always at altitude (1500 m and more).

A. clavarioides (Pfeiff.) Backbg.: see **Puna clavarioides**.

A. humahuacana (Backbg.) Backbg.: = **A. shaferi** var. **humahuacana**.

A. salmiana (Parm.) Backbg.: see **Opuntia salmiana**.

A. shaferi (Br. & R.) Backbg.

Plants bushy, up to 60 cm in height; stems from 2 to 20, of around 3 cm in diameter, with light green epidermis. The tubercles are not distinct, but have fine horizontal wrinkles on the surface of the stems instead. Areoles



Fig. 10: *Austrocyllindropuntia shaferi*, botanical garden of Tilcara (Jujuy).

round, light yellow, 3 mm in diameter, and 10 mm apart arranged in a row. Dark-green leaves on the young areoles, about 1.5 mm long. Young spines light brown, passing to whitish then to pruinose pink. Spines 10 and more per areole, very long directed downwards, measuring 30 to 50 mm long, which is worthy of the plant's nickname "cola de zorro" (tail of fox). Moreover areoles carry white bristles, and glochids that are light yellow at their upper part.

Flowers near the extreme end of the stems; receptacle globular 1.5 to 2 cm in diameter, green; perianth rotate, to 30 mm in diameter. External tepals greenish-red; internal tepals garnet-red, largely rounded, with a little mucro. Filaments orange; anthers yellow. Style yellowish-white; Stigma green, with 5-6 lobes.

Fruit carmine, globular to ovoid, 18mm diameter, 19 to 22 mm high, with many small areoles around 1 mm in diameter, furnished with white glochids; red flesh. Fruits contain up to 25-30 light yellowish-brown seeds; these seeds are smooth and piriform, and measure 4×2.5 mm. The hilum is apical.

Area of distribution: From Purmamarca (Jujuy province) in the South, up to the Bolivian border and even beyond.

A. shaferi var. humahuacana (Backbg.) Kiesling

Is distinguished from the typical form by the fewer stems and shorter spines.

The area of distribution would be limited to the region of Humahuaca, however I personally observed only the type species.

A. verschaffeltii (Cels) Backbg.

In nature, this species forms cushions of relatively low short ovoid segments, around 4 cm long and 15 to 25 mm wide, somewhat reminiscent of the aspect of *Maihuenopsis*. In culture, on the other hand, it develops elongated cylindrical segments, of a diameter from 10 to 15 mm, and they can reach 20 cm long. The root is more or less tuberous, and can carry several heads. The epidermis is green to slightly glaucous green, the base of the segments quickly becomes brownish and fissured. Areoles yellowish-white, 2 mm in diameter. Spines long, fine, flexible, yellowish-white, 4-5 per areole, measuring up to 60 mm long. The young areoles carry fleshy leaves, green, sometimes tinted red, a maximum length of 15 mm.

Flowers borne near the end of the segments; height 45 mm, diameter 35 mm. Receptacle of 25 mm, light green, with rare areoles, scales with carmine point, and a crown of bristles light yellow, 15 mm long. External tepals nar-



Fig. 11: *Austrocyllindropuntia verschaffeltii*, Abra del Infernillo (Tucuman).

row, green with a carmine point. Internal tepals round, serrated, with a small mucro, orange to fire-red. Stamens sensitive; filaments orange, anthers light yellow. Cylindrical style, white, 18 mm long; stigma with 9 lobes of 2 mm, dark purplish.

Area of distribution: The mountains to the North-West of Tucuman (Sierra del Aconquija) up to Bolivia.

A. vestita (S-D) Backbg.

Another plant more stocky in nature than in culture, where they become bushy and can reach 40 cm in height. The segments are thicker than the preceding one, and can measure up to 2 cm in diameter; the epidermis is coloured leaf-green. The indistinct tubercles are rhomboid-shaped and they carry areoles of 2 mm in diameter, yellowish-white. Spines 4 to 8, short, white to yellowish, and drowned in the abundant white wool which is worth its designation of the species.

The flowers measure 35 mm in height, 30 mm in diameter. Tepals red purplish. Red filaments; anthers yellow, Style light red; stigma dark crimson.

Fruit Ellipsoid, 15 mm long to 12 mm wide, red carmine, covered with white wool.

Area of distribution: From Volcan (Jujuy province) up to South Bolivia.

A. weingartiana (Backbg.) Backbg.: = **A. shaferi**.

Culture

Whilst accommodating a mineral substrate, they are plants which appreciate a certain contribution of humus. This is why I recommend a 50/50 mixture of crushed lava and light earth. Strong sunshine will be of course welcome; reserve if possible a site under the roof of the greenhouse. Water liberally in summer, and apply sufficient manure; like all *Opuntioideae*, the *Austrocylindropuntias* belong to a species requiring abundant manure. Under good conditions, flowers can be observed, in particular with *A. verschaaffeltii*.

AYLOSTERA Speg.

See *REBUTIA*.

BLOSSFELDIA Werd.

This genus includes the smallest known cacti, and it seems to be derived from *Frailea*, by disappearance of the ribs and tubercles, and thorough reduction of the spines and bristles. Even if one practically does not distinguish any more ribs, the areoles are laid out in regular spirals, at the start of the apex thick wool. The flowers, tiny, are yellow, and self-fertile. The floral tube, very short, carries only scales and a little wool. The fruit, spherical or club-shaped, opens by lateral dehiscence at the upper part.

B. campaniflora Backbg.: = **B. liliputana** var. **formosa**.

B. fechseri Backbg.: = **B. liliputana** var. **fechseri**.

B. liliputana Werd.

Species highly specialized, selecting the fissures in the walls of vertical rocks. Body very small, flattened to slightly rounded, not exceeding 18 mm in diameter, with a long napiform root; initially solitary, then proliferant to form small groups of plants. Epidermis greyish-green with silver-grey. Areoles tiny, whitish, arranged in spirals; no spines.

Flower central, about 1cm long. Ovary olive-brown, with small triangular scales, and a little wool in the upper part. External tepals light yellow with a



Fig. 12: *Blossfeldia liliputana*, Purmamarca (Jujuy).

median stripe of olive-brown and a brownish point. Internal tepals pale yellow, lanceolate, with a darker median stripe on the external face. Stamens golden-yellow. Stigma white, papillose, with 5 lobes

Fruit spherical, around 7 mm in diameter, mauve olivish at first, then brown.

Area of distribution: Province of Jujuy (Tumbaya, Purmamarca).
Represented also by a geographical race in the South of Bolivia.

B. liliputana var. fechseri (Backbg.) Ritter

Body very green and very high. Origin; province of Catamarca.

B. liliputana var. formosa Ritter

Body very dark, hemispherical, with a depressed apex and not very woolly. Areoles more inserted.

Origin: Provinces of Salta (Alemania) and La Rioja.

Culture

Robust plants, not posing any particular problems. Avoid a too compact soil (clay!) that would prevent the development of roots. Flowers willingly.

BRACHYCALYCIUM Backbg.

See *Gymnocalycium saglionis*.

CEREUS Mill.

Very old genus (1754), which included at the beginning all the columnar cacti, but it is currently reduced to about fifty species, whose distribution extends from the Antilles to Argentina. Sometimes bushy plants, sometimes straightforwardly arborescent, forming massive trunks surmounted by an imposing crown. Flowers glabrous, a long tube furnished with sparse scales. When the flower fades, the perianth falls, but the style persists a certain time, sometimes even upon the fruit. The latter is oblong, coloured from greenish to red. The seeds are large (2.5 mm in diameter), generally of a matt greyish-black, more rarely shiny.

Though their great dimensions are often a disadvantage in culture, one can during several years follow well the development of the young seedlings, which one can lay out in a flower bed in open ground. Moreover, several species will flower already from a cutting of only 1 to 2 metres.



Fig. 13: Cereus aethiops: origin road to Tupungato (Mendoza)

C. aethiops Haw.

Species bushy, diameter 30 to 40 mm, reaching 2 m high, with a bluish-green epidermis. The stems, which ramify with age, are generally erect, but can also become more or less crawling. Ribs round, straight, 8; tubercles merging together. Areoles around 4 to 5 mm in diameter, 12 mm apart, briefly whitish, then greyish to blackish. Spines straight, strong, erect. Radials number 9-11, yellowish-white with a black end, measuring up to 10-12 mm long. Centrals 2-3-(4), completely black, up to 30 mm long.

Flowers lateral to subterminal; length 20 cm, diameter 10 cm. Tube glaucous-green at the base, passing quickly to mauvish; glabrous, with rare small scales with red point. External tepals old pink, with a median stripe of mauve. Intermediate tepals white with a lilac-pink median band, then, more towards the interior, with a light green band. Internal tepals pure white. All tepals lanceolate, with the internals wider, with a little mucro. Stamens in two series; the primary in a compact bouquet at the base of the perianth on both sides of

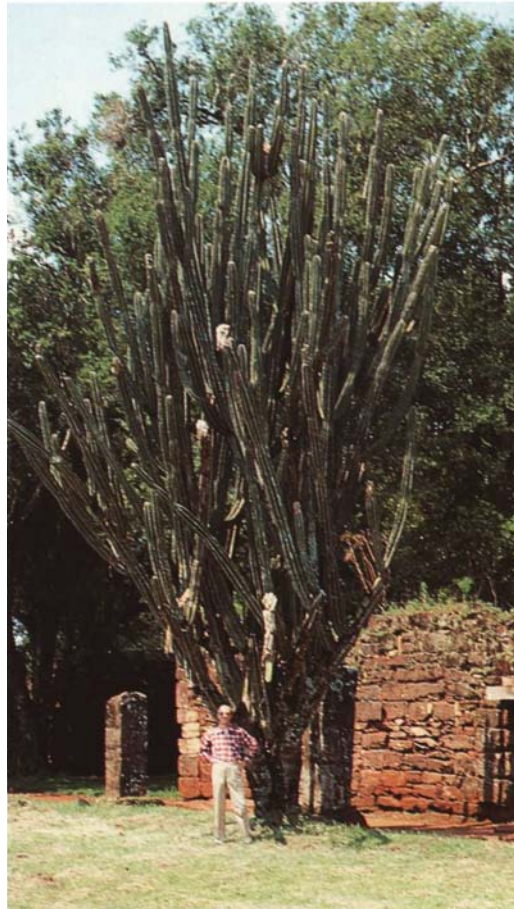


Fig. 14: *Cereus argentinensis*, San Ignacio (Misiones).

the style; secondaries in a single peripheral crown. Filaments light green with a white extremity. Anthers light yellow. Style pale green; Stigma yellowish-white, with 12-13 lobes.

Fruit piriform, truncated at its upper end, 40 mm tall and 28 mm in diameter, initially bluish-green, passing to mauve then to red when ripening.

The plants start to flower at 50 cm in height.

Area of distribution: The Rio Negro in the South, up to the North-West of the province of Tucuman

C. argentinensis Br. & R.

Arborescent plants reaching 12 m in height, with a trunk from 20 to 50 cm in diameter and branches from 10 to 15 cm thick. Young growths fresh green, with dark transverse bands, passing to glaucous mat-green. Ribs 4-5-(6) from 5 to 6 cm high. Areoles round, 6-8 mm in diameter, initially white, but quickly becoming grey to blackish. Short radial spines (10 mm) 3-5, initially orange with brown point, passing later to blackish gray. Central spines 1-2, 20 to 50 mm long.

Superb flowers 23 cm long and 16 cm diameter, established laterally. Ovary and tube light green, glabrous, with a few small scales. External tepals spatulate, fleshy, initially short and green with a fine carmine-red edge,



Fig. 15: *Cereus argentinensis*, single flower; origin Cerro Azul (Misiones).

then longer and with a wider edge. Intermediate and internal tepals lanceolate (2 cm), with a very small mucro. The colouring advances progressively from the outside to the centre of the flower: initially pink, with a pale green base and median stripe, then pink with a more carmine end, then white with a pink median stripe, and finally pure white. Throat light green. Stamens in two series; white filaments, anthers ochre. Style 145 mm, light green becoming paler at the top; stigma yellow, with 12 lobes of 25mm, exceeding the stamens.

Area of distribution: Provinces of Misiones and Formosa. (Chaco Boreal).

C. forbesii Otto

Species arborescent, measuring up to 7 m high, with a trunk of 10 cm and more in diameter. Young growth bluish green, passing to olive-green to more or less greyish; branches of 65 to 130 mm in diameter. Ribs 4 to 7, 20 to 25 mm high, less distinct in the older parts of the plant. Areoles round, around 4-5 mm in diameter, with white yellowish wool, not very abundant, becoming



Fig. 16: Cereus forbesii, La Estrella (Salta)

blackish-grey thereafter. Radial spines 2 to 5, measuring up to 2 cm long, pale brown, darker at the base. Central spines stronger and darker, up to 45 mm long; old spines on the trunk can measure up to 10-11 cm.

Flowers lateral, 16.5 to 20 cm long, and 8 to 12 cm in diameter. Ovaries long, 25 × 18 mm; tube light green, glabrous, with some very small scales. External tepals carmine with a green median band. Internal tepals pink. Filaments white, barely greenish at the base; anthers brown blackish. Style light green with a white end, 10 cm long. Stigma yellowish white, with 20 lobes 2 cm long.

Fruit red with a bluish pruinose coating and red flesh.

Area of distribution; Species very widespread on the plain, found in the provinces of Cordoba, Santiago del Estero, La Rioja, Catamarca, Salta and Jujuy. Often associated with *Stetsonia coryne* and *Opuntia quimilo*

N.B. Some authors proposed recently to invalidate the name *C. forbesii*, of which there is neither type, sufficiently detailed description, nor quite identifiable illustration. The new name suggested for the Argentine species would then become *C. Hankeanus* (Web) K. Sch., of which the excellent illustration by Gürke in "Blühende Kakteen" would be the neotype.

C. roseiflorus Speg.

Arborescent plants, of 4 to 5 m in height and 15-25 cm in diameter; young growths light bluish green, passing to matt leaf green, without transverse bands. Ribs (4)-5-6, 25 to 35 mm high, rounded. Areoles, 6-8 mm in diameter, yellowish-white passing to dirty white, 20 to 25 mm apart. Young spines light brown, passing to blackish-brown; radials 3-5-(7), initially more or less erect, becoming appressed, not exceeding 10 mm long; single central, erect, reaching 20 mm.

Flowers established laterally, but near to the higher end of the stems; height 18-20 cm, diameter 14-15 cm. Ovary and tube light green, glabrous, with very few rudimentary rounded scales. Tube with 5 to 9 vertical furrows. External tepals spatulate, mauve with a pale green median stripe, more or less fleshy. Intermediate tepals lanceolate mucronate, wide (20 mm), white with a wide pink broad median stripe, more accentuated at the end. (Colour "flower of peach-tree"). Internal tepals nearly white, lanceolate, denticulate and mucronate. Throat green. Stamens in only one series: filaments white, anthers light brown. Style pale green with a darker base. Stigma, light yellow, presenting a rather exceptional structure: 5 to 6 primary branches are divided each one in 2 or 3 secondary branches, making on the whole 14 to 18 lobes. I have personally checked this characteristic, previously observed by Spegazzini.

The species is found sporadically in the province of Misiones, in the company of *C. argentinensis*, from which it is characterized by its lesser dimensions, it has ribs not as tall and not as flattened, and has shorter spines. Let



Fig. 17: Cereus roseiflorus,
origin region of Campo Viera
(Misiones)

me add, side flower, the furrows of the tube and the particular structure of the stigma. In culture, growths of 25 to 30 cm high already produce flowers (another observation of Spegazzini confirmed by me!), whereas plants of *C. argentinensis*, grown under comparable conditions, have not yet flowered on stems of 1.9 metres.

Area of distribution: Sierra de Misiones, and undoubtedly also southern Chaco. (Province of Formosa).

CHAMAECEREUS Br. & R.

Genus of monotypic dwarf plants cereiform with basal ramification. Woolly floral bud, lobivioide Flowers infundibuliform of red colour. Fruit sub-spherical, desiccating at maturity.

C. silvestrii (Speg.) Br. & R.

Segments of 7-14 mm in diameter and a maximum length of 6 cm, light green, forming cushions of 5 to 25 cm in diameter. Within these cushions,

the central segments are erect, while the side ones are more or less radiating in a rosette. Ribs narrow and low, 6 to 9 (generally 8). Areoles very small, white, 1 to 2 mm apart. Spines short (1 to 1.5 mm), silky, white to translucent, 10 to 15.

Flowers 40 mm high, and 45-50 mm in diameter. Tube pink brownish, spineless, but with many scales with white and black wool and some bristles, Tepals lanceolate acuminate, in 3-4 rows, red-orange to shiny red. Red filaments; anthers light ochre-yellow. Style greenish-white to yellowish; Stigma the same colour, with 8 lobes.

Fruits of 7 × 6 mm, brownish mauve.

Very popular plant in culture under the name of “gherkin -cactus”¹. Many hybrids have been obtained by crossing the species with *Lobivias*, *Echinopsis*, and even *Trichocereus*.

Area of distribution: Wooded hills to the North-North-West of the province of Tucuman. Seems to have become rare.

Culture

Considering its origin, the plant will appreciate a good well decayed compost, and moderate sunny exposure. Kept well dry during the winter rest, it will shrink somewhat, but will resist the cold much better. Cultivated well, this species flowers abundantly.

CLEISTOACTUS Lem.

Plants slender cereiform, erect or crawling, has low ribs and fine spines, often silky, more rarely stronger and acicular. Flowers cylindrical to zygomorphic, sometimes with a straight tube, sometimes curved or S-shaped, widening very little to the extremity; Tepals short. Fruits spherical, scaly and woolly. Small seeds, dark brown to black, marked with punctuations.

The Genus is encountered not only in the North of Argentina, but also in Peru, Bolivia, Paraguay and into Uruguay.

C. baumannii (Lem.) Lem.

Erect stems, of a diameter from 35 to 50 mm, ramifying from the base, and reaching a maximum length of approximately 2 metres; skin leaf-green to dark olive-green. Ribs 14-16, measuring up to 5 mm high, but thinner at the base of the plant. Areoles round, 3-4 mm in diameter, 12 mm apart, yellowish-white to brown in some populations. Radial spines 8 to 12, fine, radiating, whitish, measuring up to 15 mm long; central spines 2 to 4, strong, erect varying from

¹ In Belgium and France...



Fig. 18: *Cleistocactus baumannii*, Icaño (Santiago del Estero)

light yellow to yellowish-brown, reddish-brown, and even to blackish red, and measuring up to 4 cm long.

Flowers zygomorphic, hardly S-shaped, from 6 to 7 cm long. Tube light red, with the scales darker with purplish point, furnished with a little white wool in the axils. Tepals of a stronger red, lanceolate, the interiors slightly bent towards the outside. Filaments pink white; anthers carmine. Style yellowish-white; stigma with 5-6 lobes of ochre yellow.

Fruit spherical, diameter 15 mm, red with white flesh.

The colouring of the spines is extremely variable in this species, which gives rise to the description of a certain number of varieties or even of species, which all fall into synonymy.

Area of distribution: From Bolivia, Paraguay and Uruguay up to the South of the province of La Rioja, and passing through the provinces of Jujuy, Salta, Formosa, Chaco, Corrientes, Santiago del Estero, Santa Fe and Entre Rios.

C. bruneispinus Backbg. = **C. baumannii**.

C. ferrarii Kiesling

Cylindrical stems 35-40 mm in diameter and 50 to 80 cm long, ramifying from the base; epidermis dark green. Ribs 12 to 18, low, hardly exceeding 1 mm high and 5 mm wide. Areoles oval, 1.3×1 mm, 5 mm apart, furnished with whitish wool not very abundant. Spines 20 to 25, very fine, little differentiated, 3 to 5 mm long; the lower a little longer than the upper, centrals a little stronger; all more or less bulging at the base, light yellow to transparent.

Flowers lateral, on the upper part of the stems, tuberous, of around 1 cm in diameter and 3.5 to 5 cm long. Pericarpel and receptacle red, with triangular acute scales, small on the pericarpel, and measuring up to 5 mm long on the receptacle, with white wool tufts from 5 to 10 mm long in the axils. Perianth green to yellowish green, many sepals narrowly lanceolate, not opening much at the time of the anthesis. Stamens in two series; white filaments, long primaries of 20 to 25 mm, secondaries not making more than 5 mm, and laid out in a ring at the end of the tube. Anthers yellow. Style cylindrical, 25 to 30 mm long, creamy white; green stigma, with 7 lobes of 4 mm.

Globular fruit around 1.5 cm in diameter, pink. Seeds black and shiny, pointed, 1.2×0.7 mm; hilum small, situated at the extreme point of the seed.

Area of location: Sierra de Zapla (province of Jujuy) and Agitas Blancas. (province of Salta).

C. flavispinus (K. Sch.) Backbg. = **C. baumannii**.**C. hyalacanthus** (K. Sch.) Goss.

Stems erect, ramifying from the base, and measuring up to 1.2 metres high and 7 cm in diameter. Body light green, but of whitish appearance because the spines are very dense. Ribs round, not very high (2-3 mm), 16 to 20. Areoles round, diameter of 1.5 to 2 mm, yellowish-white to brownish. Spines very many, silky, erect on the apex, but all running towards the base along the body. (From where comes the vernacular name of "cola de cordero" = tail of lamb). Young spines brownish, generally passing to yellowish-white to transparent, but able to remain brownish in some populations. Radial spines fine, white, appressed, 40, in the lower part of the areole. Central spines 4 to 5, stronger, erect, the lower longest, measuring up to 20-30 mm long.

Flowers lateral, slightly zygomorphic, slightly curved, 35-40 mm long. Ovary spherical, 4 mm in diameter, with brown wool. Tube light red, with scales with a clear point and with white wool. Tepals narrowly lanceolate, carmine with yellow point.



Fig. 19: *Cleistocactus hyalacanthus*, Chorrillos (Salta)

Area of distribution: Provinces of Jujuy and Salta, around 2000 metres altitude.

C. jujuyensis Backbg. = **C. hyalacanthus**.

C. smaragdiflorus (Web.) Br. & R.

Stems erect to crawling, with a diameter of 35 mm, up to 1.50 metres and more long; epidermis leaf green. Low ribs, 12 to 14, Areoles round, yellowish white, diameter from 1.5 mm and 5 mm apart. Radial spines 8-10, fine, acicular, white. Central spines 4-5, erect on the apex, and directed horizontally along the body, except the upper spine, the longest, which are directed upwards; colour brownish-yellow with reddish-brown, length up to 35 mm.

Flowers lateral, tuberos, straight, 5 cm long. Ovary and tube red, with scales with a carmine point and a little white wool. Tepals carmine with green end, very narrow, slightly bent towards the outside. Filaments white; anthers cream. Stigma light green.

Fruit spherical, red.

Area of distribution: From Bolivia to the North-West of Argentina; provinces of Jujuy, Salta, Tucuman, Catamarca and La Rioja.

C. smaragdiflorus fa. rojoi (Card.) Ritter

Originally described as a genuine species from South Bolivia, Ritter rightly placed *C. rojoi* at the level of a form of *C. smaragdiflorus*. The differences between both are so tiny that they do not justify a separate specific status. The distinction is only based on the colouring of the stamens: whereas the filaments of the typical form are white with cream-coloured anthers, the *rojoi* form shows pink to mauve anthers at the end of mauve filaments with white base. However, my observations of specimens coming from the Argentinean side of the Bolivia border (Aguas Blancas, Itiyuro...) have shown that the latter have mauve anthers, at the end of fully white filaments. This seems to suggest that the transition from the type species to the *rojoi* form occurs gradually from South to North.

Area of distribution: from North of Salta province to South East of Bolivia (Entre Rios and O'Connor provinces).



Fig. 20: Cleistocactus smaragdiflorus

Culture

Considering their dimensions, it is recommended, if possible, to plant *Cleistocactus* in the open ground. A mineral substrate added with compost is perfectly appropriate for them; lighting will be moderate, except for *C. hyalacanthus*, which prefers strong sunshine. They are fairly demanding plants from the manure point of view, they do not pose particular problems, and become very floriferous after a few years. The reproduction by seed is easy.

DENMOZA Br. & R.

Genus monotypic, considered wrongly as including two distinct species, whereas there is in fact only a dimorphism related to the age of the plants. Whereas the young specimens are spherical and are slightly elongated, and carry only reddish spines, strong, straight to more or less bent, the older plants become straightforwardly columnar, and covered with fine and silky complementary spines, of white colour.

Thus it should not be a surprise if, at the beginning, Salm-Dyck classified the species amongst the *Echinocactus*, whilst Lemaire and Schumann respectively regarded it as *Cleistocactus* or *Pilocereus*,

Whereas the young features generally disappear before flowering, they can however remain for a very long time in some individuals, which still adds to the confusion.

D. erythrocephala (K. Sch.) Berg. = **D. rhodacantha**.

D. rhodacantha (SD) Br. & R.

Body spherical or slightly flattened when young, lengthening thereafter; old plants measuring up to 1.5 m high to 35 cm in diameter. Epidermis matt light green. Apex slightly depressed, woolly and thorny; the apex of the plants of flowering size is more or less inclined laterally. Ribs straight to slightly sinuous, separated by deep vertical furrows,



Fig. 21: *Denmoza rhodacantha*, Guido (Mendoza). Young plant.

14 to 18, and sometimes up to 30 with the older specimens. Tubercles acute, with vertically elongated chins under the areoles, ending in a short transverse furrow just above the next areole. Areoles large, oval, white, 6 × 10 mm, from 25 to 30 mm apart. Spines straight to slightly bent, strong, semi-erect, interlaced; young spines orange with brown end, becoming pink greyish with reddish end. One distinguishes 7 to 11 radial spines, and 1 to 2 central spines; maximum length 6 cm. As the plant ages, about 15-20 finer, white and silky spines appear around the preceding spines.

Flowers on the apex or nearby, from 55 to 75 mm long. Ovary short, around 6 mm, conical, with 2 mm long fleshy scales, and brown wool. Tube red pinkish, funnel-shaped, strongly scaled and woolly. Short and pointed tepals, 8 mm long, red. Stamens and stigmata exceed the corolla.

Fruit sub-spherical, 2 cm in diameter, brown, woolly, reminiscent of a sweet chestnut.

The species is sometimes cultivated in its area of origin as ornamental plants, under the name of “quisco”.



Fig. 22: Denmoza rhodacantha, Cachipampa (Salta). Old plant.

Area of distribution: Originally described as from Mendoza (giving it the name), the species is also found in the provinces of San Juan, La Rioja, Catamarca and Salta. Whereas in the South, it occupies the biotopes of low or average altitude, its more northern niches are located at higher altitude. (2000-3500 m).

Culture

Though it does not pose particular problems, it is a species of very slow growth. It will take about 12 to 15 years to reach about fifteen centimetres, when it will start to flower. The propagation by seed does not offer any problem.

ECHINOPSIS Zucc.

There is a current tendency to include in the genus *Echinopsis* ("sensu latiore" Friedrich) not only *Pseudolobivias* and *Hymenorebutias*, but also *Trichocereus*, *Helianthocereus*, and *Soehrensias*.

Although there are indeed marked affinities between the different quoted groups, it is nevertheless necessary to allow for the criteria that allows the separation of some of them in a sufficiently convincing way. To decide then if they are genera, of sub-genera or sections relies on personal appreciation. I personally will include, *Pseudolobivias* and *Hymenorebutias* in the genus *Echinopsis*, but reserve a separate treatment for the genus *Trichocereus* (including *Helianthocereus* and *Soehrensia*).

In addition it is obvious that in the genus thus enlarged, I will come across species that are transitional towards *Trichocereus* on the one hand and *Lobivia* on the other.

In general, they are spherical to more or less columnar plants with lateral flowers. The tube is of variable length, spineless but with wool in the axils of the scales. The nectar chamber is not well-defined. The seeds are sub-spherical to oval, cap-shaped or truncated; the hilum is straight or slightly oblique. Testa is black, but the seeds are often covered with a superficially wrinkled cuticle, conferring to them under a magnifying glass a light brown colour and a rough aspect with or without dark grooves.

E. albispinosa K. Sch.

Body leaf-green to glaucous-green, solitary to more or less offsetting, spherical to short-cylindrical: Height 70 mm, diameter 55 mm. Apex depressed, covered with yellowish wool. Ribs high, acute, straight to weakly sinuous, 12. Areoles round to oval, 3-4 mm, white to yellowish, becoming bald thereafter. Radial spines rather strong, appressed to semi-erect, white to pink, 7-11-(13), reaching about 10 mm long. Central spines 1-2, strong, erect, up to 22 mm long. Young spines with a red base, passing to yellowish-white or pinkish with a brown tip, then to dirty white with a black point.

Flowers lateral: 19.5 cm high, 10 cm diameter. Tube light green, with olive-green scales with a pink tip and brown point, furnished with a mixture of white and black wool, the proportion of the latter increasing on the upper part of the tube. External tepals narrowly lanceolate, olive-green passing to white with a green median band and olive-green tip. Internal tepals lanceolate, definitely wider (15-20 mm), white. Throat green. Primary filaments green; secondary filaments white with a pale green base. Anthers cream. Style light green; stigma greenish-white, with 10-12 lobes.

Area of distribution: South of the province of Salta to the North of Tucuman.

NB: It is this species which was confused by Spegazzini with *E. tubiflora*, of which it is not certain that it is to be found in Argentina.



Fig. 23: *Echinopsis albispinosa*, plant from seeds; origin Vipos (Tucuman).



Fig. 24: *Echinopsis ancistrophora*, Sierra Medina (Tucuman).

E. ancistrophora Speg.

Body spherical flattened, diameter from 5 to 8 cm, shiny dark green, often with a copper-sheen on the top of the ribs. Apex slightly depressed, woollen, spineless. Ribs 12-15, straight, high (1 cm) sharp, with areoles deeply inserted between the tubercles ("crenelated"). Areoles yellowish-white to grey, rounded to triangular, wider than high, of 3×2 mm, 6 to 14 mm apart. Radial spines 5-7, fine, flexible, radiating and slightly bent, 5 to 15 mm long. Young spines greenish-yellow with a black or brown tip, becoming white or greyish-pink with a red point. Single central spine (sometimes absent), erect, hooked at its extremity, reddish white, measuring 10 to 20 mm.

Flowers lateral; height 16 cm, diameter 8.5 cm. Ovary and tube light green, the latter of a diameter of 7-8 mm only to the upper part of the ovary, widening at its upper part. Scales pinkish at the tip, with a mixture of grey and black wool in the axils, the black colour being dominant at the base of the tube. External tepals narrowly lanceolate, initially dark green ("sepals"), then white with a wide median stripe of green. Internal tepals of a pure



Fig. 25: *Echinopsis ancistrophora*:
flowering in culture

white, initially broadly lanceolate, then spatulate mucronate. Green throat. Stamens in two series; the primary in a compact bundle around the style, established deeply in the tube; the secondaries in a ring on the circumference of the perianth, established at the base of the tepals. The crown of primary stamens can be incomplete at the top. Filaments greenish white; cream-coloured anthers. Pale green style with darker base, 12 cm long; white stigma, 9-12 lobes of 1 cm. Odourless to very slightly scented.

Fruit elliptical, 16 × 8 mm, green more or less tinted mauve.

Area of distribution: Species common in the North of the province of Tucumán and the South of the province of Salta.

E. ancistrophora var. hamatacantha (Backbg.)

Is distinguished from the type form by the clearer colour of the epidermis, more ribs (16 to 25) not so high, the spines not tinted with red, centrals not so hooked, and longer flowers; 18 to 20 cm.

Area of distribution: Found sporadically in the province of Salta and in the South of the province of Jujuy.



Fig. 26: *Echinopsis ancistrophora* var. *hamatacantha*.
Abra de Santa Laura (Salta).

E. ancistrophora var. polyancistra (Backbg.)

Neighbour of the preceding variety, of which it is differentiated by the



Fig. 27: *Echinopsis ancistrophora* var. *polyancistra*: Origin El Alisal (Salta).

spines being shorter and finer, the flowers definitely not so long (10 to 11 cm), and more brownish colour on external parts of the tube and perianth; scales pinkish-brown, external tepals olive-green.

Area of distribution: Province of Salta; Campo Quijano; Quebrada del Toro.

N.B. There exists, only in the province of Salta, a third variety, *E. ancistrophora* var. *kratochviliana*, characterized by its very short flowers (5 cm), and of the longer and darker central spines. However I did not observe this form personally.

***E. aurea* Br. & R.**

Body light green to greyish green, spherical to short cylindrical, measuring up to 6-8 cm in diameter and 10 cm in height. Depressed apex, not woolly, spiny. Straight ribs, 12 to 18, separated by deep vertical furrows, but less distinct at the base of the plant. Tubercles rounded, merging together, little differentiated. Areoles round, about 3 mm in diameter, 8 mm apart, with dirty white wool. Radial spines 5 to 9, straight, fine, radiating, brown when young, passing to yellowish or greyish-white with reddish base; length up to 10 mm. Central spines 1 to 4, strong, erect, of blackish-brown colour, except the longest, which measures up to 18 mm and is directed downwards.



Fig. 28: Echinopsis aurea, origin Tanti (Cordoba).



Fig. 29: Echinopsis aurea var. quinesensis

Flowers arising from lateral areoles; 90 mm high, diameter 60 to 80 mm. Tube around 30 mm long, light green passing to light brownish-pink at the top; scales light brown with the axils furnished with white and black wool. External tepals lanceolate, light yellow with a wide median stripe of brown, that disappears progressively with the intermediate tepals. Internal tepals spatulate mucronate, of a dark-yellow. Stamens in two series, primary filaments yellow with a carmine to shiny red base; yellow secondary filaments, implanted on the hymen. Anthers cream-white. Style white to pale yellow, 30 mm long and 1 mm in diameter; stigma cream-white, with 9 lobes.

Area of distribution: Sierra Chica Cordoba; Sierra de San Luis.

E. aurea var. quinesensis Rausch

Distinguished especially from the type by its radial spines short and fine, appressed, around twenty. Central spines 4 to 6, measuring 15-20 mm long, (Up to 6 cm according to Rausch?)

Form extremely close to, if not identical to the variety *leucomalla*.

Area of distribution: North of San Luis.

E. aurea var. sierragrandensis (Rausch) Lambert

Differs from the type form by the 1-2 central spines, that can reach 40 mm in length.

Area of distribution: Sierra Grande de Cordoba (1200 to 1800 metres altitude).

E. baldiana Speg.

Plants cylindrical, 25-30 cm high and 6-15 cm in diameter. Epidermis light green. Ribs round, 10 to 14, rather high (10-14 mm), less distinct at the base of the plant. Areoles escutcheon-shaped, of 4 × 5 mm, with greyish wool. Spines straight, erect; the radials 7-11, up to about 15 mm long; the 4 centrals measuring 25 to 30 mm in length. All spines brown with a reddish base when young, passing to pale yellow to greyish, dark pointed base.

Flower very large. Tube dark green. Tepals lanceolate, white. Stamens and style white.

Fruit elliptical, 4-5 cm long and 2.5 cm in diameter, green tinted mauve.

Area of distribution: Sierra de Ancasti (Catamarca) and Sierra de Sumampa (Santiago del Estero).

E. chacoana Schütz: = **E. rhodotricha**.



Fig. 30: *Echinopsis aurea* var. *sieragrlandensis*, Holada (Cordoba).

E. densispina Werd.

Body glaucous green, lengthened; height 105 mm, diameter 40 mm. Apex depressed, spiny. Ribs straight, rather deeply separated, 17 to 20. Areoles oval, 2×1.5 mm, 2 to 5 mm apart, white passing quickly to brownish-yellow. Radial spines fine, white, appressed, interlaced, 18 to 20, up to 10 mm in length, central spines 5 to 7, light brown with whitish base and dark point, 1 to 2 cm long.

Flowers lateral; height 80 mm, diameter 60 mm. Tube light green, with darker scales with a brownish point, and a mixture of greyish-white and black wool. The black wool, nearly absent on the ovary, becomes more abundant at the top of the tube. External tepals yellow with a median stripe of green, spatulate, mucronate. Internal tepals light yellow to shiny yellow, with the border slightly orange, spatulate, mucronate and denticulate. White hymen. Stamens in two series; primaries light yellow with green base, secondary filaments light yellow with white base. Anthers cream. Green style; light green stigma, with 10-12 lobes.



Fig. 31: Echinopsis densispina.



Fig. 32: Echinopsis densispina var. amblayensis, Amblayo (Salta).

There also exists a red flowered specimen, often distributed, alas, under whimsical names.

Area of distribution: Region of Tumbaya, province of Jujuy.

E. densispina var. amblayensis (Rausch) Lambert comb. nov.

Basionym: *Lobivia amblayensis* Rausch, K.u.a.S., 67, 1972.

Dwarf form of 3 to 5 cm in diameter and 2 to 3 cm in height, napiform root 11-12 cm long. Glaucoous green epidermis. Ribs straight to slightly spiralling, 10 to 16. Areoles small, round, yellowish. Radial spines white fine, radiating, around 15. One central spine erect, brown.

Superb flower orange to red, 80 mm in diameter, with largely spatulate tepals. Mauve or green primary filaments; with either green or red stigma.

The body small and low that surmounts a long napiform root is an adaptation to the environment; denuded plateau, sandy, with the sparse low shrubs swept by violent winds. This type of adaptation is a typical example of convergence, which is found in a great number of species, sometimes very distant from each other from the point of view of systematics, but that live under similar conditions.

Area of distribution: Amblayo, province of Salta.



Fig. 33: *Echinopsis densispina* var. *pectinifera*:
origin West of Tumbaya (Jujuy).

E. densispina var. pectinifera (Wessn.) Lambert comb. nov.

Basionym: *Lobivia pectinifera* Wessn., J. DKG, 13-16, 1940.

Body less elongated than with the typical form sub-spherical, ribs fewer (10-13). Radial spine fine and appressed, white with reddish base, 10 to 15. No central spine. (Exceptionally 1?). External tepals lanceolate, light orange with a central greenish line. Internal tepals spatulate, mucronate, shiny orange with a salmon border. One also finds flowers carmine pink to mauve.

Area of distribution: West of Purmamarca to Quebrada de Humahuaca, province of Jujuy.

E. dobeana (Dölz) Lambert comb. nov.

Basionym: *Lobivia dobeana*, Dölz, Beitr. z. Sukkde., 1339/1.

Body leaf-green, flattened spherical; diameter 55 mm, height 40 mm, offsetting. Apex a little depressed, slightly woolly. Ribs 10-13, high, acute. Indistinct tubercles merging together. Areoles rounded to triangular, initially wider than high, then slightly elongated escucheon-shaped, of 2 × 3 mm; brownish wool passing to greyish. Radial spines 6-7-(10), appressed to erect, straight, initially chestnut-brown with a black point, then blackish-grey, reaching 9 mm long. Single central spine blackish-grey, erect, up to 15



Fig. 34: *Echinopsis dobeana*, origin Sierra de Ancasti (Catamarca).

mm. With the adult plants, the spines, principally the centrals, are bulging in a bulb at the base.

Flowers lateral, funnel-shaped, are inserted on the shoulder; height 60 mm, diameter 40 mm. Tube light green, with brownish-green scales with a yellowish mucro, furnished with a mixture of white and black wool on the ovary, becoming completely black at the top of the tube. External tepals lanceolate, green with a brownish median stripe and a whitish small mucro, bent towards the exterior. Intermediate tepals widely lanceolate to spatulate, carmine with a green median stripe and whitish mucro. Internal tepals spatulate, more or less denticulate-mucronate, cherry-red. Throat old-pink. Stamens in two series. Primary filaments carmine-pink with an olive-green base, secondary filaments carmine; anthers cream. Style brownish-green; stigma brilliant green, with 9-11 lobes.

Area of distribution: Sierra de Ancasti (Catamarca).

Note: Rausch considers that this plant falls within the *aurea-fallax* group, which he baptizes as "*Lobivia aurea* var. *dobeana*". It is a point of view which I cannot share. Indeed, *E. dobeana* differs from *E. aurea* and *E. fallax* not only by its spiny armature and the colour of its flower, but also and especially by the form of the latter. Whereas the flower of the *aurea* group is in the shape of a funnel extending downwards by a long and narrow tube, the flower of *Echinopsis dobeana* is definitely shorter and squatter, in a funnel extending directly to the beginning of the ovary.

E. eyriesii (Turp.) Zucc.

Plants spherical to short cylindrical, 12 to 15 cm in diameter, and up to 30 cm high; generally offsetting. Epidermis dark green. Depressed, fairly woolly apex. Ribs straight, acute, high (2 cm), 11 to 18. Round, with a diameter of 8 mm, areoles 35mm apart, with white to brownish wool. Very short spines; radials around 10, dark brown, hardly exceeding 5 mm long; centrals 4 to 8, of the same colour and length of the radials.

Flowers lateral, 17 to 25 cm long, with a diameter of 10-12cm. Ovary spherical, slightly scaled, with a little dirty white wool. Tube light green, with long and narrow scales, dark green to blackish pointed, in the axils of which one observes dirty white to blackish wool. External tepals lanceolate, dark green. Intermediate tepals white with a brownish green median band. Internal tepals pure white, stamens in two series; filaments greenish white; anthers light ochre-yellow. Style yellowish white with a green base; yellowish-white stigma, with 8-12 lobes.

Fruit elliptical, around 3 cm long.

Area of distribution: Southernmost Brazil, Uruguay, eastern Argentina; province of Entre Rios.



Fig. 35: *Echinopsis eyriesii*.

E. fallax (Oehme) Friedrich

Body higher than wide 60 to 80 mm in diameter, and up to 35 cm in height; epidermis matt leaf-green. Solitary when young, the plants become more or less offsetting with age. Ribs 12-14, straight to very slightly sinuous, acute, separated by deep vertical furrows, indistinct at the base of the plant. Tubercles conical, merging together along the ridge of the ribs. Areoles rounded, 4 × 3 mm, with white greyish wool, slightly bald thereafter. Radial spines, 7-9, radiating to semi-erect, straight, a maximum length of 15 mm. Central spines 2-4, erect initially upwards, then lateral, and finally downwards (perpendicular to the curvature of the body), reaching 45 mm long. Young spines blackish-brown with a reddish to orange base, becoming yellowish or (generally) grey with a black point.

Flowers borne from lateral areoles, with a diameter of 70 mm and a total length of 85 mm, including around 30 mm for the tube. The latter very pale



Fig. 36: *Echinopsis fallax*, Cuesta de Huaco (La Rioja).

green, with blackish-brown scales, with greyish- white wool and with black bristles. Tepals vary from very pale yellow to shiny yellow, the externals with a median stripe of brown. External tepals lanceolate, the internals largely lanceolate to spatulate mucronate, 30 to 35 mm long, and a maximum width of 12 mm. Stamens in two series; primary filaments dark yellow with green base, secondary filaments, established on the hymen; anthers yellowish white. Style greenish-white to green; green stigma, with 8-10 lobes.

Fruit light green, piriform, with a diameter of 20 mm and a height of 25 to 30 mm, covered with small white tufts of bristles.

Area of distribution: Province of La Rioja.

E. fallax var. albiflora (Rausch) Lambert

Variety with pretty flowers of a pale pink, discovered by Rausch in the North-West of the province of Cordoba.

E. fallax var. catamarcensis (Ritter) Lambert

Is distinguished from the typical form by its little fewer ribs, its flowers slightly smaller, and its central spines definitely shorter.

Area of distribution: Mountains around the town of Catamarca, between 550 and 1400 m.



Fig. 37: *Echinopsis fallax* var. *catamarcensis*, origin Cuesta de Portezuelo (Catamarca).

E. fallax var. cylindrica (Backbg.) Lambert comb. nov

Basionym: *Lobivia cylindrica* Backbg., in Backbg. & Knuth, Kakteen-ABC, p. 415, 1935

This variety is distinguished from the type-form by its ribs generally more numerous (14-17), by its flowers being slightly shorter (7 cm), and by its central spines which are not only shorter (15-20 mm.), but especially of a blackish-brown colour with a red base i.e. which preserves its youthful tones instead of passing to gray.

It is this form which is frequently found in collections under the (faulty) name of *Pseudolobivia luteiflora*.

Area of distribution: North of the province of Cordoba.

E. fallax var. shaferi (Br. & R.) Lambert

Form very characteristic, cylindrical, 4 cm in diameter and up to 25 cm to the top, offsetting. Radial spines 9-11, appressed, white with a black point. Central spines 1 to 4, grey with a red base, the bottom one the longest, reaching 25 to 50 mm in length. Contrary to measurements given by Britton and Rose, the flower is by no means smaller than that of the species-type.

Area of distribution: Region of Andagala, province of Catamarca.



Fig. 38: *Echinopsis fallax* var. *cylindrica*, Agua Colorado (Cordoba).



Fig. 39: *Echinopsis fallax* var. *shaferi*, Cuesta de la Chilca (Catamarca).

E. haematantha (Speg.) Lambert comb. nov.¹

Basionym: *Echinocactus haematanthus* Speg., Cact. Plat. Tent., p. 498, 1905.

Body sub-spherical, 6-7 cm in diameter and 5-10 cm high; epidermis dark green. Ribs 11 to 13, straight to slightly sinuous. Areoles greyish white, 5-6 mm in diameter, 8 to 10 mm apart. Radial spines 6 to 8, pale grey with dark point, appressed to curved, 5-10 mm long. Central spines 3 to 4, brown to greyish, erect and hooked, with a length of 30 to 50 mm.

Flowers lateral, 5-7 cm high and wide. Tube dark green, with triangular scales and with greyish brown wool. Tepals dark blood red, spatulate mucronate. Stamens in two series; pink filaments, anthers white, pollen yellow. Style white; stigma the same colour, with 9-12 lobes.

Area of distribution: Indicated as Amblayo (province of Salta) by Spe-gazzini, the species has never been found there; on the other hand, Rausch believes that he collected it in the area of Angastaco, South-West of Cachi.

E. haematantha var. chorrillosensis (Rausch) Lambert comb. nov.

Basionym: *Lobivia chorrillosensis* Rausch, K.u.a.S., 25, p. 145, 1974.

Form from Quebrada del Toro, close to the species-type and the variety *kuehnrichii*, but with the central spines much less developed.

E. haematantha var. elongata (Backbg.) Lambert comb. nov.

Basionym: *Lobivia elongata* Backbg., Descr. Cact. Nov., p. 29, 1956

Form more columnar (up to 20 cm high), with yellow flowers, found to the South of Cachi.

E. haematantha var. hualfinensis (Rausch) Lambert comb. nov.

Basionym: *Lobivia hualfinensis* Rausch, K.u.a.S., 19, p. 67, 1968.

Variety with longer and interlaced spines, brown. Flower orange to reddish, with white throat.

Area of distribution: Region of Hualfin, province of Catamarca.

E. haematantha var. jasimanensis (Rausch) Lambert comb. nov.

Basionym: *Lobivia haematantha var. jasimanensis* Rausch, *Lobivia* 85, p. 140, 1986.

I think it is best to give a detailed description of this variety, which does not seem to be very widespread in culture until the present time:

¹ Combination already published by Hunt, Bradleya, 1991.



Fig. 40: *Echinopsis haematantha* var. *jasimanensis*, origin Barranca Larga (Catamarca).

Body flattened spherical, elongating somewhat thereafter: height 60 mm, diameter 45-50 mm; epidermis glaucous green, finely punctuated with paler green. Root long napiform. Apex slightly depressed, not very woolly, overhung by the spines of the neighbouring areoles. Ribs 10-13, straight to slightly sinuous, divided into conical polygonal tubercles. Areoles rounded to oval, of 3-5 × 2-3 mm, covered with white wool becoming greyish-white at the bottom of the plant. Radial spines 7-11, yellowish-white passing to greyish-pink, appressed, curved towards the body and entangled, measuring 15 to 20 mm. Single central spine, erect, bent upwards, sinuous and entangled with the centrals of the neighbouring areoles, brownish red passing to greyish-pink with a brown point: length 40 to 55 mm.

Flowers lateral, around 50 mm in height and wide. Ovary and tube light olive-green clear, with brown scales and a pinkish tip, furnished with a mixture of white and black wool, the latter becoming dominant at the top of the tube. External tepals spatulate mucronate, with a carmine tip and a blackish-brown median stripe. Internal tepals spatulate mucronate, brilliant red with a more orange median stripe and base. Hymen creamy-white; throat greenish. Primary and secondary filaments light yellow; anthers cream. Style olive-green; stigma pistachio-green, with 10 lobes.

Fruit globular to ovoid, diameter 12 mm and up to 15 mm long, olive-green mixed with wine-red, with the end of the scales carmine and a small white mucro, furnished with a little white wool.

Seeds truncated sub-spherical, 1×0.8 mm. Testa black, warted, slightly shiny. Hilum basal, oval and flat, yellowish, surrounded by an edge, little pronounced.

Area of distribution: Described by Rausch as from Jasimana, to the West of Cafayate, I found this form at Barranca Larga, to the North of Hualfin. The area of distribution thus extends from the South-West of the province of Salta to the North-East of Catamarca, via the massif of the Sierra del Hombre Muerto.

E. haematantha var. kuehnrichii (Fric) Lambert comb. nov.

Basionym: *Lobivia kuehnrichii* Fric, Kaktusar, p. 83, 1931.

Plants slightly smaller than those of the type-form. Central spines 1 to 4, curved to hooked, black passing to gray. Flowers red, orange, golden yellow. Tube olive-green. Stigma sometimes green or yellowish-white, sometimes carmine.

Area of distribution: Cachipampa (Province of Salta).

Remarks:

- 1) In his book "Lobivia 85", Rausch puts the species *Echinopsis cachensis* Speng in synonymy with this last variety. If this way is proven correct (the elements in my possession to date do not enable me to appreciate its valid-



Fig. 41: *Echinopsis haematantha* var. *kuehnrichii*, origin Potrero (Salta).

ity), it would result in serious re-writing of the nomenclature! Indeed, *E. cachensis*, which is the species with the earliest description, would take precedence over other names, and would become the type-species, with the disappearance of the variety *kuenrichii*, and sending *haematantha* back to the rank of variety. (While *elongata* and *hualfinensis* would preserve their rank, but as varieties of *cachensis*).

- 2) In the same publication, Rausch brings back to the rank of varieties *E. haematantha* the species *E. densispina* and its related forms. I have not followed him in this way, more especially as its argument that there would be progressive passage of the strongly spined forms to the species with fine and bristly spines is not verified in the field. The variety *E. densispina* var. *amblayensis*, for example is separated from the other forms of *densispina* by populations of *E. haematantha* var. *kuehnrichii*...

***E. hamatacantha* Backbg.: = *E. ancistrophora* var. *hamatacantha*.**

***E. kratochviliana* Backbg.: = *E. ancistrophora* var. *kratochviliana*.**

***E. leucantha* (Gill) Walp.**

Plants solitary, very exceptionally offsetting, spherical to elliptical, becoming columnar with age; diameter 15 to 20 cm, height up to 50 cm and more. (The longest specimens found in the North of Patagonia; "*E. melanopotamica*" up to 1.5 m!). Apex is covered with spines, strong and curved, conferring to it a very characteristic aspect. Ribs straight, acute, 15 mm high, 14 to 16. Tubercles with elongated conical chins under the areoles. Areoles large rounded twisted, 6 to 7 mm in diameter, with abundant white to yellowish wool. Spines strong, erect, the centrals curved upwards, measuring up to 40 mm long. Young spines black with a brown base, passing to pinkish-grey with a brown point. Radials 9-(11), centrals 1 to 2.

Flower with long tube, measuring 20 to 23 cm long and 9.5 cm in diameter. Light brown tube, covered with short dark scales and with tufts of white wool. External tepals rose-white with a median stripe of brownish-green and pink end; internal tepals pure white. All tepals lanceolate with a mucro, the externals wide, around 10 mm, internals 12-15 mm. Primary and secondary stamens in one continuous crown; filaments white with a greenish base; anthers cream. Style light green, as well as the stigma, which counts 14-16 lobes.

The open flower releases delicate honey perfume.

Globular fruit, slightly ovoid, of 3.5 × 3 cm, reddish on maturity.

Area of distribution: Species distribution very extensive, from Rio Negro in the South, up to the North-West of Tucuman and to the South of Salta in the North.



Fig. 42: *Echinopsis leucantha*, Colalao (Tucuman).

***E. mamillosa* var. *kermesina* (Krainz) Friedrich**

Body leaf-green, spherical more or less flattened, reaching up to 15 cm diameter. Apex weakly depressed, spineless, furnished with a little yellowish wool. Ribs 16 (with a tendency to multiply), straight, high, divided into lateral compressed conical tubercles, more or less merging together. Areoles rounded, 3-4 mm diameter, furnished with yellowish wool passing to dirty white. Radial spines 11-16, radiating, light brown with a dark tip, passing to greyish-white with a brown tip. Central spines 4-6, strong, erect, the higher remaining browner; length up to 20-25 mm.

Flowers immediately near to the apex: height 13 cm, diameter 8 cm. Tube light green, with scales of the same colour, furnished with white and black wool, the latter becoming preponderant at the top of the tube. Scales progressively elongating gradually to pass to the external tepals. Those narrowly lanceolate, greenish at the base, then reddish-brown. Internal tepals spatulate with a small mucro, superbly carmine coloured. Stamens in two series. Filaments carmine; anthers canary-yellow. Style pink-carmine; stigma yellowish-white, with 9 lobes.



Fig. 43: *Echinopsis leucantha*, Cuesta de los Temeros (Mendoza).

Area of distribution: Extreme North of the province of Salta, between Santa Victoria and Rio Bermejo (Bolivian border).

As with many *Echinopsis*, the flower is very ephemeral (around 24 hours); moreover, the flower do not open completely except in optimal light conditions.

***E. melanopotamica* Speg.: = *E. leucantha*.**

***E. minuana* Speg.**

Plants initially solitary, then offsetting, 10 cm in diameter to 15 cm high, and elongating with age. Epidermis light leaf-green. Depressed apex, practically without wool, spiny. Ribs 10, high, acute (width 18 mm, height 13 mm), separated by deep vertical furrows. Areoles in a rounded shield-shape, yellowish-white passing to greyish, diameter 4-5 mm, and 26-28 mm apart. Spines straw-yellow with reddish base and black point, quickly becoming greyish-yellow with black end. Radials 3 to 7, straight, strong, erect, to 20 mm long; centrals single, straight, measuring up to 35 mm long.

Flowers lateral; height 15 cm, diameter 6 cm. Tube olive-green to brownish, covered with brownish-red scales with a little mucro of shiny yellow, and with abundant white and black wool, the latter increasing in proportion in the upper part of the tube. External tepals long and thin, dark green, opening



Fig. 44: *Echinopsis mamillosa* var. *kermesina*.

in a funnel. Intermediate tepals white with a median stripe of green. Internal tepals pure white, wider; up to 11 mm. Throat light green. Stamens in two series; filaments white; anthers cream. Style pale green; stigma yellowish-white, with 9 lobes.

Fruit shiny bottle-green, with small elongated yellow scales and with greyish-white wool.

Area of distribution: Provinces of Entre Rios and Corrientes.

E. polyancistra Backbg.: = **E. ancistrophora** var. **polyancistra**.

E. rebutioides (Backbg.) H. Friedrich: = **E. densispina**.

E. rhodotricha K. Sch.

Body elongated, 10-12 cm in diameter, and up to 80 cm high. Epidermis light leaf-green. Apex slightly depressed, woolly, with a few young spines. Ribs 8 to 13, 1.5-2 cm high, round, with the tubercles not very pronounced, separated by deep vertical furrows. Areoles shield-shaped, of 8-9 × 6-7 mm, 2 to 3 cm apart, furnished with yellowish wool passing to greyish-white. Radial spines 5-7, strong, erect, brown black end when young, passing to brownish-yellow with blackish-brown end; the lowest, longest, measuring up to 2 cm.



Fig. 45: Echinopsis minuana:
origin Rio Corrientes
(Corrientes)

Single central spine, but sometimes missing, brown to more reddish, measuring 1 to 3.5 cm.

Flowers borne from lateral areoles; length 190 mm, diameter 90 mm. Ovary with many blackish scales and reddish brown wool. Tube light brown, covered with green scales and a mixture of white and blackish-brown wool with a russet-red sheen. External tepals lanceolate, white with a brown median band. Internal tepals pure white, lanceolate, and the larger almost equal to that of the external sepals. Throat light green. Primary and secondary stamens in one continuous crown; white filaments, anthers cream. Green stigma, with 11 lobes.

Fruit ovoid fruit, 4.5 × 2.5 cm, furnished with reddish brown wool.

Area of distribution: Paraguay and the North-East of Argentina. (southern Chaco).

E. saltensis Speg.

Body flattened spherical, slightly elongated; 65 mm high, 50 mm in di-

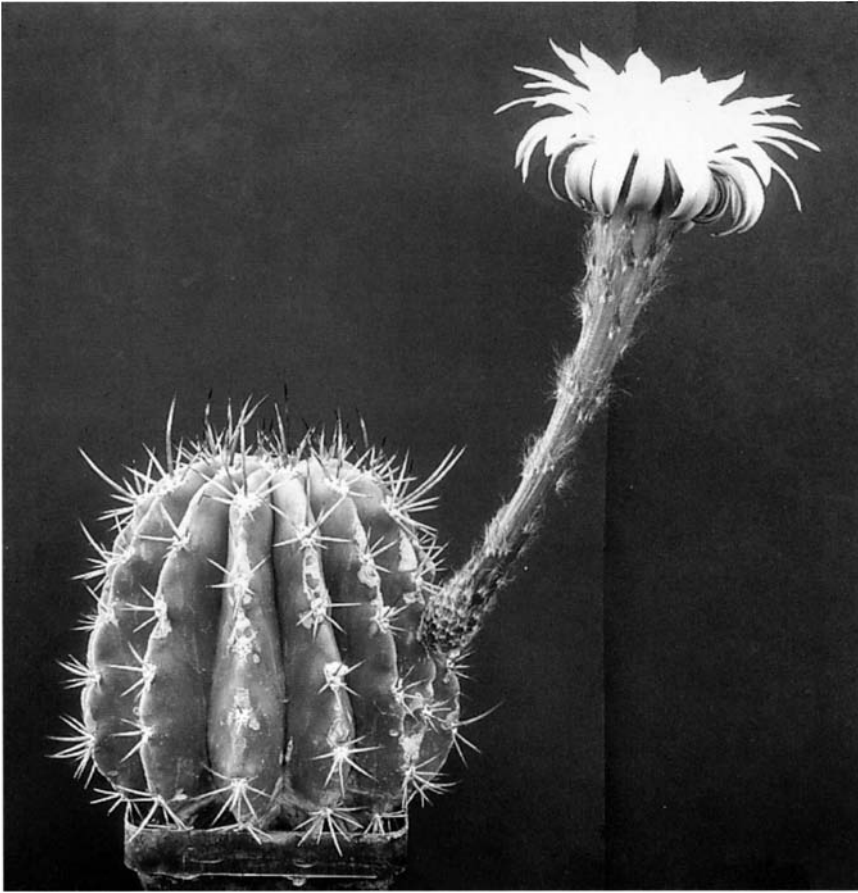


Fig. 46: *Echinopsis rhodotricha*.

ameter, initially solitary, then strongly offsetting. Napiform root. Epidermis shiny light green. Ribs 12 to 18, straight, low, rounded and crenelated. Areoles small, 5 to 7 mm apart. Spines straight to more or less curved. Radials 12-14, up to 4 to 6 mm long. Centrals 1 to 4, stronger, measuring up to 30 mm long. Young spines yellowish, becoming whitish to transparent.

Flowers lateral, 40 to 50 mm long. Tepals red, spatulate, short, up to 10-12 mm long to 8 mm or larger, Stamens dark red.

Area of distribution: Region of Alemania to Cafayate, province of Salta.

E. saltensis* var. *nealeana (Backbg) Lambert comb. nov.

Basionym: *Lobivia nealeana* Backbg. Bl. f. Kaktk., 1, 1934.

Body spherical to short cylindrical, measuring up to 35 mm in diameter and 70 mm in height. Epidermis leaf-green. Apex spiny, non-woolly. Ribs



Fig. 47: *Echinopsis saltensis* var. *nealeana*, origin El Zorrito (Salta).

10 to 14, straight, acute; tubercles rounded, separated by transverse furrows slightly V-shaped. Areoles small, round, furnished with white yellowish wool. Spines radial 7-9, fine, short (3-4 mm), appressed to radiating, light brown passing to straw-yellow. Central spine single, brown blackish, in the top of the areole, erect to slightly bent at the top, but very variable, generally making 10 to 15 mm long, but able to become sinuous and to lengthen up to 25 to 30 mm on some plants.

Flowers lateral; height 4 to 5 cm, diameter 5 to 6 cm. Tube olive-green, covered with black scales and greyish wool. External tepals olive-green with a median stripe green blackish, narrow and bent towards the outside. Intermediate tepals lanceolate, mucronate, light cherry red with a median stripe olive-green. Internal tepals spatulate, shiny cherry-red. Throat a little lighter, red with carmine. Stamens in two series; filaments carmine, anthers creamy-yellow. Style light-yellow to green; stigma yellowish-white to light green.

Area of distribution: Sierra del Leon Muerto, (Salta)

E. saltensis var. **pseudocachensis** (Backbg.) Lambert comb. nov.

Basionym: *Lobivia pseudocachensis* Backbg., Bl. f. Kaktk., 5, 1934.

Form offsetting, with leaf-green epidermis. Body 25 mm in diameter and 15 to 20 mm high; napiform root of around 10 cm. Ribs straight, acute,



Fig. 48: *Echinopsis saltensis* var. *pseudocachensis*, Cachipampa (Salta).

9 to 14. Areoles tiny, 4 mm apart. Radial spines 5-7, radiating, whitish, up to 4 mm long. Single central spine, erect, brown, barely longer than the radials.

Flowers lateral; 45 mm high, 50 mm in diameter. Tube olive-green, covered with scales with a blackish-green point and with greyish-white to brownish-white wool. Progressive passage of the scales with the external tepals, which are orange with a median stripe of olive-green and a blackish small mucro. Internal tepals orange with a carmine red border. All tepals spatulate mucronate. Throat carmine; hymen white. Stamens in two series; primary filaments carmine with a white rose extremity; secondary filaments light pink. Anthers light yellow. Style green passing to mauve. Stigma with 7 lobes, light green in the interior, mauve outside.

Area of distribution: Cachipampa. (Salta)

E. schreiteri (Cast.) Werd.

Small plants hidden in the ground, with a deep post-root, forming tufts of multiple heads. Maximum dimensions of one head; 30 mm in diameter to 35 mm high. Epidermis dark leaf-green. Apex depressed, woolly, with small spines. Ribs rounded, slightly sinuous, 10 to 14. Areoles oval, whitish to gray, of around 1.5×2.5 mm. Spines short, radiating to erect, young spines light



Fig. 49: *Echinopsis schreiteri*, Parque de los Menhires (Tucuman).



Fig. 50: *Echinopsis schreiteri*, flowering in culture.

brown, becoming straw-yellow with a brown point. Radial spines 7-9; Central single, measuring up to 10 mm long.

Flowers lateral, from the lower part of the plant; height 45 mm, diameter 38 mm. Tube light green, covered with elongated scales with a slightly brownish point; with white wool mixed with a little black. External tepals orange-red with an olive-green median stripe. Internal tepals shiny carmine-red. All tepals spatulate mucronate. Throat blackish purple. Stamens in two series; purple filaments, anthers light yellow.

Area of distribution: North West of Tucuman.

E. silvestrii Speg.

Body sub-spherical, measuring up to 10 cm in height and 8 cm in diameter. Epidermis leaf-green. Apex slightly depressed, woolly and spiny. Ribs 12 to 14, straight, sharp rounded afterwards, 10-15 mm high and 7-12 mm wide. Areoles rounded to oval, of 5-6 × 4 -5 mm, 12 mm apart, furnished with white yellowish wool passing to blackish and becoming bald thereafter. Radial spines 5-7 (9), strong, straight, radiating, up to 15 mm in length. Young spines light brown to brown orange with a yellow base, passing to greyish white with a brown point. Single central spine (seldom 2 or 3), erect, shorter than the radials (7-8 mm), dark grey to blackish.



Fig. 51: *Echinopsis silvestrii*, Simulao (Salta).

Flowers lateral; 21 cm long, diameter 12-14 cm. Ovary green, furnished with small scales with a pinkish point, with greyish-white and black wool. Tube olive-green; scales lengthening at the top of the tube and becoming dark green with a pink point, with two reddish vertical lines on each side of the base, while the black wool becomes gradually dominating. Upper part of the tube (receptacle) light green. External tepals narrow and elongated, lanceolate, white with a light green median band, or pale green with a darker median band. Internal tepals spatulate, with an indented edge and a small mucro, pure white. Throat green. Stamens in two series; primaries light green, secondary filaments white with a greenish base, anthers cream. Style green; greenish white stigma, with 10-12 lobes of 12 mm long. Odourless.

Area of distribution: Timbered places in the South of the province of Salta.

E. stilowiana (Backbg.) Lambert comb. nov.

Basionym: *Lobivia stilowiana* Backbg., J. SKG, 31, 1949.

Plants solitary, flattened spherical, measuring up to 7 cm in diameter. Root napiform, Epidermis dark green, often passing to reddish-brown. Acute ribs, 13 to 20. Areoles oval, 4 × 3 mm, 13 mm apart. Radial spines 5-7-(9), in a rosette, pinkish grey, 8 to 17 mm long. Central spine single, strong, erect, to more brownish, up to 25-30 mm long. The young spines are blackish with a red base.

Flowers lateral; height equal with the diameter, varying from 40 to 65 mm. Tube greenish, furnished with dark green elongated scales and a mixture of white and black wool. External tepals pink with median stripe of olive-green to brownish-green. Internal tepals red orange to carmine. Clear throat; hymen pale orange to pink. Stamens in two series; filaments orange to carmine-red; anthers light yellow. Style green with greenish-yellow; stigma green or white, with 8-10 lobes.

Rausch wrongly regards this species as a variety of *E. schreiteri*. I indeed could note that the two forms are encountered together at some places, whereas a species and its varieties cannot be sympatric.

Area of distribution: The North-West of Tucuman.

Culture

In the works intended for Cactophiles, *Echinopsis* are often described as “plants recommended for beginners.” which is to say that their culture does not present any particular difficulty, and that they have on the contrary the necessary qualities to allure the amateur with little knowledge. Sowing is easy, with fast growth and early flowering. (Generally after 3 or 4 years).

They should be planted in a humus soil, but with good drainage, whilst a fairly sunny position will be perfectly appropriate to them.



Fig. 52: *Echinopsis stilowiana*, Abra del Infernillo (Tucuman).

Some species, – like *E. leucantha* for example, – will prove a little more delicate to reproduce, and will require more patience before producing their first flowers.

ERIOCACTUS Backbg.

See *NOTOCACTUS*

ERIOCEREUS (Berg.) Ricc.

Plants cereiform, crawling to more or less erect, of weak diameter, with ribs rounded to more or less angular. Large flowers, funnel-shaped, with the

tube more or less furnished with wool, nocturnal. Fruit red, opening on maturity a little like the husk of a sweet chestnut.

Some authors, like Britton & Rose, place this genus in synonymy with *Harrisia*. I prefer to regard it as a separate genus, not only because of certain distinctive characteristics. (*Harrisia*: more erect to arborescent, fruit yellow to orange not opening on maturity...), but especially because of geographical isolation, the areas of distribution of the two genera are not even adjacent.

Moreover, in a general factual way, I prefer to acknowledge names that mean something (*Eriocereus* = woolly cereus), and this in addition to whatever were the merits of Mr Harris!...

E. guelichii (Speg.) Berg.

Species bushy and creeping, most often not higher than 2 to 3 metres, but being able to reach in extreme cases up to 25 m in length, according to



Fig.53: Eriocereus guelichii, Avia Terai (Chaco): diurnal flower, exceptionnal!

Spegazzini. Stems of 3 to 8 cm in diameter, initially light green, but becoming greyish and woody with age. Ribs 3 to 5, 15 mm high, rounded, acute and more or less jagged with saw teeth. Areoles slightly wider than high, 6 × 5 mm, yellowish-white passing to greyish, inserted on the small promontories of the teeth. Spines strong, erect, 6 to 8, little differentiated; longest (central) measuring up to 35 mm long, young spines reddish with a black point, becoming greyish.

Flowers lateral; 27 cm long, diameter 22 cm. Ovary and tube light green, practically without wool, but with wide scales with a red end, more or less erect and curved towards the exterior, lengthening in the top of the tube to pass gradually to the external tepals. The latter darker green, slightly olive, with a very small red point, and narrowly lanceolate. (9-10 mm wide). Internal tepals white, much wider (around 3 cm), with a small point. Throat light green. Stamens in two series; the primaries in a compact tuft under the style, the secondaries in peripheral crown of only one line. Filaments light green; Anthers cream-coloured. Style light green; stigma greenish-white, with 18 lobes. Odour fetid.

Fruit red, 45 to 60 mm in diameter, covered with scales with a curved brown point, inserted on strong tubercles, and with very little white wool in the axils. This fruit opens at maturity by lateral dehiscence of the skin. The pulp is white, of a pleasant sweetened flavour. The seeds are black, shiny, flattened laterally, 2.6 mm high and 2.1 mm wide. The testa is extremely warted; the hilum is deeply sunken

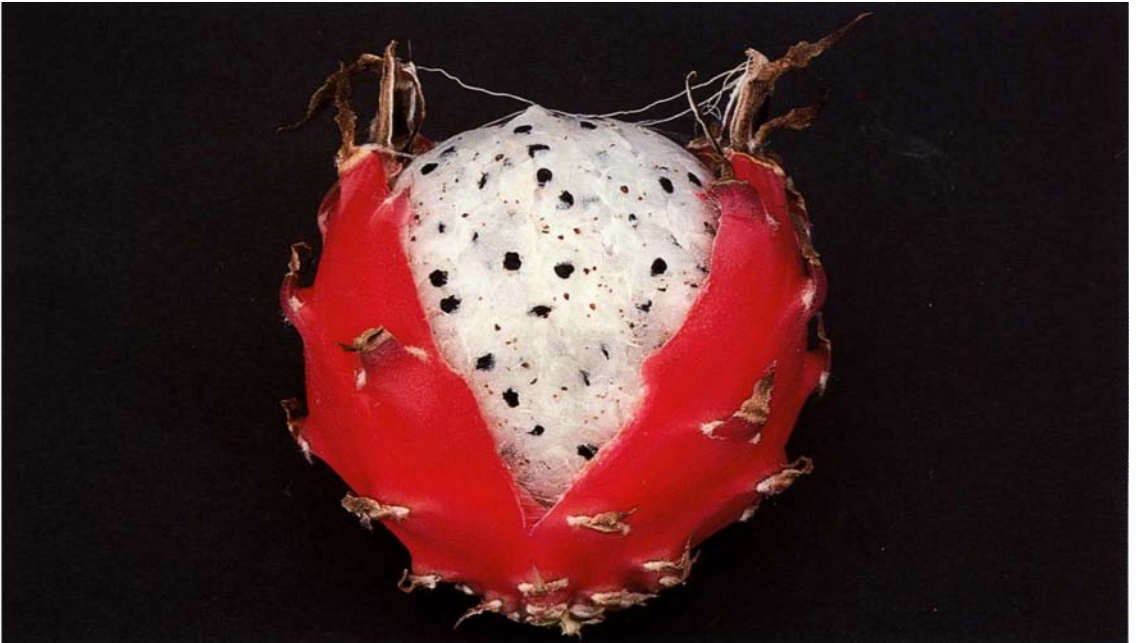


Fig. 54: *Eriocereus guelichii*: ripe fruit.

Area of distribution: Chaco austral and boreal. (Argentina and Paraguay).

E. martinii (Lab.) Ricc.

Stems initially erect, then rapidly crawling, 20 to 25 mm in diameter, and 1.5 m to 2 m long. Epidermis leaf-green, slightly darker around the areoles. Ribs 4, rounded, made of merging tubercles separated by sinuous shallow furrows. Areoles white, about, 4-5 mm in diameter and 5-6 cm apart, inserted at the top of little promontories. Each areole carries from 1 to 3 (4) very strong spines, white with a reddish brown point and very short blackish base, the longest is directed downwards and measures up to 25 mm, plus 4 to 5 small rudimentary spines of blackish-red colour.

Flowers 19-20 cm high, with a diameter of 15 cm. Ovary leaf-green, spherical, with a diameter of 15 mm, furnished with small cherry-red triangular scales, with tufts of white wool, 1 to 2 lateral spines brown reddish, and a black central spine, short (5 mm), flexible and curved. Tube light green, with

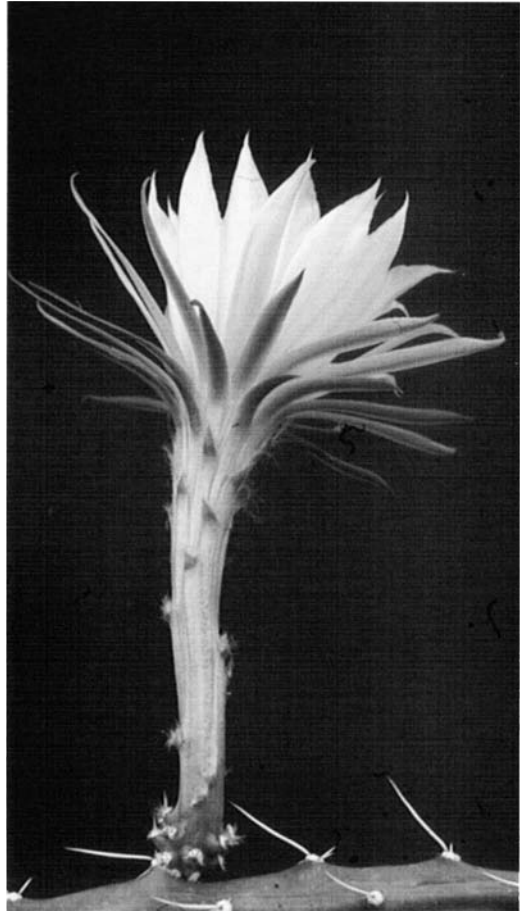


Fig. 55: Eriocereus martinii:
origin Rio Corrientes
(Corrientes).

cherry-red scales elongating gradually towards the top, the wool becoming light brown, and the spines disappearing. External tepals narrowly lanceolate (width 5 mm), green with reddish point. Intermediate tepals pale green with a yellowish-white border, passing to white with a median stripe of pale green. Internal tepals pure white, 22 mm wide, with a small point. Throat light green. Stamens in two series; primaries in a compact tuft under the style, the secondaries in a peripheral crown in one line. Filaments green, becoming white greenish at their end. Style light green, 16 cm long; of the same stigma colour, with lobes of 12 mm. Odour slightly fetid; nocturnal.

Fruit red, with strongly prominent tubercles; scales with a light brown point, with strong tufts of wool and 3 to 5 small spines in the axils.

Area of distribution: Southern Chaco; Corrientes; in undergrowth.

E. pomanensis (Web.) Berg.

Plants more erect than their co-generics, epidermis bluish green to glaucous green. Stems of 25 to 30 mm in diameter, and up to 2 metres and more in length. Ribs 4 to 6, straight, low, with the rounded tubercles a little prominent, separated by vertical furrows not very apparent, slightly sinuous. Areoles rounded triangular, around 4 mm in diameter, 15 to 20 mm apart, white, young spines light brown, becoming grey with a black point at the base of the areoles, with black at the top of this one. Radials 5 to 8, 15 to 20 mm long.



Fig. 56: *Eriocereus pomanensis*, road to Villa Maria (Cordoba).

Single central, with a light brown base and dark point, measuring about 25 mm.

The flowers of the same dimensions and structure as that of the following species, of which the present species is a close neighbour.

Fruit red, scaly and woolly, but deprived of spines in the axils of the scales.

Area of distribution: Provinces of Catamarca, Santiago del Estero and Córdoba. (According to Spegazzini, also La Rioja, Entre Rios, San Luis, Tucuman and Salta...)

E. tortuosus (Forb.) Ricc.

Species crawling, with the stems interlaced, well justifying its name. Stems reaching 2 m in length and 50 mm in diameter, coloured dark leaf-green, lighter at the ends. Ribs round, 7, separated by shallow vertical furrows, slightly sinuous. Areoles inserted on a small promontory, with a diameter of 6 mm and 1 to 2 cm apart, furnished with yellowish wool passing to greyish. Young spines light yellow with a light brown base and black point, passing to grey with a black point, or to completely black. Radial spines 7, strong and erect; the upper measuring about 2 cm long. Central spines 3, the longer reaching 4 cm.



Fig. 57: *Eriocereus tortuosus*, La Estrella (Salta).

Flowers lateral, 15 to 16 cm long. Ovary spherical, olive-green, with quite marked tubercles; scales triangular, green with a reddish end, with strong tufts of white wool and three small spines reddish or black within the axils. Tube light green, strongly scaled; scales green with a reddish point, axils furnished with wool, still with some spines at the bottom, but becoming spineless at the top of the tube. External tepals lanceolate, green with a brown point. Intermediate tepals white with a light green median band. Internal tepals spatulate, pure white. Stamens in two series; primary filaments green, the secondaries white; anthers cream-coloured. Style light green; yellowish-white stigma, with 14-16 lobes. Night flowering.

Carmine red fruit, of around 45 mm in diameter, scaly, woolly and spiny.

Area of distribution: Provinces of Salta, Tucuman, Santiago del Estero and Santa Fe.

Culture

Considering their dimensions, it will be necessary to plant *Eriocereus* in very large pots, or better still, in the open ground. With the necessary space, and good sunlight, the plants have fast growth, and flower easily. The nocturnal flowers are unfortunately very ephemeral; opening in the evening they fade immediately the following day.

FRAILEA Br. & R.

Small plants solitary or proliferating, flattened spherical to more or less cylindrical, the epidermis light green to brown. Ribs divided more or less distinctly into small flattened tubercles. Flowers small to medium size, with wool and bristles, frequently cleistogamous. However, as in the majority of cleistogamous species, in certain circumstances not always well explained, normal chasmogamous flowers appear, which then allows a cross fertilization. Relatively large seeds, whose characteristic form is used for the distinction of the species.

The area of distribution of the genus includes the South of Brazil, Paraguay, Eastern Bolivia, North-East Argentina and Uruguay.

F. asterioides Werd.

Body of very flattened form, diameter from 35 to 40 mm, surmounting a napiform root; solitary, being able to become more or less proliferating thereafter. When the circumstances become unfavourable, the plant can become disc-shaped (discoïdal), and completely hidden in the ground. Epidermis brownish-green to brown. Ribs flattened, not tuberculate, 10 to 13. Areoles white, carrying 5-7 small radial spines appressed from 2 to 3 mm long; young spines blackish-brown, passing then to light brown. No central spines.

Flowers on the apex, proportionally large, 30 to 40 mm in diameter. Tube scaly, furnished with an abundant white wool. External tepals light yellow with a point tinted with pink. Internal tepals lemon-yellow, lanceolate. Filaments pale yellow; anthers orange yellow. Yellowish style; stigma white, with 5-8 lobes.

Fruit green yellowish, furnished with white wool and brown bristles.

Area of distribution: South of Brazil, North of Uruguay, and province of Misiones (Argentina).

Note:

Backeberg was wrong when he put this species in synonymy with *F. castanea*. The latter is a plant of taller form, definitely spinier, and with purplish-brown fruits, whose area of distribution is limited to a restricted territory in the North of Uruguay.

F. pumila (Lem.) Br. & R.

Species extremely offsetting; individual heads sub-spherical, 22 mm high to 33 mm in diameter. Root napiform, epidermis leaf-green often passing to reddish. Ribs flattened, straight to slightly spiralling, 16 to 18, divided into hexagonal rounded tubercles. Tiny areoles, around 1 mm in diameter, yellow-



Fig. 58: *Frailea pumila*, Tres Cerros (Corrientes).

ish, 4 to 5 mm apart. Radial spines fine, white, 11-15, 3-4 mm long. Central spines 1-2, curved downwards.

Flowers on the apex; 20 mm high, diameter 25-30 mm. Ovary and tube furnished with brownish green scales, with dirty white wool and brownish bristles. External tepals lanceolate, brownish green. Internal tepals sometimes lanceolate, sometimes spatulate, yellow. Filaments light yellow; anthers shiny yellow. Style yellowish; stigma white, with 5-7 lobes.

Fruit oval, green, furnished with carmine scales, white wool and brown bristles.

Area of distribution: Southernmost Brazil, Northern Uruguay, and provinces of Corrientes and Entre Rios (Argentina).

F. schilinzkyana (Hge. jr.) Br. & R.

Body flattened spherical, 35-40 mm in diameter, to 25-30 mm high, proliferating. Napiform root. Apex depressed, spineless. Epidermis light green, being darker in culture. Ribs slightly spiralling, low, 19 to 22, divided into rounded hexagonal tubercles of around 5 mm wide. Areoles oval, 1.5 × 1 mm, yellowish white. Radial spines 11-15, fine, appressed, light brown passing to greyish, 2 to 3 mm long. Central spine 1-(2), erect, with a brown pruinose coating and a darker point.

Flowers near the apex; height and diameter 18 mm. Tube greenish very pale, furnished with elongated scales with a brown wide median stripe and a black



Fig. 59: *Frailea schilinzkyana*, Santa Ana (Misiones).

muco, with white wool and long light brown bristles. External tepals light yellow with a slightly marked median stripe of green. Internal tepals pure yellow. All the tepals lanceolate. Throat greenish. Filaments yellowish; anthers yellow. Style yellowish; stigma white, with 7 strongly papillose lobes.

Fruit dark green, with brownish scales, the axils furnished with a little wool and 1 to 3 brown bristles.

Area of distribution: Paraguay and the province of Misiones (Argentina).

Culture

Since *Fraileas* come from areas of a wetter subtropical climate, one should not leave them drying to much in winter. For the same reason, one should take care never to let the temperature fall below 10° C. However, one should take care to give them a perfectly well-drained substrate; in nature the plants generally grow on rocky surfaces, and cannot live in a soil gorged with water.

GYMNOCALYCIUM Pfeiff.

Generally spherical to sub-spherical plants, however certain species lengthen when they reach an advanced age. Solitary or proliferating, with fibrous or napiform roots. Very apparent ribs, divided into tubercles more or less marked. Flowers campanulate to infundibuliform, without floral tube, the perianth opening directly at the top of the pericarpel, which can be more or less elongated. The latter bears rounded to more or less pointed scales, and carries neither spines, nor bristles, nor the least wool tuft. The name is particularly quite well selected for the genus.

One observes several types of seeds, which has led to subdivisions of the genus, which is particularly rich in species. The system of Fric and Kreuzinger, specified later by Schütz, distinguishes 5 large groups, as follows:

Macrosemineum: Seeds relatively large, from 2 to 3 mm, black, helmet-shaped (edge of the hilum more or less undulating).

Ovatisemineum: Seeds from 1 to 1.5 mm, black, cap-shaped (edge of the hilum practically straight), often covered with a cuticle. (sometimes wrongly called an "aril").

Microsemineum: Seeds smaller than or equal to 1 mm, brown to black, matt or shiny, of various forms. (It is especially this heterogeneous group which was the subject of finer divisions in the system of Buxbaum).

Trichomosemineum: Very characteristic seeds, of a size from 1 to 1.5 mm, shiny brown maroon, smooth with very fine protrusions, and a very wide whitish edge around the hilum.

Muscosemineum: Seeds smaller or equal to 1 mm, light matt brown, with a warted testa and a small hilum not very apparent, presenting the aspect of small raspberries.

Thereafter, Buxbaum expanded the analysis of the seeds, and established a subdivision of the genus into 12 series.

Without going into the details, I will include for each species, its membership with the group and the series concerned. What it is especially essential to remember is that the examination of seeds is very significant for the determination of the species.

The area of distribution of the genus extends from southernmost Brazil to Uruguay, Paraguay, Bolivia, and above all to Argentina, which is to some extent the centre of gravity of the genus. This is why the number of species reviewed henceforth will be particularly high for only one genus.

G. achirasense Till & Schatzl

Bodies globular to elongated, becoming more or less columnar as they age;



Fig. 60: *Gymnocalycium achirasense*, Cerritos Blancos (San Luis).

diameter up to 12 cm. Roots fibrous; epidermis light green to green greyish. Apex not very depressed, non-woolly, the spines overhang the adjacent areoles. Ribs straight, tall, separated by deep vertical furrows, 8 to 15. Tubercles angular, with well pronounced chins; very marked transverse furrows, straight, occupying around half of the width of the ribs. Areoles oval, 5-6 × 8-9 mm, yellowish white passing quickly to greyish, and uncovering themselves thereafter. Radial spines strong, straight to slightly curved, radiating to erect, 9 to 11. Young spines greenish-yellow with a brown end, passing to reddish-brown, and finally to "horn" grey with a blackish-red base. Central spines 1-2, of the same aspect as the radials.

Flowers established close to the apex, funnel-shaped; height 70 mm, diameter 85 mm, very short pericarpel (12 mm), light green, the scales having a white edge and a carmine-pink point. These scales pass gradually to the external tepals, which are pink with a green median band, then brownish on the external face. Internal tepals lilac-pink, with a more mauve median band. Filaments white; anthers creamy-yellow. Style yellowish-white; stigma white to pale yellow, with 12-14 lobes. The stigma exceeds the anthers at the beginning of the opening of the flower, but at the same level thereafter. (subsequent lengthening of the filaments).

Seeds of the Microsemineum type, Horridispina series, from around 1 to 1.2 mm with finely warted testa, dark brown, and with an oblique hilum with a weak edge.

Area of distribution: The North-East of the province of San Luis.

G. acorrugatum Lambert

Body flattened spherical, 75 mm in diameter to 65 mm in height, matt green to glaucous green, solitary. Napiform root. Apex slightly depressed, woolly, overhung by the spines of the neighbouring areoles. Ribs straight to slightly sinuous, quite separated by vertical furrows, 9 to 10. Tubercles rounded, merging together, without transverse furrows, except in very young specimens. Areoles round, large, 6 to 8 mm in diameter, 17 to 20 mm apart, furnished with white wool when young, becoming blackish thereafter. Radial spines 9, strong, curved, interlaced, measuring up to 3 mm long. Central spines 1-2, curved towards the top, up to 35 mm long. Young spines sometimes chestnut-brown with a yellow base, sometimes blackish-gray with a reddish base, all becoming greyish-white thereafter with a brown point.

Flowers near the apex; height 65 mm, diameter 60 mm. Pericarpel leaf green, sometimes more or less purplish, with rounded scales with a white edge and small pink point. These scales pass gradually to external tepals, which are pinkish white with a brownish green median band. Internal tepals pale pink with a carmine pink centre line. All tepals spatulate, internal with a small mucro. Throat of very intense carmine colour. Stamens in two series. All filaments white with a pink base; anthers shiny yellow. Style greenish; stigma light yellow, with 9 lobes, under the stamens.

Fruit bottle green, with the scales fibrous pink with a fine white edge. Seeds of the Microsemineum type, Mostiana series, of 1.2-1.3 × 0.8-1 mm, with matt testa, granulous, blackish-red.

Area of distribution: San Agustin de Valle Fertil, province of San Juan.

G. albispinum Backbg.

Form extreme neighbour of *G. bruchii*, from which it differs by the radial spines that are more bushy and interlaced, and the presence of more central spines.

Would have been found in the region of Cruz del Eje, province of Cordoba.

G. alboareolatum Rausch

Body flattened spherical, green greyish to red brownish; diameter 50-60 mm, 25-30 mm tall. Napiform root. Flat apex, woolly, spineless or with a few young spines. Ribs 8 to 11, straight to slightly sinuous, separated by vertical furrows growing indistinct at the base of the plant. Tubercles rounded polygonal, conical chins, separated by deep transverse brace-like furrows. Areoles oval, 5 × 3 mm, abundantly furnished with white wool. Radial spines straight, radiating, 5-7, light brown when young, becoming greyish-pink with a dark tip, and measuring up to 44 mm in length. No central spines.

Flowers borne on the apex; height 50-60 mm, diameter 45 mm. Pericarpel

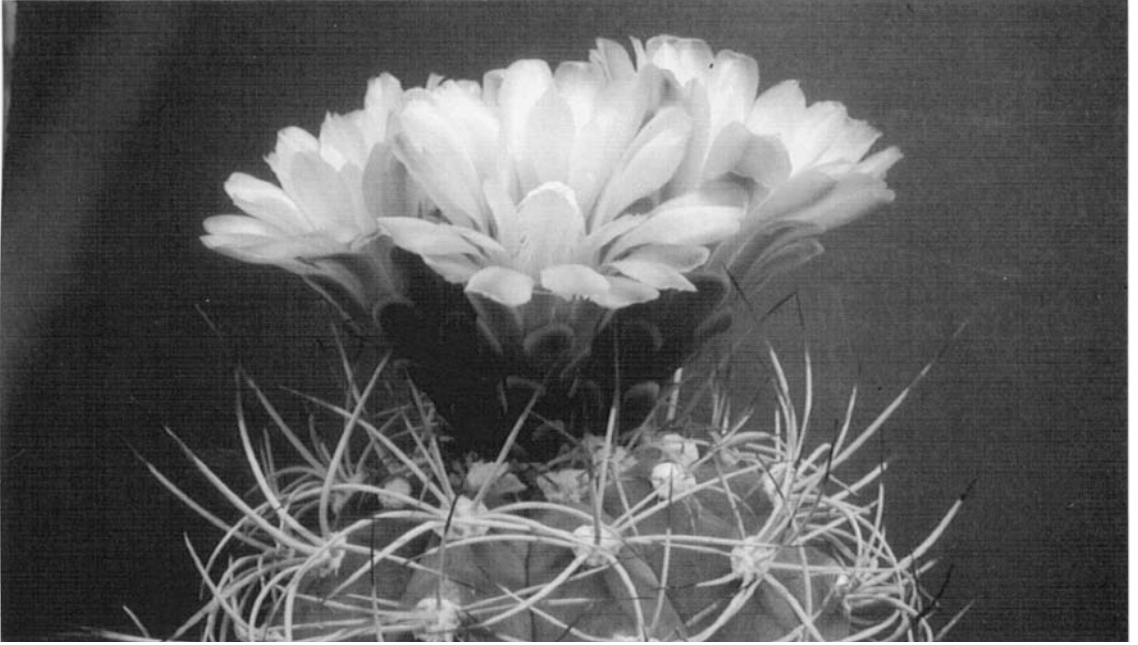


Fig. 61: Gymnocalycium acorrugatum:
origin San Agustin de Valle Fertil (San Juan).

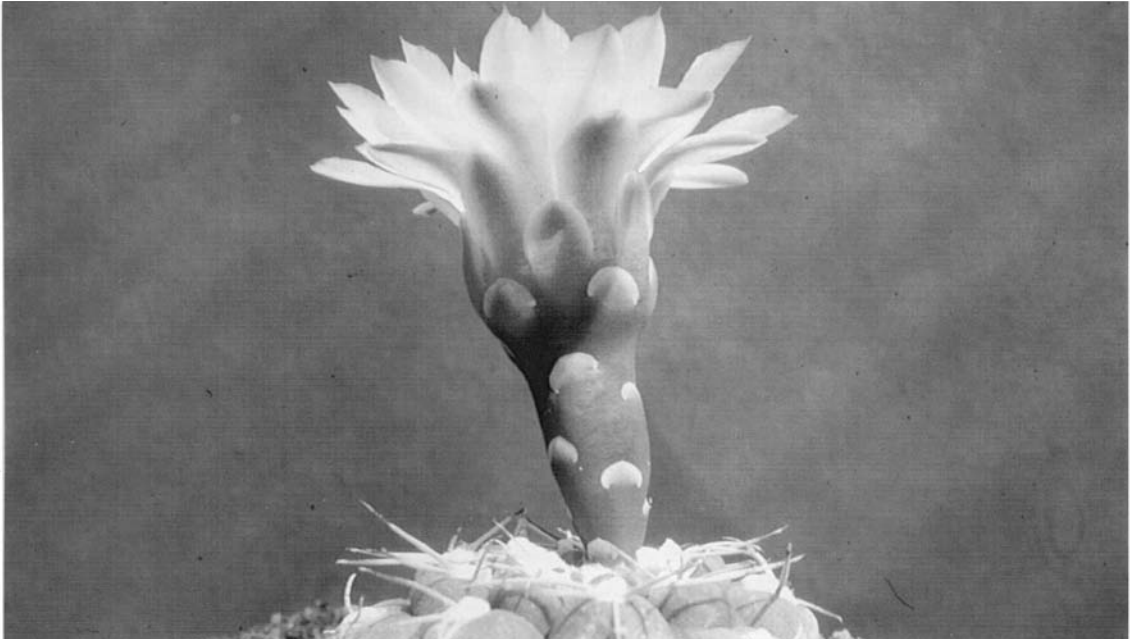


Fig. 62: Gymnocalycium alboareolatum.

15-17 mm, olive green to greyish, the rounded scales with a pink border, with a small mucro of the same colour. External tepals light rose with a median stripe of olive-green. Internal tepals white with a pink centre line. All the tepals lanceolate, with a small mucro. Throat carmine. Filaments white; anthers pink, with cream-yellow pollen. Style light green, 12 mm in length and 2 mm in diameter; stigma white yellowish, short, with 12 lobes, below the stamens.

Fruit oval, 25 to 30 mm long, slate blue, the scales with a pink border. Seeds Microsemineum type, series Mostiana, 1.2×1 mm. Testa black and warted; hilum shiny, oblique and convex.

Area of distribution: Surroundings of Villa Sanagasta, province de La Rioja.

N.B. Rausch described afterwards a variety *ramosum*, which I could not observe up to now.

G. altagraciense Schütz: = **G. calochlorum**.

G. ambatoense Piltz

Body simple, globular to more or less flattened, reaching 15 cm in diameter and 10 cm tall. Epidermis leaf green to olive-green. Apex slightly depressed, woolly. Ribs wide, straight to sinuous, 9 to 17 (generally 10 to 14) separated by deep vertical furrows. Tubercles angular, chins separated by transverse furrows sometimes short and straight, sometimes long and more



Fig. 63: *Gymnocalycium ambatoense*, Quebrada de Cebila (Catamarca).

distorted. Areoles oval, 6-8 × 4-5 mm, furnished with yellowish-white wool passing to blackish. Radial spines 5 to 11 (generally 9), curved towards the body, measuring up to 30 mm long; dark brownish-red with a light point when young, they then pass to greyish-pink with a brown point. Central spines sometimes absent, infrequently 1 to 3, straight to slightly curved, erect, in the same colouring of the radials, and reaching 25-30 mm long, seldom more.

Flowers near the apex, bell-shaped; height 25-45 mm, diameter 30-40 mm. Pericarpel dark green, with rounded scales, very light pink border and a reddish point. External tepals spatulate to round, white pink with a wide median stripe of olive-green. Intermediate tepals spatulate elongated to lanceolate, white with a median stripe of brownish pink. Internal tepals spatulate acuminate to lanceolate, silky white with a centre line of pale pink to pale olive and a reddish base. Throat carmine. Filaments pink; anthers brownish pink lilac, with yellow pollen. Style yellowish; stigma light yellow, with 10 lobes.

Fruit largely spherical, up to 1.7 × 2.3 cm, matt dark green. Seeds of the *Microsemineum* type, series *Mostiana*, 1 × 0.7-0.8 mm. Testa reddish-brown to blackish, matt and warted; hilum deeply sunken, with a thick edge, strongly angular.

Area of distribution: Sierra de Ambato, province of Catamarca.

G. andreae (Böd.) Backbg.

Species strongly offsetting; heads 40-45 mm in diameter and 25-30 mm tall; epidermis dark leaf-green slightly bluish. Apex depressed, not very woolly, spineless, but covered by some spines with new growth. Ribs 8-11, separated by very distinct vertical furrows, and divided into rounded tubercles slightly chinned, with short to average transverse furrows. Areoles oval, white, 3 × 2 mm. Radial spines 5-7 fine, appressed to radiating, white with reddish base, reaching up to 8 mm long. Central spines 0-(1). (The original description mentions 1 to 3 central spines; they are lacking from my plants although they were collected by Omar Ferrari in the type-locality...)

Flowers near the apex; height 35 mm, diameter 40 mm. Pericarpel short, dark green, the scales with a fine white border and a brownish point. The scales pass gradually to the external tepals, which are light greenish-yellow with a green median stripe and a dark greenish-brown extremity. Internal tepals pure lemon-yellow. All the tepals lanceolate, the internals narrowest. Filaments light yellow; anthers cream. Style pale yellow; stigma yellowish-white, with 6 lobes.

Seeds of the type *Ovatisemineum*. *Baldiana* series, of around 1 mm, with matt black testa, finely warted, and with a slightly oval hilum.

Area of distribution: Pampa Esquina (Cerro Los Gigantes), Sierra Grande Cordoba.



Fig. 64: *Gymnocalycium andreae*, origin Los Gigantes (Cordoba).

G. asterium Y. Ito = **G. stellatum**.

G. azureum n.n. = **G. hossei**.

G. baldianum (Speg.) Speg.

Body dark glaucous green, solitary, flattened spherical; height 30-40 mm, diameter 55-70 mm. Root short napiform. Depressed apex, spineless. Ribs (9)-11-14, straight, divided into regular polygonal tubercles with globular chins, separated by shallow straight transverse furrows. Areoles elliptic to round, 2-3 mm, white. Radial spines appressed, white greyish with a reddish base, 5 to 7, reaching up to 12 mm long. Without central spines.

Flowers near the apex, funnel-form; height 50 mm in diameter 35 mm. Pericarpel green-blue to olive-brown, scales with a wide yellowish-white border and a small pink point. External tepals pink with a brownish green median band. Internal tepals pink with a carmine median band. (Colours variable amongst different plants; tones go from purple to blood red). Filaments pink-carmine; anthers light yellow. Style pink-carmine; stigma yellowish-white, with 6 lobes.

Fruit glaucous green, scales with a broad whitish border.

Seeds of the type *Ovatiseminum*, series *Baldiana*, of which this species is the type.



Fig. 65: *Gymnocalycium baldianum*: origin Anquincila (Catamarca).



Fig. 66: *Gymnocalycium baldianum* fa. *venturianum*.

Area of distribution: Sierra de Ancasti, province of Catamarca.

G. baldianum *fa. sanguiniflorum* (Werd.): is a form with paler pink flowers.

G. baldianum *fa. venturianum* (Fric ex Backbg.): Name reserved for plants that reach a size larger than the type, with more marked tubercles and large blood-red flowers with purple sheen, opening very wide.

G. bayrianum Till

Body flattened spherical, velvety glaucous green, sometimes brown reddish, able to reach up to 15-20 cm in diameter when adult. Root napiform. Apex slightly depressed, generally spineless. Ribs 6 to 10, more thereafter (up to 17), wide and flat at the base, more angular near the apex. Tubercles with chins not very marked, separated by little shallow transverse furrows, reaching half the width of the ribs. Areoles rounded, yellowish white passing to blackish. Long radial spines (25-30 mm), erect, flexible and curved, 3 to 5, greyish pink, with a yellow base when young. Central spines 0-1, reaching 35-45 mm long when they exist. With the older plants, which are proportionally higher, 2 small additional radial spines can appear, and the central spine is generally present. But above all, spines become longer and more interlaced, which gives place to an appreciable dimorphism compared to the young specimens.

Flowers near the apex, 60 mm tall, 40 mm in diameter. Pericarpel greyish green, with rounded scales with a broad pink border. External tepals spatulate, white with a wide median stripe of metal grey with a pink end. Internal tepals largely lanceolate, white with silky sheen, reddish at the base. Filaments white; anthers pale yellow, style greenish yellow; stigma of the same colour, with 11 lobes.

Fruit ovoid, 25 × 16 mm, greyish green, bluish pruinose coating, with some wide pink scales.

Seeds of type Microsemineum, series Sagliones, of 0.8-1 mm, with matt red-brown testa finely warted, and with an oval hilum, slightly curved, without thickened edge.

Area of distribution: Sierra Medina (Tucuman) and border zone between the North of Tucuman and the South of Salta.

G. bicolor Schütz

Body dark shiny green, flattened spherical, reaching up to 10 cm in diameter and 5 cm tall. Apex depressed, woolly, overhung with spines of neighbouring areoles. Ribs 9-13-(17), straight to slightly sinuous, high,



Fig. 67: *Gymnocalycium bicolor*, Agua Colorada (Cordoba).

widening at the base of the plant, separated by deep vertical furrows. Tubercles rounded polygonal, with pronounced and elongated chins, separated by short and straight transverse furrows. Areoles oval, large, 10×6 mm, yellowish-white passing to greyish. Spines strong, radiating to erect, straight to slightly curved. Radials to 11, the upper ivory coloured, the three lower, as well as the central spines, metallic-grey with a brown point. When wet, the metallic-grey colour changes to dark brown. Central spines 1 to 2.

Flowers on the apex; height 40 mm, diameter 65 mm. Pericarpel narrow, light green, scales with a narrow white border, carmine tipped. External tepals spatulate, white with a light green median band. Internal tepals lanceolate, white. Throat carmine. Filaments yellowish-white; anthers yellow. Style greenish-white; white stigma, with 12 lobes.

Seeds of the *Microsemmeum* type, series *Mostiana*.

Area of distribution: The North-West of the Province of Cordoba.

G. borthii Koop

Body spherical slightly elongated, reaching 90 mm in diameter and 100 mm tall. Initially solitary, it can become more or less offsetting. Epidermis glaucous green. Apex flat, little or no wool, thorny. Ribs vertical to slightly sinuous, 9 to 16, divided into polygonal tubercles, initially strongly chinned,

but the chins attenuate towards the base of the plant. Transverse furrows occupy all the width of the ribs. Areoles oval, of $2-3 \times 5$ mm, yellowish white, becoming bald thereafter. Radial spines 5-7-(9), erect, straight, flexible; the lower the longest, up to 25 mm, and are more or less flattened. Young spines are light yellow streaked with brown and pass to yellowish-grey with a dark grey base. There are no central spines.

Flowers are formed at the periphery of the apex; height 45-50 mm, diameter 50-55 mm. Pericarpel long and thin (20×8 mm), covered with pruinose patches; scales not very many, rounded, with a pinky white border and a small pink point. Initially wider than high, the scales lengthen, and then pass gradually to the external tepals. The latter, widely lanceolate, are initially olive-green to brownish, with a rosy-white edge, then light pink with a green median band. Internal tepals spatulate lanceolate, white with pink median stripe and a pink base. Throat magenta-pink. Filaments white, passing to greenish, then with pink at the base; anthers cream to yellow. Style white yellowish with greenish base; stigma white to pale yellow, with 10-13 lobes, surpassing the stamens.

Fruit spindle-shaped, 25×14 mm, dark glaucous green, with some scales with rosy white edge.

Seeds of the *Ovatiseminum* type, series *Baldiana*, with remainders of cuticle.

Area of distribution: Surroundings of Quines (North of San Luis) to San Rafael (Mendoza).



Fig. 68: *Gymnocalycium borthii*, origin San Rafael (Mendoza).



Fig. 69: *Gymnocalycium bozsonianum*, origin Chepes Viejo (La Rioja).

G. bozsonianum Schütz

Body olive green greyish, flattened; diameter up to 80 mm and more. Apex depressed, with little wool, but covered by young spines of the adjacent areoles. Ribs 9 to 12, more or less sinuous, separated by rather deep vertical furrows that get indistinct at the base of the plant. Tubercles rounded and polygonal, chins not very marked, separated by short transverse furrows, straight and shallow. Areoles rounded to oval, of around 3-4 × 4-5 mm, greyish-white, becoming bald thereafter. Radial spines 3-5, strong, erect, straight, measuring up to 20 mm long, young spines light brown with a dark point, becoming then greyish-pink with a blackish point. Central spine generally absent; when it is very exceptionally present, it offers the same aspect as the radials.

Flowers are borne on the apex, funnel-shaped; height equals the diameter, from 35 to 50 mm. Pericarpel green olive, furnished with conical scales, with pale pink edge and tiny carmine point. External tepals pale pink with a brownish-green median stripe and small carmine point. Internal tepals pale pink with a brilliant pink median band. Throat wine-red to carmine. Filaments light rose; anthers sulphur-yellow. Style carmine; stigma yellowish-white, with 10-12 lobes. The pistil develops precociously, emerging from the not yet open floral bud; thereafter the stamens lengthen in their turn, so that the stigma is found slightly below the anthers.

Seeds of the *Microsemeum* type, series *Castellanosiana*, of 0.6-0.8 × 0.8-1 mm, with testa shiny brown carrying tiny protuberances; hilum basal rounded.

Area of distribution: Chepes Viejo (South of La Rioja).

G. brachyanthum (Gürke) Br. & R. = **G. multiflorum**

G. brachypetalum Speg. = **G. gibbosum**.

G. bruchii (Speg.) Hoss.

Small species of flattened-spherical form; maximum height of 35 mm and 60 mm in diameter; strongly offsetting. Napiform root. Dark green epidermis. Apex depressed like an umbilicus, woolly and spiny. Ribs 11 to 14, low, divided into non-chinned rounded tubercles. Areoles elongated (2-3 mm), whitish, becoming bald thereafter. Spines fine, bristly, appressed, curved and interlaced, 12-14, whitish to transparent, with a brownish base, measuring up to 6 mm long. Central spines generally absent; occasionally 1, more brownish.

Flowers at the edge of the apex, funnel-shaped, with a height of 30 mm and a diameter of 35 mm. Pericarpel olive-green, with few scales, rounded at the base, but lengthening gradually upwards to pass into the external tepals. Scales dark olive-green with a white border and a pink brownish point. External tepals spatulate, pink with a brownish median band. Internal tepals lanceolate, pale lilac-pink with a pink-carmine median band. Filaments white; anthers light yellow. Style yellowish; stigma yellowish-white, with 8-10 lobes, not exceeding the anthers.



Fig. 70: *Gymnocalycium bruchii*, Yacanto/Calamuchita (Cordoba).

Fruit globular, of 1.4×1 cm, moss green, becoming more brownish at maturity.

Seeds of the *Ovatiseminum* type, series *Baldiana*, with remainders of cuticle. (separation of a series *Lafaldense* does not appear to me sufficiently justified to be maintained).

Species self-fertile, and having twice as many chromosomes as that of *Gymnocalycium* in general: $2n = 44$, instead of 22.

Area of distribution: Sierra Chica de Cordoba to the Sierra de Calamuchita.

G. bruchii var. brigittae Piltz

Differs from the typical form by the fewer ribs (7-9), areoles more isolated from each other, spines fewer and shorter, never reaching the adjacent areoles, and pericarpel more compressed. The fruits are covered with a more bluish pruinose coating.

Origin: East Slope of the Sierra Grande de Cordoba.

G. bruchii var. niveum Rausch

Characterized by the more cylindrical body and more numerous (22-24), white spines.



Fig. 71: *Gymnocalycium bruchii* var. *niveum*.

Origin: Region of Ongamira (North-East of Capilla del Monte), province of Cordoba.

G. bruchii fa. spinosissimum Haage jr. ex Simon.

Strongly aberrant form, of much larger size (up to 15 cm in height and 7 cm in diameter), and with the spines much stronger. Radials radiating to semi-erect, pink with greyish pruinose coating and darker point, 11-13, reaching up to 11 mm long. From 1 to 3 centrals of the same colour, erect to more or less curved upwards, measuring up to 15 mm long.

Unknown origin.

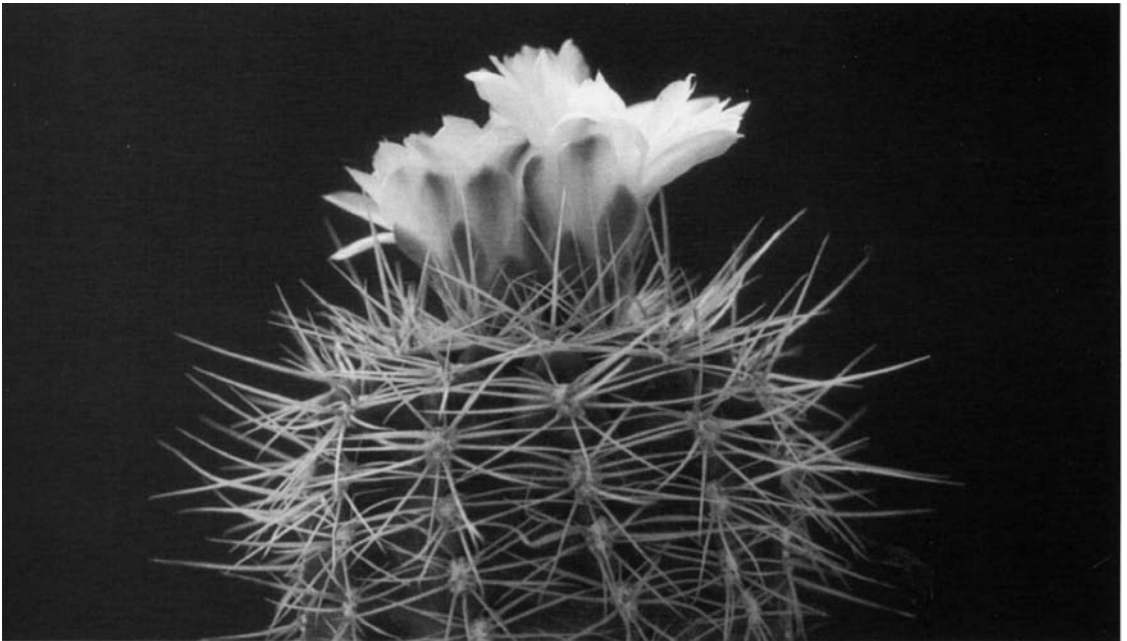


Fig. 72: *Gymnocalycium bruchii fa. spinosissimum*.

G. calochlorum (Böd.) Y Ito

Body flattened spherical, measuring up to 50-60 mm in diameter and 30-40 mm tall, strongly offsetting with age. Epidermis leaf-green to slightly bluish green. Apex depressed, covered with young and interlaced spines. Ribs 9 to 12, straight to slightly sinuous, separated by shallow vertical furrows, growing indistinct to the base of the plant. Tubercles rounded polygonal, chins little differentiated, separated by short transverse furrows, occupying around half the width of the ribs. Areoles oval, around 4 × 2 mm, furnished with yellowish wool when young, passing then to white, and regressing on the base of the plant. Radial spines from 9 to 13, appressed, fine, sinuous and



Fig. 73: *Gymnocalycium calochlorum*, San Sebastian (Cordoba).

interlaced, white, sometimes with a red base, measuring up to 8 mm long. No central spines.

Flowers near the apex, a height of 50 to 75 mm, with a diameter from 40 to 60 mm. Pericarpel of 25 to 30 mm long, water green to light bluish green, scales rounded with a more or less wide white border, and sometimes offering a small pink terminal spot. External tepals spatulate to lanceolate, white to rosy, with a green median stripe and a more brownish terminal spot, with a metallic sheen to the internal face. Internal tepals always lanceolate, white to pink more or less pronounced, with a median stripe more marked. Throat pink-carmine. Filaments white, sometimes the base slightly pink; anthers yellow. Style pink; stigma white, with 9-11 lobes.

Fruit with bluish pruinose coating, with small rounded scales with wide white edge.

Seeds of the *Ovatisemineum* type, series *Baldiana*; testa matt black, without remainders of cuticle.

Area of distribution: Sierras in the province of Cordoba, towards 1000 metres altitude.

G. capillaense (Schick.) Backbg.

Species narrowly connected to the preceding one. Body sub-spherical, leaf-green sometimes more or less bronzed, offsetting. The diameter can reach 9

cm but owing to the fact that the plants are partially hidden in the ground, the height of the top part above the soil level does not exceed 25 to 30 mm. Apex depressed, not woolly, spineless. Ribs straight to slightly sinuous, round, 9 to 13, separated by deep vertical furrows. Tubercles polygonal with strong angular conical chins, separated by transverse furrows short and straight, reaching around half the width of the ribs. Areoles oval, of 3-4 × 4-5 mm, whitish, becoming bald thereafter. Spines 3 to 5, strong, radiating to semi-erect, curved, able to overlap, and measuring up to 20 mm long. Young spines light brown, passing to greyish-white or pinkish with a reddish base. No central spines.

Flowers near the apex; height 70 mm, diameter 60 mm. Pericarpel light glaucous green, with the scales slightly rounded to conical, with a whitish edge and pink point. External tepals spatulate to lanceolate, rosy-white with a green wide median band. Internal tepals always lanceolate, white with a pink median stripe Throat carmine. Filaments white; anthers sulphur-yellow. Style greenish white to yellowish white (never pink!); stigma yellowish-white, with 9-10 lobes.

Fruit with bluish pruinose coating, scales with a white border.

Seeds of the Ovatisemineum type, series Baldiana; testa shiny black, finely warted, without cuticle remainders.

Area of distribution: Sierra Chica de Cordoba. (it is replaced more in the South by the neighbouring species *G. sutterianum*).

G. carminanthum Borth & Koop

Body flattened sphere; diameter up to 100 mm, height up to 55 mm. Epidermis leaf-green to velvety bluish-green. Apex slightly depressed, little or no wool, spineless. Ribs straight, flat, separated by vertical furrows which grow indistinct at the base of the plant. Tubercles with angular chins very apparent, separated by transverse furrows straight and short, occupying one third of the width of the ribs, and growing indistinct at the base of the plant. Areoles oval, 7 × 5 mm, 15 mm apart, yellowish white passing to greyish. Radial spines 5-9, generally 7, strong, curved towards the body, practically not overlapping, 15 to 25 mm long. Young spines light brown, passing to greyish-pink with a brown end. Central spines 0 to 2, curved at the top, 10 to 30 mm long, but generally absent.

Flowers near the apex; height 45-50 mm, diameter 45-55 mm. Ovary spherical, green, around 7-8 mm in diameter. Pericarpel light green, with rounded scales with a white wide border, with a touch of pink at the end. External tepals spatulate, pink carmine with a green median band. Internal tepals lanceolate, cherry-red with a dark carmine-red median band. Throat carmine. Filaments carmine; anthers light yellow. Style carmine; Stigma yellowish-white, with 8-9 lobes.

Fruit dark green to olive green, 15 × 10 mm.

Seeds of the type Microsemineum, series Mostiana, around 1 mm, with a matt black testa, warted, and with the hilum deeply inserted, with a wide edge, strongly angular.



Fig. 74: *Gymnocalycium capillaense*, Capilla del Monte (Cordoba).



Fig. 75: *Gymnocalycium carminanthum*.



Fig. 76: *Gymnocalycium castellanosii*, Sierra de Mendoza (La Rioja).

Area of distribution: Sierra Ambato, province of Catamarca.

Species extremely close to *G. oenanthemum*, of which it is probably only a form.

G. castellanosii Backbg.

Body globular, reaching 15 cm or more in diameter, velvety green. Apex depressed, woolly and spiny. Ribs 10 to 17, naked, separated by deep vertical furrows, and divided into polygonal angular to more or less rounded tubercles, strongly convex, with the chins emphasized with a small vertical ridge. Transverse furrows brace-like or trapezoidal. Areoles rounded to slightly oval 7×6 mm, furnished with yellowish white wool. Spines strong, curved and interlaced. Young spines chestnut brown with a black point, passing to greyish pink with a brown point. Radial spines 5 to 7; centrals 0 to 2.

Flowers on the apex; height 30-45 mm, diameter 40-55 mm. Pericarpel short, olive-green, with wide scales of yellowish-white to pink. External tepals white with a carmine base, a wide median stripe of dark olive-green on the dorsal face, and carmine point. Internal tepals pure white. All tepals lanceolate, except those which form the transition with the scales. Throat carmine. Filaments light yellow, with a pink base; anthers light yellow. Style white; stigma in the same colour. With 10 to 12 lobes, under the stamens.

Fruit sub-spherical, around 17 mm, pruinose green, with rounded scales with whitish borders.

Seeds of the Microsemineum type, series Castellanosia, from around 1 mm, with shining brown testa with minute protuberances; basal oval hilum.

Area of distribution: Sierras to the South of the province of La Rioja.

G. catamarcense H. & W Till

Body matt leaf-green; height up to 15 cm, diameter up to 20 cm. Apex flat to slightly depressed, spineless but often overhung by the spines of the neighbouring areoles. Ribs flattened, widening regularly towards the bottom of the plant, 10 to 21. Tubercles merging, with weak chins and short transverse furrows, indistinct. Areoles oval to elliptic, 12 mm long, white becoming grey. Radial spines strong, appressed, straight or a little curved, (5)-7-9, measuring up to 30 mm long. Young spines brown with a yellow base and black tip, becoming whitish-grey with a reddish base and black tip. No central spines.

Flowers near to the apex: height 45 mm, diameter 45 mm. Pericarpel short, light green, with the rounded scales bordered with yellowish-white and a slightly pinky point. External tepals spatulate, white with a green median stripe. Internal tepals lanceolate, ivory-white, sometimes with a pink central line. Throat carmine pink. Filaments pink; anthers carmine-pink, pollen ochre-yellow. Style greenish-white; stigma white, with 10 lobes.



Fig. 77: *Gymnocalycium catamarcense*, Quebrada de Belen (Catamarca).

Fruit light green, of 16-20 × 20-25 mm, with broad and flat scales, tinted pink and a broad white border.

Seeds of the *Microsemineum* type, Mostiana series.

Area of distribution: Region of Andalgala to that of Belen and Hualfin, via Cuesta de Belen and the Quebrada of the same name. Moreover there would be an isolated subspecies (*ssp. schmidianum*) in the region of Tinogasta.

The species manifests a significant polymorphism, which has led to the description of a series of forms, of which I will retain here only that which I personally collected, and know:

G. catamarcense fa. montanum H. & W. Till

Is distinguished from the typical form by the stronger and more curved spines, and of less flattened cross-section.

Found in the mountains in the region of Hualfin, where I have observed it in abundance between Villavil and El Bolson.



Fig. 78: Gymnocalycium catamarcense fa. montanum, El Bolson (Catamarca).

G. chubutense (Speg.) Speg.: = **G. gibbosum**

G. curvispinum Fric n.n.: = **G. nigriareolatum**

G. denudatum (Lk. & O.) Pfeiff.

Type species of the genus, especially widespread in the South of Brazil, which nevertheless has a population originating in the province of Corrientes (Argentina). It is the description of the latter which I give hereafter:

Body spherical flattened, 55 mm in diameter and 35 mm tall, strongly offsetting; epidermis glossy leaf green. Apex depressed like an umbilicus, woolly, with young spines. Ribs 9, straight, wide and flat, separated by shallow vertical furrows. Tubercles rounded flat, hardly marked, with chins little differentiated, separated by short, and shallow transverse furrows. Areoles oval, of 3-4 × 2 mm, pale yellow passing to dirty white. Radial spines 7. Fine, appressed, sinuous, yellowish-white, up to 8 mm long. No central spines.

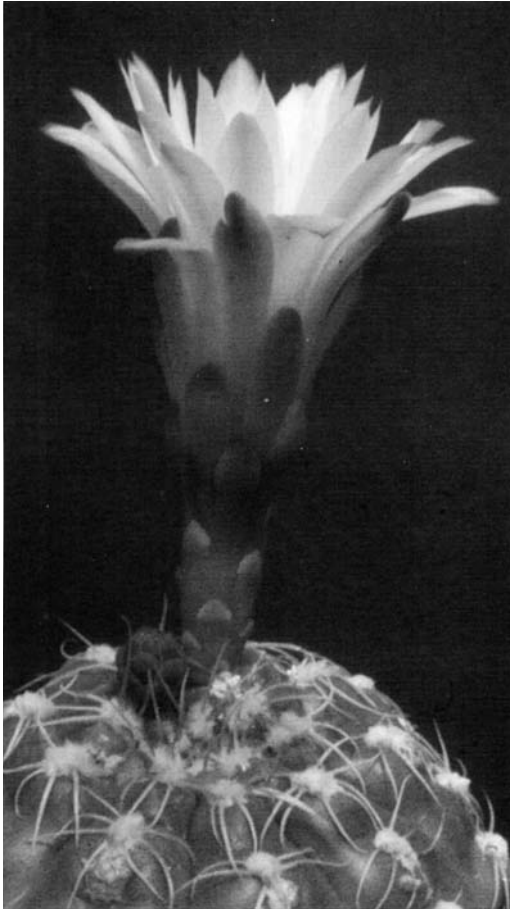


Fig. 79: Gymnocalycium denudatum, origin Tres Cerros (Corrientes).

Flowers at the edge of the apex; height 55 mm, diameter 60 mm. Pericarpel elongated, light green, with the scales finely edged with white and with a pink point. These scales lengthen gradually towards the top of the pericarpel, whilst their end becomes blackish-green. External tepals white with a green median stripe and brownish-pink point. Internal tepals white ivory. All tepals narrowly lanceolate, and inserted rather loosely, which confers to the flower a particular aspect. Throat carmine. Filaments pink; anthers light yellow. Style white; stigma of the same colour, with 6 lobes.

Seeds of the Macrosemineum type, Uruguayenses series, subseries Denudata, measuring around 2 mm, with testa matt black, finely warted, and with the hilum flattened without an edge.

Area of distribution: South of Brazil (Rio Grande do Sul) North of Uruguay, and sporadically in the Argentinean areas adjacent to Brazil.

Replaced in Paraguay by the form *G. paraguayense*, that many consider to be a variety of the present species.

G. erinaceum Lambert

Body flattened spherical to spherical, reaching up to 50 mm tall and 55 mm in diameter, generally solitary, but able to proliferate with age. Root napiform, epidermis velvety greyish-green. Apex depressed, slightly woolly, overhung by the young spines of adjacent areoles. Ribs 12, straight, flattened, divided into tubercles with rounded chins, separated by short and straight transverse indistinct furrows. Areoles oval to round, of around $3 \times 3-4$ mm,



Fig. 80: *Gymnocaulium erinaceum*, Sauce Punco (Cordoba).

white, becoming bald thereafter. Radial spines 7-9, fine, of round cross-section, semi erect to appressed, white with a reddish or blackish base, reaching 6 to 8 mm long. Young spines blackish-brown. Central spines 1-2, fine, erect, of the same colour as the radials, measuring up to 1 cm long.

Flowers near the apex, funnel-shaped; height 55 mm, diameter 48 mm. Pericarpel short, 13 to 18 mm long to 7 mm in diameter, glaucous green slightly pruinose, with some rounded scales wider than high, with a wide and whitish border and a pink point. External tepals spatulate mucronate, of Isabelle colour to greyish-white, with a dark terminal stain with pink point, and a greenish median stripe on the external face. Intermediate tepals lanceolate, white with a fine greyish stripe at the end. Internal tepals lanceolate, shorter than the intermediaries, white. Throat carmine-red. Filaments white with a pink base; anthers light yellow. Style greenish-white; stigma white, with 11 lobes.

Fruit spindle-shaped, 16 × 13 mm, moss-green with bluish pruinose coating, with a few rounded scales with a white border.

Seeds of the type *Ovatisemineum*, series *Baldiana*, 1.2 × 1 mm; testa black and warted, with many remainders of cuticle; hilum largely piriform, flat, blackish brown.

Area of distribution: Sierra de Tulumba and Sierra de la Ischilin, in the South of Dean Funes, province of Cordoba.

G. ferrarii Rausch: = **G. hossei**.

G. genseri n.n.

Name given to a form narrowly related to *G. mostii*, coming from a zone extending from the Sierra de Ischilin in the North of Dean Funes.

G. gibbosum (Haw.) Pfeiff.

One of the oldest known species. Glaucous green body, initially flattened spherical, then becoming spherical to more or less elongated, and able to reach 20 to 25 cm high. Apex slightly depressed, spineless, little or no wool. Ribs 10 to 16, straight, separated by very apparent vertical furrows, which however grow indistinct at the base of the plant. Tubercles angular to rounded, separated by short transverse furrows; the chins initially pronounced, become indistinct thereafter. Areoles elongated, of 6-10 × 4-6 mm, greyish white, becoming bald in the long run. Spines radial 5-7-9, semi-erect, slightly curved, overlapping, 20 to 25 mm long. Of light brown colour with darker base when young, they quickly become whitish-grey with reddish or blackish base. Central spines 0-2, straight, of same aspect as the radials.

Flowers near the apex, funnel-shaped; height 45-60 mm, diameter 60-65 mm. Pericarpel 17 mm, dark green, scales brownish-green with white edge. External tepals largely rounded, sub-acuminate, of ivory-white with a brownish median band. Internal tepals spatulate mucronate, more or less denticulate, pure white. (sometimes the intermediate series shows a fine central line of light brown). Throat greenish, with a touch of carmine at the bottom. Filaments greenish-white; anthers cream. Style greenish-white; white stigma, with 12 lobes, exceeding the stamens.

Fruit globular to spindle-shaped, from around 20 to 40 mm tall, green, the scales with a white border.

Seeds of the *Ovatisemineum* type, series *Baldiana*, of 1 to 1.5 mm in diameter; testa matt black, finely warted, with remainders of the cuticle; hilum basal, oval, flat.

Area of distribution: South of the province of Buenos Aires to Patagonia. Replaced more to the West (provinces of Mendoza and San Luis) by the neighbouring species *G. strigianum* and *G. borthii*.

Varieties

As often in such a case, such a vast area of distribution is on a par with great variability.

Thus various authors have described more or less deliberately a series of "varieties", of which it is quite difficult to appreciate the taxonomic value. Indeed, some of these forms would have disappeared, owing to the continual extension of agriculture in their region of origin, whereas others have quite simply regressed to the type form after some generations in culture. Moreover, it is not excluded that some "varieties" widespread in collections are in fact only cultivars, artificially maintained by "inbreeding", and this is all the more easy as the species is self-fertile.

The extensive research undertaken recently in the areas of origin by several collectors, has permitted the rediscovery of many populations of *G. gibbosum* of varied aspect, in a whole series of localities. In a general way, the northern populations, coming from wetter zones, are characterized by a shorter pericarpel and more globular fruits. Conversely plants of the more arid southern areas, present a pericarpel and a fruit more elongated. Moreover, the flowers of southern populations offer a throat more or less tinted with pink at the base, whereas this colour is in fact completely missing in the plants of northern origin.

The majority of authors agree that the southernmost form is *G. gibbosum* s.s. It occupies an area of very vast distribution, in an extreme expanse South of the province of Buenos Aires to the province of Santa Cruz, but hardly deviating more than 200 km from the coast. This subspecies typically consists of solitary to not very offsetting plants, reaching great sizes (20-25 cm and more), and whose spines are extremely variable, even within a given population.



Fig. 81: Gymnocalycium gibbosum.

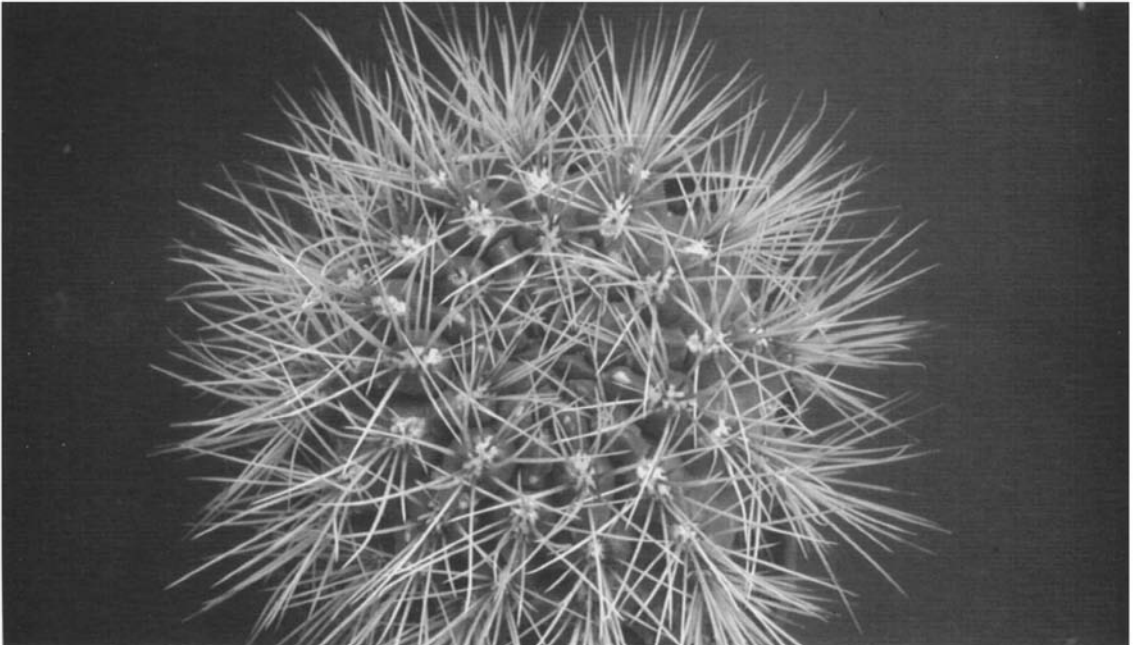


Fig. 82: Gymnocalycium gibbosum var. nobile: a cultivar?

With regard to the northern group, opinions are much more divergent. Some authors privilege *G. hyptiacanthum*, others try (wrongly, according to me!) to return *G. platense* to the *gibbosum* complex, whereas a recent study by Piltz resurrected, like a rabbit out of a hat, the name of *G. mackieanum* (Hook.) Metzger, Meregalli & Kiesling, a name which had fallen into disuse since its description by Hooker in 1837...

G. glaucum Ritter

Species with a napiform root particularly well developed, generally from 10 to 15 cm long, but able to reach 50 cm in nature. Brownish grey body tinted with a little green, strongly flattened to hemispherical, of 11 to 12 cm in diameter and 5 cm high. Ribs 10 to 16, divided into slightly flattened tubercles, with pointed conical chins, separated by transverse brace-like furrows. Areoles very large, oval, of 7.5-15 × 5-7.5 mm, dirty white. Radial spines strong, erect, curved, overlapping, 5-7-(9). Young spines reddish-brown, passing to greyish-pink; length 20 to 40 mm, able to reach 7 cm on older plants. No central spines.

Flowers near the apex; height 35-55 mm, diameter 25-45 mm. Pericarpel greenish-brown, with reddish base and bluish sheen, rounded scales with a thin white border and a small dark point. External tepals spatulate, rosy white with a greenish median band. Internal tepals spatulate mucronate,



Fig 83: *Gymnocalycium glaucum*, Sierra de Copacabana (Catamarca).

white with a median pink stripe and carmine base. Throat carmine. Filaments pink; anthers yellow. Style pale green with a reddish base; stigma pale yellow, with 9-12 lobes.

Fruit 2.5-3 × 1.5-2 cm, brownish green to greyish-green with reddish base, bearing rounded scales with a white border.

Seeds of the *Microsemineum* type, series *Mostiana*, from around 1 × 0.8 mm; testa black, finely warted; hilum white, basal, elongated, slightly convex.

Species related to *G. hossei*, from which it differs by the greyer colour of the body, the longer areoles, the complete absence of central spines, as well as the more globular floral bud and the yellow colour of the anthers.

Area of distribution: Sierra de Copacabana, province of Catamarca.

***G. guanchinense* Schütz: = *G. hossei*.**

***G. horridispinum* Frank ex Till**

Body shining dark green, initially sub-spherical, but quickly becoming cylindrical; 25-40 cm high, diameter 10-18 cm. Apex hardly depressed, little or no wool, but strongly spined. Ribs 10 to 13, high, acute, divided into tubercles with conical chins strongly prominent. Areoles oval, 8-10 × 5-6 mm, yellowish-white passing to greyish. Radial spines 9-11, strong, radiating to erect, 20 to 25 mm long. Young spines blackish-brown with the base more reddish, passing to grey with a brown point. (reddish-brown when



Fig. 84: *Gymnocalycium horridispinum*.

wet). Central spines 4, strong and erect, in the same colour as the radials, measuring up to 30-40 mm long.

Flowers in a crown around the apex, funnel-shaped; height 60 mm, diameter 60 mm. Pericarpel green, with elongated scales of the same colour with a red point. Scales passing gradually to the external tepals, which are pink-lilac with a greenish median band. Internal tepals of a silky rosy-white with a pink-lilac median band. Throat pale pink. The flowers darken more or less after one or two days, and become more mauve. Filaments white; anthers light yellow. White style; stigma of the same colour, with 8-10 lobes.

Ovoid fruit, of 15 × 20 mm, dark green, becoming slightly reddish at maturity.

Seeds of the *Microsemineum* type, series *Horridispina*, of 0.5 × 1 mm; testa black, finely warted; hilum elongated, oblique.

Area of distribution: South-West of Salsacate, province of Cordoba. Also found between Tanninga and Chepes; seems to be rare.

G. hossei (Hge jr.) Berg.

Body glaucous green to brownish; height 11 cm, diameter 13 cm, root napiform. Apex slightly depressed, not very woolly, spineless. Ribs regular, round, separated by not very deep vertical furrows, 14 to 17. Tubercles angular rounded, separated by transverse furrows horizontal to oblique, sometimes short, sometimes occupying all the width of the ribs. Chins prominent, conical. Areoles oval rounded, of 6-7 × 3-5 mm, yellowish-white to brownish or greyish. Spines strong, erect, curved, interlaced, reaching up to 30 mm long. Young spines brown, becoming grey to pinkish with a black point. Radial spines from (5)-7-9; centrals 0 to 2, curved upwards.

Flowers borne on the apex; height 45-60 mm, diameter 35-50 mm. Pericarpel slate-blue, with rounded scales with a pink border. External tepals spatulate, white to pink, with a median stripe of olive-green to brown. Internal tepals spatulate with a small mucro, white to pale pink, with a centre line of more marked pink. Throat carmine. Filaments pink; anthers magenta under the pollen, which is ochre-yellow. Style greenish white; yellowish-white stigma, with 10-13 lobes.

Fruit bluish-green, with wide pink scales with a white border.

The seeds are of the type *Microsemineum*, series *Mostiana*; their number can approach a thousand in only one fruit.

Area of distribution: The North-East of the province of La Rioja and zones bordering on Catamarca.

This species presents a great variability of the spines as well as the colouring of the flowers. It is not surprising that it is responsible for a lot of names to be put into synonymy. Let me quote *G. ferrarii*, *G. guanchinense*, *G. weissianum*, and especially *G. mazanense*. Incidentally one most often



Fig. 85: *Gymnocalycium hossei*. Guanchin (La Rioja).

finds it in collections under the latter name.

At the varietal level, one can easily reject *var. roseiflorum* (Backbg.). On the other hand, *var. ferox* (Backbg.) is indeed distinguished from the type by its longer (45 mm), strong and erect spines. As to the *var. polycephalum* (Piltz) I estimate that it should be put in synonymy with *var. ferox*.

G. hybopleurum (K. Sch.) Backbg. = **G. catamarcense**.

G. hyptiacanthum (Lem.) Br. & R.

Northern form of *G. gibbosum*, deserving possibly the status of subspecies, and coming from the Sierra de los Padres, province of Buenos-Aires.

Some authors designate under this name a species from Uruguay with yellow flowers, close to *G. leeanum*. It is an erroneous conception.

G. kieslingii Ferrari

Body greyish-green, with a diameter from 40 to 90 mm, and a height above soil level of around 25 mm, with often an underground part of equal height. Napiform root. Apex depressed, woolly with young spines. Ribs straight to slightly sinuous, round and relatively low. Tubercles 9 to 13, rounded, with chins rounded too, separated by short transverse furrows, reaching around a third of the width of the ribs. Areoles rounded, 4×3



Fig. 86: *Gymnocalycium kieslingii*, Cuesta de Huaco (La Rioja).

mm, furnished with white wool, but becoming bald more or less thereafter. Fine radial spines, straight, appressed, 5-7(9), young spines straw-yellow with a brownish base, passing to greyish-white with a reddish base.

Flowers near the apex; height 70 mm, diameter 55 mm. Pericarpel from 25 to 30 mm long, green-greyish, rounded scales, with wide white border, and a very small mucro of the same colour. Scales lengthening gradually to pass to the external tepals. The latter slightly spatulate to lanceolate, white with an olive-green wide median band. Internal tepals lanceolate, silky white. Throat carmine. Filaments white to yellowish, with a base more or less pink especially at the level of the primary stamens; anthers cream. Style pale green with a pink base; stigma white to yellowish, with 8-12 lobes.

Fruit narrowly spindle-shaped, of around 3.5×1 cm.

Seeds of the *Ovatisemineum* type, *Baldiana* series; testa warted, with remainders of cuticle; hilum large, rhomboidal, slightly recessed.

Area of distribution: Cuesta de Huaco and Cuesta de Cebila, in the North of the province of La Rioja.

***G. kieslingii* fa. *castaneum* Ferrari**

Differing from the typical form by the more brownish body, the larger areoles, and stronger spines with blackish base. Is also more off-setting, and seems to reach more significant dimensions (11 cm in di-

ameter).

Area of distribution: From North of Villa Sanagasta to Anjullon (Sierra de Velasco).

G. kozelskyanum Schütz

Form of *G. riojense* coming from the Sierra de los Colorados (Province of La Rioja). Does not seem to deserve the specific status.

G. leptanthum (Speg.) Speg.

Greenish-gray body; diameter 70 mm, height 35 mm. Root napiform. Apex depressed, not very woolly, bearing young spines. Ribs 12-15, divided into angular tubercles, with prominent chins, separated by short transverse furrows. Areoles elliptic, white passing to reddish-brown. Radial spines 9-11, fine, appressed, white with reddish base, measuring up to 1 cm long. No central spines.

Flowers offset very slightly from the apex; height 75 mm, diameter 60 mm. Floral bud greener, scales largely white with a pink tip. Pericarpel elongated (33 mm), greenish-grey with a slightly bluish pruinose coating, with white edged scales. External tepals elongated lanceolate, white to pale pink, with a glaucous green brownish-green wide median band. Internal tepals white to very pale pink, with a central line more or less marked pink. Throat carmine. Filaments light yellow, with a touch of pink; anthers light yellow to shiny yellow. Style pale green; stigma white, with 12 lobes, between the primary and secondary stamens. The flower opens completely only if the light is sufficiently strong.

Greenish grey fruit, with brownish-pink scales bordered with white.

Seeds of the type *Ovatisemineum*, series *Baldiana*, of around 1.1 mm; testa matt black finely warted, with remainders of cuticle; hilum rhomboidal rounded, slightly recessed.

Area of distribution: Reported as originating in the area of Cosquin, the species was not found there. On the other hand, it was collected in several places in the North of the province of Cordoba, between Dean Funes and the border of Santiago del Estero.

G. marsoneri (Fric) Y. Ito

Body dark green, flattened spherical; diameter 12 cm height 7 cm. Roots fibrous. Apex depressed, spineless, non-woolly. Ribs sinuous, from 10 to 15, divided into angular polygonal tubercles, carrying prominent chins when young, but smaller thereafter. Transverse furrows occupy the third to half of the width of the ribs. Areoles oval, 8 × 3-4 mm, yellowish passing to brownish. Radial spines semi-erect appressed, straight, (3)-5-7, the longest reach-



Fig. 87: Gymnocalycium leptanthum, cut of the flower.

ing 22 mm. Young spines greenish-yellow or brownish with brown end, becoming greyish-white with black tip. No central spines.

Flowers established far towards the outside; 55 mm tall, diameter 45 mm. Floral bud of light water-green, with wide pale pastel-green scales, with a pink carmine point. Pericarpel light bluish-green, with rounded scales edged with yellowish-white and a carmine point. External tepals spatulate, yellowish-white with a wide green median stripe and a carmine point. Intermediate tepals white with a fine central line sometimes green, sometimes pink. (With some plants the flowers can present a colour generally more rosy). Internal tepals smaller, spatulate to lanceolate, white. Filaments white; anthers light yellow. Style greenish-white; white stigma, with 8 lobes.

Fruit initially shiny green, basal scales with a whitish border and a pink point, becoming carmine at maturity.



Fig. 88: *Gymnocalycium marsoneri* , General Guëmes (Salta).



Fig. 89: *Gymnocalycium mesopotamicum*, (Type).

Seeds of the type Muscosemineum, series Schickendantziana, from around 1 mm, testa light matt brown, the surface characteristically papillose; hilum oval, narrow, rather large, slightly convex.

Area of distribution: South of the province of Salta in the North of Tucuman.

G. mazanense Backbg.: *G. hossei*.

G. mesopotamicum Kiesling

Body shiny dark green; diameter 50 mm, height 30 mm, strongly offsetting. Apex deeply sunken, little or no wool, overhung by the spines of the neighbouring areoles. Ribs 14, straight to more or less sinuous, obtuse, regular. Tubercles rounded, flat, more or less merging together, separated by indistinct transverse furrows. Areoles elongated, 4×1 mm, white, widening a little towards the top where a floral bud develops. Radial spines 13-15, pectinate, appressed, light reddish brown with a dark point when young, passing quickly to brownish-pink or matt chocolate-brown. No central spines.

Flowers borne from areoles at the edge of the apex; height 65 mm, diameter 50 mm. Pericarpel long and slim (22 mm long, 8 mm in diameter at mid-height), leaf-green. Scales conical, brownish-mauve with a fine white edge. External tepals spatulate, green with a white edge and pinkish tip. Intermediate tepals widely lanceolate, white with a green median stripe and brownish-mauve point. Internal tepals narrowly lanceolate, pure white. Throat carmine. Filaments white with a pink base; yellow anthers. Style cream-white; white stigma, with 6-8 lobes.

Fruit claviform, 2-3 cm long and 7-8 mm in diameter, matt green, the scales with a pink point.

Seeds of a particular type which, considering the recent description of the species (1980), is neither included in the classification of Schütz, nor in that of Buxbaum. They are truncated globular seeds, 1.7-1.8 mm in diameter, with a black testa of silky aspect, slightly warted, with a large oval and convex hilum.

Area of distribution: South of the province of Corrientes, between Mercedes and Paso de los Libres.

G. mihanovichii (Fric & Gürke) Br. & R.

Body reddish-brown suffused with green, more in the hollow of the furrows; diameter 55 mm, height 33 mm. Dark punctuation present or missing according to individuals. Apex depressed, not very woolly, few or no spines. Ribs acute, 8, with transverse ridge very markedly prominent.

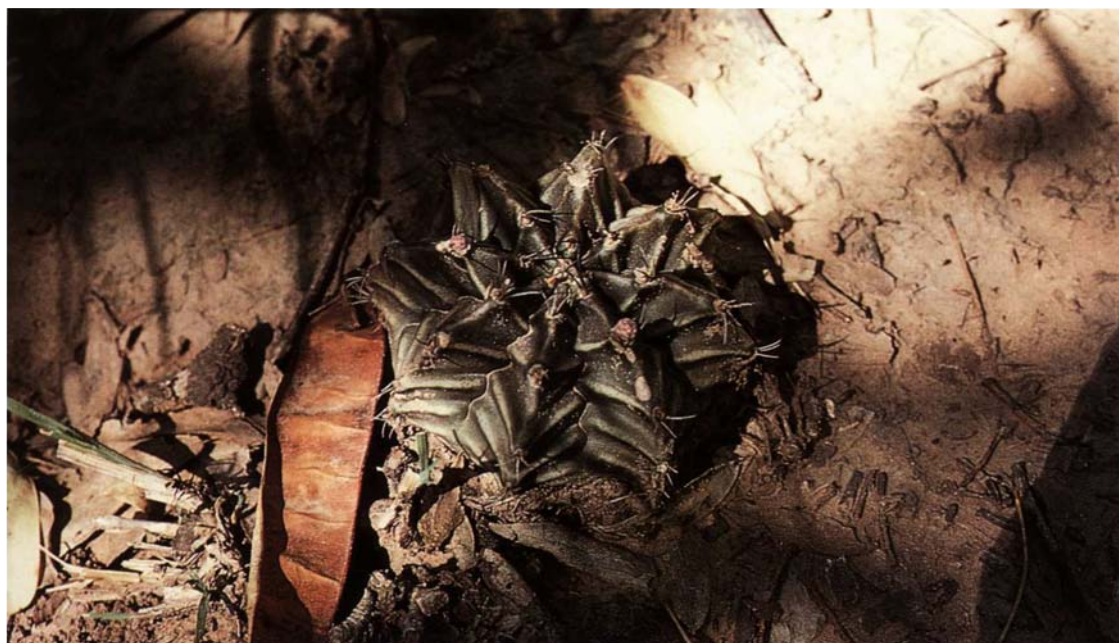


Fig. 90: *Gymnocalycium mihanovichii*, Pozo del Tigre (Formosa).

Areoles small (2-3 mm), oval, yellowish-white, becoming bald thereafter. Radial spines short (5-10 mm), straight to slightly curved, 5. Young spines brown with lighter base, becoming greyish-pink with a brown point. No central spines.

Flowers lateral; height 60 mm, diameter 45 mm. Pericarpel light green, with white, slightly pointed scales. External tepals, pale yellowish-green, with a wide brown median band, spatulate, recurved. Internal tepals greenish-yellow, lanceolate, forming a conical dome; the flower never opening completely. Filaments white; anthers light yellow. Style white; of the same colour as the stigma, with 11 lobes.

Fruit Spindle-shaped, red at maturity.

Seeds of the Muscosemmeum type, Mihanovichiana series, sub-spherical, around 0.8 mm in diameter; testa light brown nipped; hilum oval, small and flat.

Area of distribution: Paraguayan Chaco to Argentinean Chaco (Provinces of Formosa and Chaco).

N.B. In addition to a certain number of Paraguayan varieties described by various authors, Fric and Pazout believed to have to distinguish a *var. stenogonum* from Argentinean Chaco. These plants, which are different from the type mainly by their more significant size, do not really appear to deserve a separate status.

G. monvillei (Lem.) Br. & R.

Some authors think of having to reserve this name to the species that is very common in the Sierra de Cordoba, which I will later describe as *G. multiflorum*.

We prefer to relegate *G. monvillei* as “a nomen dubium”. Indeed, the description is not only incomplete, but the locality of its origin is designated very precisely as the Cordillera department, to the East of Asuncion (Paraguay). *Gymnocalycium*s of this area are known to belong to *G. fleischerianum* (species eminently variable and polymorphic), maybe *G. paraguayense*, and thus has nothing in common with the plants of Cordoba.

G. moserianum Schütz

Body flattened spherical, dark-green, measuring up to 15 cm in diameter and 10 cm in height. Root napiform. Apex slightly depressed, woolly and spiny. Ribs 10, slightly sinuous, rounded, separated by very apparent vertical furrows. Tubercles rounded polygonal, with prominent chins, separated by short transverse furrows. Areoles oval, 4 × 3 mm, white, but subsequently becoming bald. Radial spines 3-5, radiating to semi-erect, straight to more or less curved, up to 25 mm long. Young spines yellowish-brown, passing to greyish-pink with a brown base. No central spines.



Fig. 91: *Gymnocalycium moserianum*, Salsacate (Cordoba).

Flowers near the apex; height 57 mm, diameter 45 mm. Pericarpel glaucous-green, with rounded scales white edged and with a pink point, passing gradually to the external tepals. The latter are spatulate, olive-green with a white edge and a pink tip. Intermediate tepals lanceolate, white with an olive-green median band. Internal tepals lanceolate, narrower than the intermediate, pure white with a reddish base. Throat pink-carmine. Filaments white with a carmine pink base, especially at the base of the primary stamens; anthers light yellow. Style light green with a pink-carmine base, 12 mm long; yellowish white stigma, with 8-11 lobes of 6 mm.

Fruit spindle-shaped, 2-3 × 1 cm, dark green.

Seeds of the *Trichomosemium* type, *Quehliana* series, from around 1 mm; testa shiny brown, smooth, with rare papillae; edge of the hilum complete.

Area of distribution: From Serrezuela and Villa de Soto to Salsacate, province of Cordoba.

G. mostii (Gürke) Br. & R.

Body glaucous-green to dark green; diameter up to 13 cm and more, height up to 9 cm. Roots fibrous. Apex slightly depressed, woolly, covered by the spines of neighbouring areoles. Ribs straight to sinuous, 9-14 and convex to acute, high, separated by deep vertical furrows. Tubercles rounded polygonal, with strong conical chins, separated by short and



Fig. 92: *Gymnocalycium mostii*, Sierra Chica (Cordoba).

straight transverse furrows, reaching around half of the width of the ribs. Areoles large, rounded to oval 6-10 × 10-12 mm, whitish, becoming bald thereafter. Radial spines strong, semi-erect to radiating, curved and interlaced, 7 to 11. Young spines with a reddish-brown or blackish base, becoming pearl-gray with a brown point, and up to 25 mm long. Central spines 1-2, erect, strong, grey with a dark brown point, curved towards the top, also reaching a length of 25 mm.

Flowers on the apex; height 40-50 mm, diameter 50-60 mm. Pericarpel green, short, 8 mm tall to 7 mm in diameter. Scales rounded with a small point, whitish border, with a pink end. External tepals spatulate, then lanceolate, white with a pink base, with a brownish pink median band. Internal tepals lanceolate, ivory-white with a pink median band. Throat carmine. White filaments; anthers light yellow. Style white, sometimes greenish; white stigma, with 10-12 lobes, under the stamens.

Seeds of the *Microsemineum* type, series *Mostiana*. (Type species!).

Area of distribution: Sierra Chica de Cordoba.

The *var. kurtzianum* (Gürke) Backbg., would be distinguished from the typical form by its sinuous ribs and its whiter flowers. One observes however, in a given population, plants with the ribs sometimes straight, sometimes sinuous. Concerning the flower colour, it is intense pink at the flower opening, and gradually fades thereafter...

G. multiflorum (Hook) Br. & R.

This species, widespread amongst practically all the hills of the province of Cordoba, and even to the North of San Luis, is found as two distinct forms according to the altitude; the "low" form below 1000 metres, and the high form from above this altitude.

In the "low" form, the body is flattened spherical (height reaching around three quarters of the diameter) and is green, slightly shiny. The apex is depressed, slightly woolly and spineless. The ribs, 13-15, are more or less sinuous, and divided into polygonal tubercles with conical chins. Areoles large, elongated, not very woolly, 10 × 4 mm. Spines strong, erect and curved; young spines pale green with a brown tip, later becoming straw-yellow to brownish-yellow. Radials 7-9. Centrals absent.

Flowers borne near the apex, largely open in funnel, reaching 10 cm in diameter; pericarpel short. Tepals pure white, with at most a brownish-pink to mauve line at the end of the external tepals. White filaments; cream-coloured anthers. Pale yellow style; stigma 11-13 lobes, exceeding the stamens.

The "high" form differs from the preceding one by the more spherical body, as high as wide in the adult specimens (maximum diameter observed: 22 cm). The spines, with reddish base, are more numerous; from 11 to 13 radials, 1 to 2 more centrals. The flowers are pink, with a more distinct carmine pink median stripe on the tepals. Stamens and pistil as with the "low" form.



Fig. 93: *Gymnocalycium multiflorum*, Tanti (Cordoba).

One also observes with the “high” form, a significant proportion of female unisexual flowers, with sterile anthers. This phenomenon, called gynodioecy, is accompanied by the very reduced size of the flowers, compared to the normal bisexual flowers.

It does not appear to be convenient to hold varietal names for the described forms, considering that the intermediaries meet at average altitudes.

Seeds of the *Microsemmeum* type, *Horridispina* series.

Area of distribution: Sierras of Cordoba and of the North of San Luis.

As I already stated, some authors indicate the present species under the name of *G. monvillei*, and consider that *G. multiflorum* would be a species from the South of Brazil.

According to what I could see, “*G. multiflorum sensu Till*” would be only a form of *G. megalothelos*.

G. nidulans Backbg.

Body glaucous-green to brownish green, of a diameter of 14 cm and 10 cm tall. Root napiform. Apex spiny. Ribs 13-17, divided into polygonal tubercles with prominent triangular chins, separated by very sunken transverse furrows. Areoles oval, 5-6 × 7-8 mm, yellowish white to light-brown. Radial spines (5)-7-9, strong, long (35-45 mm), erect, curved and



Fig. 94: *Gymnocalycium nidulans*, Señor de la Peña (La Rioja).

interlaced, greyish-pink passing to pearl-gray. Central spines absent or single, able to reach 6 cm long.

Flowers inserted on the apex; height 60-65 mm, diameter 45-50 mm. Floral bud with blackish-green scales with a carmine-pink border. Pericarpel greyish green with a slate blue pruinose coating. Scales round, wider than high (5 × 3 mm), with a small mucro, and wide rosy white border, passing gradually to the external tepals. The latter spatulate, ivory-white with an olive-green wide median band. Internal tepals spatulate to widely lanceolate, white with a central line of pale pink. Throat carmine. Filaments carmine with a white end; anthers carmine pink covered with ochre-yellow pollen. Style white with a carmine base, 11 mm; stigma pale yellow, with 12 lobes of 4-5 mm, under the stamens.

Fruit ovoid, 25 × 21 mm, green to blackish with a blue sheen, with wide scales with a pale pink point. Greenish flesh.

Seeds of the *Microsemineum* type, Mostiana series.

Area of distribution: Surroundings of Señor de Peña, province of La Rioja.

Species closely related to *G. hossei*, of which it differs essentially by the more contorted shape of the ribs and the exacerbated development of the spines, allowing it to survive in places that are completely denuded. It is likely that it was initially a local population whose adapta-

tion to the environment resulted in a more thorough specialisation. If I regard it as a true species, it is because it seems genetically isolated from *G. hossei*.

G. nigriareolatum Backbg.

Body glaucous-green to velvety dark green, initially flattened spherical, then sub-spherical; diameter 10-20 cm, height 10-15 cm. Root napiform. Apex depressed, woolly, spineless or with young spines. Ribs 10 to 15, regular, straight, divided into angular tubercles with acute and very prominent conical chins. Areoles oval, 7 × 8 mm, blackish in the wild, whilst new areoles developed in culture remain yellowish-white. Radial spines 5-7-(9), radiating, curved, whitish-grey with a brown point, measuring up to 30 mm long. Young spines black with an orange-brown base. Central spines 0-1, erect towards the top when it is present.

Flowers near the apex; height 45-50 mm, diameter 35-45 mm. Pericarpel short (12 mm), leaf-green, with rounded scales with a white edge and pink point. The scales pass gradually to the external tepals, while elongating and becoming lighter green. External tepals lanceolate, more or less bent towards the outside, white with a median green stripe and pink point, the median stripe terminates in a brownish spot. Internal tepals ivory-white, lanceolate. Throat carmine. Pink filaments; yellow anthers. Style greenish-white; stigma yellowish-white, with 10-12 lobes, under the stamens.



Fig. 95: *Gymnocalycium nigriareolatum*, Cuesta de Portezuelo (Catamarca).

Fruits of same colour as the body, the scales have a thin white edge and pink point.

Seeds of the Microsemineum type, series Mostiana, from around 1 mm; testa shiny brownish-black, warted; hilum oval, flat, with a spongy edge more or less developed according to the populations.

Area of distribution: Occupying a vast area all around the town of Catamarca, known in the Cuesta de los Angeles in the South-West, the Sierra of Graciana in the North, and Cuesta de Portezuelo in the South-East.

Species presents many affinities with *G. hypopleurum*, but is easily distinguished by the yellow colour of the anthers, which makes it close to *G. glaucum*. The fact that the areoles are black in nature and remain pale in culture did not find a satisfactory explanation up to now.

The aspect of the plants (length of the spines, shape of the ribs...) can vary notably according to the local circumstances. It is a species found notably amongst rocks, not growing in places deprived of stones.

G. occultum Eric ex Schütz

Form of the complex *stellatum-riojense*, coming from the South-East of the province of Catamarca and areas bordering on La Rioja; possible synonym of *G. Riojense*.

G. ochoterenai Backbg.

Southernmost form of *G. stellatum*, of the North of San Luis and the areas bordering La Rioja.

G. oenanthemum Backbg.

Body flattened spherical, reaching 10 to 12 cm in diameter. Epidermis leaf-green to more or less glaucous green. Slightly depressed, spineless, apex non-woolly. Rounded ribs, 10-13, reaching up to 2 cm wide, separated by vertical furrows thinner at the base of the plant. Tubercles with angular chins, strong, separated by short but very distinct transverse furrows, occupying around one third of the width of the ribs. Areoles oval, 7-8 × 3-4 mm, yellowish-white passing to blackish-grey. Radial spines 5-7, strong, slightly curved towards the body, pinkish-grey with a brown point, reaching 2 cm long. Central spines absent.

Flowers near to the apex; height 45-50 mm, diameter 35-40 mm. Pericarpel light green, with half-moon shaped scales bordered with white, then tinted pink and lengthening gradually to pass to the external tepals. Those are spatulate, cherry-red with a green wide median stripe. Internal tepals spatulate mucronate to lanceolate, brilliant cherry-red, with a median band of a more distinct wine-red. Filaments carmine-pink; anthers yellow. Style pink; stigma white, with 8-10 lobes.



Fig. 96: *Gymnocalycium oenanthemum*, Sierra de Ambato (Catamarca).
Photo H. Vertongen

Fruit dark green, 15-18 × 10-12 mm.

Seeds of the Microsemineum type, Mostiana series, around 1 mm, with matt black testa, finely warted, and with an elongated hilum, strongly inserted, with a wide spongy edge.

Area of distribution: Sierras de Ambato and Graciana (Catamarca).

Contrary to a very widespread opinion, this species is not narrowly related to *G. catamarcense*; but rather to *G. nigriareolatum*.

G. pflanzii (Vpl.) Werd.

Body leaf-green of velvety aspect, proliferating; diameter 10-15 cm (max. 25 cm), height 6-10 cm. Fibrous roots. Apex depressed, slightly woolly, covered by the spines of the neighbouring areoles. Ribs 8-12, thick, divided into rounded polygonal tubercles, without chins, separated by transverse furrows in an arc. Areoles large, oval, 10 × 14 mm, yellowish passing to blackish and becoming bald. Spines strong, erect, curved, initially blackish with a brown base, becoming pinkish-grey with a black tip. Radials (5)-7-9, reaching up to 25 mm long; centrals 1-2, not longer than the radials.

Flowers near the apex, funnel-shaped; equal diameter and height, 45 to 50 mm. Pericarpel very short, matt green, the wide scales with a white border, passing gradually to the external tepals. The latter spatulate, more or less bent

towards the outside, white with a green to brownish green wide median band. Internal tepals narrower, spatulate, slightly denticulate, white with carmine base. Throat carmine to purplish. Filaments and anthers of the same colour; yellow pollen. Style carmine; stigma carmine-pink, with 10-12 lobes, level with the anthers.

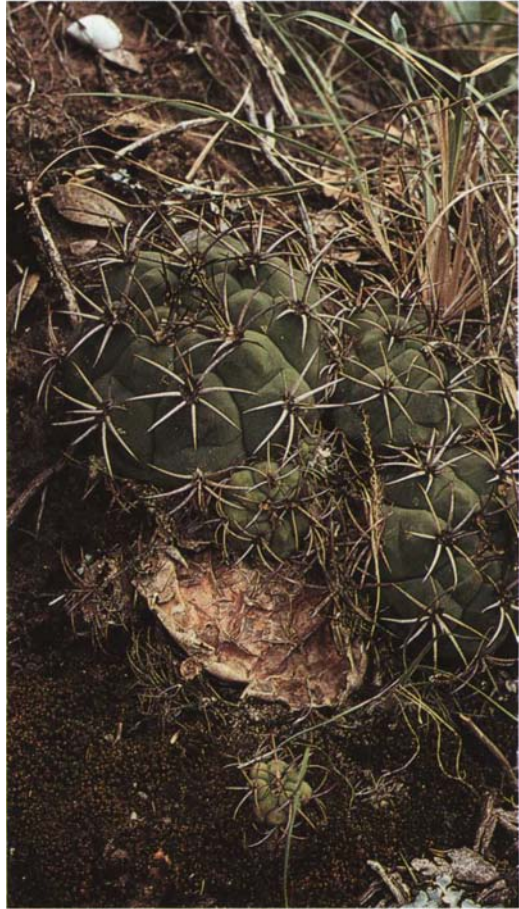


Fig. 97: *Gymnocalycium pflanzii*,
Rio Juramento (Salta).

Fruit sub-spherical, around 2 cm in diameter, becoming carmine red at maturity. Pulp intense cherry-red.

Seeds of the Microsemineum type, Pflanziana series, very small ($0.6-0.7 \times 0.4-0.5$ mm); testa shiny reddish-brown, smooth; hilum elliptic, whitish, slightly convex.

Area of distribution: South-East of Bolivia to the North-West of Paraguay and the North of Argentina. (Provinces of Salta and Jujuy).

G. piltziorum Schütz

Body glaucous-green to pale brownish-green, flattened spherical; diameter 75-160 mm, height 55-100 mm. Root napiform. Apex slightly depressed, little or no wool, spineless. Ribs 10 to 21, straight, separated by very apparent vertical furrows, growing indistinct at the base of the plant. Tubercles curved polygonal, conical chins under the areoles, separated by short transverse furrows reaching about half of the width of the ribs.

Areoles oval to round, 3-4 × 4-5 mm, not very woolly, light yellow passing to blackish grey. Radial spines 5-7, strong, radiating to semi erect, curved and interlaced, measuring up to 30 mm long. Young spines chestnut-brown with a yellow base and grey point, becoming straw-yellow thereafter. Generally no central spines; exceptionally 1.

Flowers near the apex; height 55-70 mm, diameter 50-60 mm. Pericarpel 20 to 25 mm dark olive-green, with pointed scales with a wide yellowish-white border. External tepals spatulate, white with a pinkish-brown wide median band. Internal tepals lanceolate, white with a pink fine median band. Carmine throat. Pink filaments; yellow anthers. Green style; stigma yellowish, with 12 lobes.

Fruit dark glaucous-green, 28 × 15 mm, with wide and flat scales, brownish with a wide yellowish edge.

Seeds of the Trichosemineum type, series Quehliana, of 1.2 to 1.4 mm; testa shiny chestnut-brown, with many papillae; hilum with incomplete edge, as horse shoe.



Fig. 98: *Gymnocalycium piltziorum*: origin Agua Blanca (La Rioja).

Area of distribution: Sierra de Velasco, province of La Rioja, in the Sierras of Zapata and Vinquis, province of Catamarca.

Species close to *G. riojense*, from which it is characterized by the spines definitely stronger and longer. H. and W. Till recently proposed to bring it back to the rank of subspecies of *G. riojense*.

G. quehlianum (Hge. jr.) Berg.

Body brownish-green to glaucous-green, flattened spherical; diameter up to 50 mm, height up to 50 mm. Root napiform. Apex depressed, little or no wool, covered by some spines of the neighbouring areoles. Ribs 9-14, straight, separated by shallow vertical furrows, and divided into tubercles more or less merging together, with well developed chins. Areoles small, rounded to oval, whitish. Radial spines 5-7, weak and short (5-8 mm), appressed to radiating, white with a reddish base; the lower spine (odd) is shorter than the side ones. No central spines.

Flowers near the apex, variable form, more or less slim according to the populations; height 50-70 mm, diameter 50-60 mm. Pericarpel elongated (25-30 mm), dark olive-green, the scales with a wide white border. External tepals white to yellowish-white, with a dark olive-green wide median band. Intermediate tepals with a light green stripe and an olive-green band. Internal tepals silky-white, sometimes with a weak yellowish median band. The tepals are sometimes spatulate, sometimes lanceolate,



Fig. 99: *Gymnocalycium quehlianum*: origin Cuesta del Aguila (Cordoba).

according to populations. Throat carmine. Filaments white; yellow anthers. Style white to greenish-white; white stigma, with 10-12 lobes, under the stamens.

Fruit spindle-shaped, dark olive-green, few scales, becoming white with a pink tip on their upper part.

Seeds of the *Trichomosemineum* type, *Quehliana* series, of 0.8-1.2 mm; testa shiny brown, smooth, with very small papillae; hilum with an interrupted edge, as a horse shoe.

Area of distribution: Province of Cordoba (Sierra Grande, Sierra Chica, Sierra de Tulumba...) and North of San Luis.

Variable species, in particular in the form of the flower and tepals. A certain number of varieties have been described, from which I will only retain:

***G. quehlianum* var. *zantnerianum* Schick.**

Differs from the typical form by the higher number of the ribs (15-17), and the pinker colour of the flowers.

I collected the plant in the Sierra de Tulumba.

***G. ragonesei* Cast.**

Small hemispherical to flattened conical plants, the upper face discoid to tabular, with a weak central depression; diameter 35-70 mm, height 15-25 mm. Initially solitary, becoming more or less offsetting with age. Colour varying from greenish-brown to mauvish-brown. Apex little or not spiny, strongly woolly, yellowish-white. Ribs 8 to 13, very flat, divided into merging tubercles, separated by small short indistinct transverse furrows. Areoles round, of 1 to 2 mm diameter, furnished with yellowish-white to dirty white wool, becoming bald thereafter. Short radial spines (3-5 mm), straight to sinuous, appressed, whitish, 3-4-(6). No central spines.

Flowers near the apex, shaped as a long funnel; height 15-60 mm, diameter 30 mm. Pericarpel brownish-grey to slate-gray, long and thin, reaching up to two thirds of the length of the flower, with conical scales with a white border. External tepals spatulate to lanceolate, more or less serrated, ivory-white with an olive-green to brown wide median band. Internal tepals lanceolate, white. Throat white, with a little pink at the base. Filaments pale green; anthers light yellow. Style pale green; stigma yellowish-white, with 9 lobes, at the level of the secondary stamens.

Fruit of around 25 mm long, greyish-green, with lateral dehiscence.

Seeds of the *Trichomosemineum* type, *Quehliana* series, around 1.2 mm; testa shiny light brown, with clearly visible cell network, few and very small papillae; hilum with an important and interrupted spongy edge.

Area of distribution: Salinas Grande, province of Catamarca.

In the wild, the plants are deeply buried in the ground, only the apex level with the surface.

G. riojense Eric ex Pazout

Body sub-spherical, matt greenish-brown, 8-11 cm in diameter and 5-8 cm tall. Napiform root. Apex depressed, spineless, woolly. Ribs 10 to 16, straight, rather acute, divided into conical nipples tubercles with conical chins, separated by very apparent V-shaped transverse furrows. Areoles oval, $3 \times 4-5$ mm, yellowish becoming greyish, then uncovered. Radial spines 3-5, straight, radiating, overlapping, up to 15 mm long. Young spines light brown to blackish-brown, passing then to light grey with a dark point. No central spines.

Flowers near the apex; height 50 mm, diameter 40 mm. Pericarpel 15-20 mm, olive-green to glaucous-green, the scales widely edged with white and with a pink point, passing gradually to the external tepals. The latter spatulate, white to rosy white, with an olive-green wide median band. Internal tepals lanceolate, white with a pink central line and carmine base. Throat dark carmine. Filaments pale green; anthers sulphur-yellow. Greenish white style with a pink base; yellowish white stigma, with 9-12 lobes, between the primary and secondary stamens.



Fig. 100: *Gymnocalycium riojense*, Astica (San Juan).

Fruit elongated, around 25×15 mm, olive-green to brownish-green.

Seeds of the *Trichomosemineum* type, series *Quehliana*, around 1.2 mm. Testa shiny chestnut brown, with small papillae; hilum with an incomplete spongy edge, in horse-shoe.

Area of distribution: Province of La Rioja and bordering areas around Catamarca and San Juan.

As in the majority of the species with a relatively wide distribution, one finds a certain number of more or less distinct forms, depending on the geographical location of the populations concerned. H. and W. Till recently tried to give a more precise picture of this situation, and have subdivided the species into not less than four subspecies and nine varieties. I will not restate them here, but refer the reader *inter alia* to *G. kozelskyanum* and to *G. piltzi-orum*.

G. ritterianum Rausch

Body leaf-green, flattened spherical, diameter from 80-110 mm and a height of 30-40 mm, often offsetting. Long napiform root. Apex depressed, not very woolly, spineless. Ribs 10 to 16, straight to slightly sinuous, convex, divided into rounded tubercles more or less merging together, with narrow and very distinct chins, separated by short V-shaped transverse furrows. Areoles oval, 6×3 mm, yellowish-white. Radial spines 7-9, radiating,



Fig. 101: *Gymnocalycium ritterianum*.

straight to slightly curved, up to 25 mm long. Central spine single, erect, up to 30 mm long. All spines straw-yellow to pinkish, with brown point; young spines light brown.

Flowers around the apex, wider than high; height 50-65 mm, diameter 60-75 mm. Pericarpel leaf-green, with broad and rounded white scales tinted with pink at the point, passing gradually to the external tepals. The latter white with a light green median stripe and the extremity abundantly spotted with brownish pink. Internal tepals white with a short and pink central line at the end. All tepals spatulate with a small mucro. Throat carmine. Filaments white; anthers light yellow. Greenish style; white stigma with 10 lobes.

Fruit piriform, 15 mm in diameter, bluish with the scales rosy white.

Seeds of the *Microsemineum* type, Mostiana series, around 1-1.2 mm; testa matt blackish-brown, warted; hilum oval with a weakly developed edge.

Area of distribution: Sierra de Famatina, province of La Rioja.

Species close to *G. hossei*, of which it is different however by the yellow anthers and the more globular form of the floral buds, which makes the species close to *G. glaucum* and *G. nigriareolatum*.

G. saglionis (Cels) Br. & R.

Body water-green to yellowish-green, diameter 20-30 cm and height 15-35 cm. The older plants become cylindrical, and lie down like a cucumber; I observed a specimen of 1 metre in length and 35 cm in diameter. Apex slightly depressed to flat, woolly and spineless, but covered by the spines of the neighbouring areolas, especially with the older plants. Ribs 16 to 23 (up to 32 and more with the older plants), sinuous, divided into polygonal tubercles strongly bulging, separated by oblique transverse furrows. Chins weak and blunt. Areoles large, oval, 6-9 × 10-15 mm, white passing to greyish. Spines erect, curved and interlaced; radials 15 and more, measuring 25 to 40 mm; centrals 1 to 3. Young spines brown to blackish, becoming pinkish-grey or yellowish with a black tip. In reality, the spines are yellow or pink with a grey pruinose coating, with the result that they become orange to red when wet.

Flowers arranged in a crown around the apex, squat and cup-shaped; diameter and height of 25 to 35 mm. One counts up to 45 flowers on only one plant. Pericarpel very short, light green with rounded scales with a white edge and pink point, passing gradually to the external tepals. The latter spatulate, rosy white with a light green to slightly brownish median band. Internal tepals spatulate mucronate, of Isabelle colour more or less pink according to the individuals. Throat white to greenish. Filaments white; anthers ochre-yellow to light brown. Style greenish-white, short (7 mm); stigma light yellow, with 12-14 lobes, between the primary and secondary stamens. One finds female unisexual flowers (gynodiocious).



Fig. 102: *Gymnocalycium saglionis*, Cafayate (Salta): older specimen.

Fruit sub-spherical, around 2-3 cm in diameter, olive-green becoming cherry-red at maturity, with wide and low scales with a pink border. At the time of the dehiscence, the green deliquescent pulp partly oozes out. One can count up to 2000 seeds in a single fruit.

Seeds of the Microsemineum type, series Sagliones, very small, $0.3\text{-}0.5 \times 0.7\text{-}0.9$ mm; testa matt black, warted, without cuticle; hilum narrow, slightly oblique, prominent, yellowish white.

Area of distribution: South of Jujuy, to the East of San Juan, via the provinces of Salta, Tucuman, Catamarca and La Rioja.

In spite of such an extended area of distribution, the species offers a remarkably stable morphology, and is recognized, so to speak, at first glance. The few variations of the spines or flower colours which one observes within the various populations do not appear to depend at all on their geographical location.

The genus (!) **Brachycalycium** (*B. tilcarensis*) created by Backeberg for the plants from Jujuy is in no way justified, and is rejected as a plain synonym of *G. saglionis*.

One rather frequently finds cristate specimens in this species.

G. schatzlianum Strigl & W. Till: = **G. gibbosum**.

G. schickendantzii (Web.) Br. & R.

Body glaucous-green to dark green, diameter 11-13 cm and 16-20 cm tall. Exceptionally, the old plants can lengthen and take the shape of a cucumber, and I observed a specimen of 55 cm long and 16 cm in diameter. Apex non-woolly, covered by the spines of the neighbouring areoles. Ribs regular, 12-14, divided into rounded polygonal tubercles, with quite marked chins. Transverse furrows almost occupying all the width of the ribs. Areoles oval, 3-4 × 6-9 mm, white to slightly yellowish, sometimes being able to pass to greyish. Radial spines (3)-5-7, strong, straight, erect, measuring up to 3 cm long, Young spines blackish, becoming greyish-pink. No central spines.

Flowers off-centre, from the shoulder sometimes down to very low on the body; height 70 mm, diameter 48 mm. Pericarpel elongated (25-30 mm), glaucous-green, with acuminate scales, with a greenish white border. External tepals sub-acuminate spatulate, ivory-white to rosy, with a dark green to brownish wide median band. Internal tepals smaller, acuminate, ivory-white to rosy, with a silky central line. Throat white to pink. Filaments white; anthers light yellow, Style pale green; yellowish stigma, with 10-12 lobes, under the stamens.

Large ovoid fruit, measuring up to 60 mm in height and a diameter of 35 mm, becoming red at maturity, and remaining fleshy for a very long period.



Fig. 103: *Gymnocalycium schickendantzii*, Villa Sanagasta (La Rioja).

Seeds of the Muscosemineum type, Schickendantziana series, from around 1 mm; testa matt light brown, papillose; hilum oval, lateral, curved.

Area of distribution: From the North of San Luis, via the provinces of Córdoba, La Rioja, Catamarca and Tucuman as far as in the South of Salta.

G. schickendantzii var. delaetii (K. Sch.) Backbg.

Is distinguished from the type form by the rounded scales, with a pink or carmine border, the more globular shape of the floral bud, and the pinker tone of the flowers. The latter, which harmoniously combines the greens and pinks, are a rapture for the eyes of connoisseurs.

This variety is found in the South of the province of Salta and the North of that of Tucuman.

G. schroederianum V. Osten

Body flattened spherical reaching up to 15 cm in diameter and 8 cm in height, which can more or less lengthen in culture; epidermis glaucous-green to brownish. Apex depressed, little or no wool, spineless. Ribs 13 to 24, deeply divided into rounded polygonal tubercles with prominent conical chins, separated by short transverse furrows. Areoles oval, 3 × 4.5 mm, whitish. Radial spines 5-7; in the latter case where there are 7 spines, the three side pairs, of which the upper one is definitely shorter, and the odd vertical spine, which



Fig. 104: *Gymnocalycium schickendantzii* var. *delaetii*, origin Osma (Salta).

is the longest (up to 22 mm) draw a very characteristic motif, that looks like a “dragonfly”. All the spines appressed, whitish to straw-yellow, with reddish base, becoming greyish at the base of the plant.

Flowers near the apex; height 70 mm, diameter 55 mm. Pericarpel thin and elongated, of around $20 \times 5-8$ mm, clear green to olive-green, the conical scales with a wide yellowish-white border. External tepals spatulate mucronate, yellowish-white with a leaf-green wide median band. Intermediate tepals lanceolate, yellowish-white with a fine green line. Internal tepals lanceolate, white or slightly yellowish, with a small mucro. Throat yellowish-white or pink. Filaments greenish-yellow; anthers creamy-white to light yellow. Style light green; Stigma yellowish-white, with 8-12 lobes, under the stamens.

Fruit elongated piriform, 25×15 mm, olive-green greyish with wide white scales, opening by lateral dehiscence.

Seeds of the *Ovatisemineum* type, series *Baldiana*, 1.2 mm; matt black, warted testa, with remainders of cuticle; hilum wide and flat.

Area of distribution: Uruguay and Province of Entre Rios, Argentina.

***G. schroederianum* var. *bayense* Kiesling**

Differing from the typical form by the smaller size, the diameter not exceeding 10 cm, the occasional presence of a central spine, and the flowers very short (50 mm)

Origin: Sierra Bayas, province of Buenos Areas.



Fig. 105: *Gymnocalycium schroederianum* var. *bayense*.

G. spegazzinii Br. & R.

Body glaucous-green to greyish-brown; diameter 18-20 cm, height 10 cm (above the soil level). In the wild the plants are partially buried, which gives to the body an aspect more flattened than actuality; this results in the (invalid) name of *G. horizonthalonium*, which was given to the species by Fric. In culture, the specimens become more spherical, even slightly elongated. Apex slightly depressed, woolly. Ribs 10 to 33, regular, with tubercles merging together, without chins, with rudimentary or no transverse furrows. Areoles elongated, of 8-10 × 4-6 mm, yellowish to greyish. Radial spines 5-7- (9), strong, curved, appressed (sometimes more or less erect), measuring 25 to 55 mm long. Young spines yellowish or blackish, becoming brownish-grey. No central spines.

Flowers on the apex, funnel-shaped; height 70 mm, diameter 50 mm. Pericarpel long (25 × 7 mm), glaucous green to bluish gray, the rounded scales with a light pink border and a carmine point. External tepals spatulate, whitish to rosy, with a glaucous-green median band. Internal tepals smaller, lanceolate, white with a pink central line and carmine base. Throat carmine. Filaments carmine; anthers light yellow. Style white to rosy; white stigma, with 10-16 lobes, under the stamens.

Fruit elongated, around 35 mm, with bluish pruinose coating, and with few rounded scales.

Seeds of the Microsemineum type, series Sagliones, around 0.9 mm; testa reddish, more blackish near the hilum, with the warts separated by

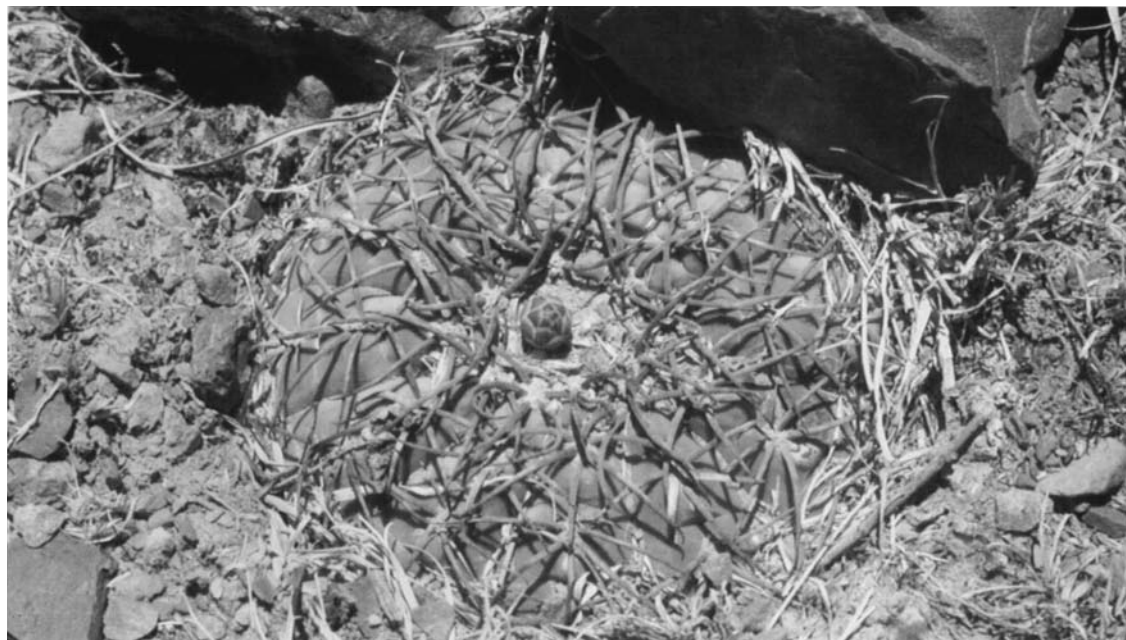


Fig. 106: *Gymnocalycium spegazzinii*, Chorrillos (Salta).

furrows and gaps; hilum basal, oval, relatively large, slightly convex, whitish.

Area of distribution: South-West of Salta in the North-East of Catamarca and the North-West of Tucuman, in altitude.

This species has a rather large richness of forms. The variations of colouring of the body and of the spines, as well as the habit and the length of these, depend on the places of origin of the plants.

G. stellatum (Speg.) Speg.

Body greenish-brown, 75-125 mm in diameter and 25-50 mm total height, lower part below the soil level (hypogean) conical and upper part concave or flattened to more or less convex. Apex slightly depressed, woolly. Ribs 7 to 12, straight, convex, divided into rounded tubercles with prominent humped chins, underlined by short transverse furrows; whilst they occupy the whole width of the ribs at the bottom, they diminish to become one third to one half at the middle height of the plant. Areoles oval, 2 × 3-4 mm, whitish, quickly becoming bald. Radial spines 3-5, short (5 mm), straight sinuous, appressed to radiating, greyish white with blackish-red base. No central spines.

Flowers on the apex; height 55-65 mm, diameter 45-55 mm. Pericarpel thin, greyish-green, the scales with a rosy white border, passing gradually to



Fig. 107: *Gymnocalycium stellatum*, Cosquin (Cordoba).

the external tepals. The latter are spatulate, white, more or less tinted with pink, with a median stripe of brownish-green. Internal tepals strongly acuminate, white or more or less rosy. Carmine throat. White filaments; yellow anthers. White style; stigma of same colour, to 8-12 lobes of 4 mm, between the primary and secondary stamens.

Fruit spindle-shaped, brownish green.

Seeds of the type *Trichosemineum*, series *Quehliana*; testa shiny brown, with well developed papillae; hilum has a spongy edge stopped at the base.

Area of distribution: West and North of the province of Cordoba.

Species looks very like *G. riojense*, with which it is frequently confused. Is somewhat distinguished by the more flattened body, with fewer ribs, the less strong and shorter spines, and whiter internal organs of the flower.

G. stuckertii (Speg.) Br. & R.

Body glaucous-green; diameter 60-65 mm, height 35-40 mm. Apex depressed, not very woolly, covered by the spines from neighbouring areoles. Ribs 9-11, sinuous, wide, round, separated by deep vertical furrows. Tubercles polygonal rounded, with strong conical chins, separated by straight transverse furrows very marked, occupying half of the width of the ribs. Areoles large, oval, 7-9 × 4-5 mm, white but quickly uncovered. Radial spines 5-7 (9), straight, semi-erect; length up to 25 mm. Young spines brown to blackish-brown, passing to greyish-pink with brown tip. No central spines.

Flowers on the apex; height 80 mm, diameter 80 mm. Pericarpel pale glaucous-green, the rounded scales with a wide white border, lengthening progressively to the external tepals. The latter lanceolate, white with a carmine median stripe and terminating in dark green. Internal tepals narrower, pale salmon pink with a median stripe of carmine pink. Throat carmine. Stamens



Fig. 108: Gymnocalycium stuckertii

in two series quite separated. Filaments and anthers pale yellow. Style pink to carmine red; yellowish white stigma, with 11-12 lobes, under the stamens.

Fruit elongated, truncated, green tinged with blue, the rare scales with a wide white border.

Seeds of the *Ovatisemineum* type, *Baldiana* series of around 1.5 mm; matt black warted testa, with abundant remainders of cuticle, giving the seed a light-brown to beige appearance; hilum wide and flat, blackish.

Area of distribution: North-East of the town of San Luis, in the province of the same name.

The flowers reach a size definitely higher than that mentioned by Spegazzini in the original description. The flowers as well as the seeds reveal a close relationship with the *capillaense-sutterianum* group.

G. sutterianum (Schick) Berg.

Body glaucous green to greyish green; diameter 55-80 mm, height 35-50 mm; generally hidden in the ground, so that only the upper part emerges to a height of 15 to 20 mm. Root napiform. Apex depressed, little or no wool, spineless. Ribs 8 to 12, straight, separated by vertical furrows that are very shallow although very apparent. Tubercles polygonal, with rounded chins, separated by straight transverse furrows, occupying around half of the width of the ribs. Areoles rounded to slightly oval, 3 × 4 mm, white. Radial spines (5)-7-9, radiating to appressed, straight, white with a more or less reddish



Fig. 109: *Gymnocalycium sutterianum*, Sierra de Calamuchita (Cordoba).

base, up to 13 mm long. Young spines erect, yellowish brown to light brown. No central spines.

Flowers borne from areoles around the apex; height 62 mm, diameter 45 mm. Pericarpel brownish green, rounded scales with a wide white border. External tepals lanceolate, white Isabelle to rosy white, with a dark olive-green median stripe outside, and a pink line on the internal face. Internal tepals lanceolate, rosy white to pink, with a central line more marked. Throat carmine. Filaments white to pink; anthers pale yellow. Style white Isabelle¹ to pink; Stigma yellowish-white, with 8 lobes, under the stamens.

Fruit greyish-green, with the scales largely tinted with pink and finely edged with white.

Seeds of the *Ovatiseminum* type, *Baldiana* series, of around 1.8 mm; testa matt black warted, disappearing under a very abundant cuticle; hilum wide and flat, blackish.

Area of distribution: From the South of the province of Cordoba to the North of the province of San Luis.

Species closely related to *G. capillaense*, being characterized by the indistinct chins, the colour of the flowers more intensely pink, in particular of the style, and the abundant presence of cuticle on the seeds. Considered by many authors to be only a form of *G. capillaense*.

G. tanningaense Piltz

Initially solitary, then proliferating; individual heads 30 mm high and 40 mm wide. Epidermis glaucous green. Apex depressed, woolly and spiny. Ribs obtuse, 9 to 12, separated by straight vertical furrows not very shallow, and divided into rounded tubercles weakly chinned. Areoles white, rounded to slightly oval, with a diameter of 4 mm. Young spines light brown, becoming blackish with a grey pruinose coating. Radial spines 7-11, appressed, sometimes more or less sinuous, reaching 10 mm long. Central spines 1-2, with a more pronounced black base, erect, measuring 8-9 mm.

Flowers near to the apex; height 50 mm, diameter 45-60 mm. Pericarpel leaf-green, with rounded scales with a wide white border, with a brownish terminal spot. The scales pass gradually to the external tepals, which are spatulate, white with a green wide median stripe and a blackish grey end. Internal tepals lanceolate, pure-white with a greenish base. Throat light green. Filaments greenish-white; anthers creamy-yellow. Style greenish-white; stigma white, with 9 lobes.

Fruit ovoid, bluish-green, around 2 cm long. Seeds of 1.2-1.4 × 1-1.2 mm, of *Ovatiseminum* type.

Area of distribution: Surroundings of Tanninga (Cordoba),

The green colour of the throat is exceptional for *Gymnocalycium* with white



Fig. 110: *Gymnocalycium tanningense*, origin Tanninga (Cordoba).

flowers; it could to indicate an affinity with the yellow flowering forms, such as *G. andreae*.

G. tillianum Rausch

Body leaf-green to bluish-green; diameter up to 15 cm, height up to 10 cm. Fibrous roots. Apex depressed, woolly, overhung by the spines from neighbouring areoles. Ribs 10 to 17, round, sinuous, separated by deep vertical furrows. Tubercles rounded, with prominent chins; straight transverse furrows, occupying the whole width of the ribs, Areoles oval, 8 × 5 mm, initially yellow then white, Radial spines 5-7, strong, erect, curved, reaching about 25-30 mm long. Central spines 0-1, erect and slightly bent upwards. Young spines brown with dark tip, becoming grey with brownish point.

Flowers around the apex; height 30-35 mm, diameter 35-40 mm. Pericarpel short (15 mm), green, with rounded olive-green scales, initially edged with white and a pink point, then bordered with pink. External tepals spatulate, cherry-red with an olive-green wide median band. Internal tepals spatulate, but narrower, with a small mucro, of carmine red colour. Throat carmine. Filaments carmine pink; anthers light yellow. Style carmine to orange-red; stigma white to yellowish, with 9-11 lobes, under the stamens.

Fruit sub-spherical, brownish green with lighter scales.

Seeds of the type Microsemineum, series Pileisperma, from around 1 mm.



Fig. 111: *Gymnocalycium tillianum*.

Testa matt blackish-brown, finely granulous; large basal hilum, circled with a strong prominent white ring.

Area of distribution: Sierra de Ambato; province of Catamarca.

Species close to *G. carminanthum*, of the same area, from which it differs mainly by the rather particular type of seed.

***G. tobuschianum* Schick: = *G. multiflorum*.**

***G. valnicekianum* Jajo**

Body light green to shiny bottle-green; diameter 10-15-(20) cm, height 7-12-(15) cm; initially solitary, then offsetting with age. Fibrous roots. Apex depressed, furnished with young spines. Ribs wide, slightly convex, 8 to 12 and more. Tubercles merging together, with strong angular chins, separated by indistinct transverse furrows. Areoles large, oval, 6-9 × 9-12 mm, yellowish passing to light gray. Radial spines strong, semi-erect, curved, 7-15-(20), reaching up to 35 mm long. Young spines light brown, becoming light grey with brown or black tip. Central spines 1-4-(10), erect, more or less curved upwards, of the same colour as the radials and hardly longer; up to 40 mm.

Flowers around the apex, like a widened funnel; height 55 mm, diameter 70 mm. Pericarpel short, green, scales with a white border. External tepals white to pale yellow, with a greenish brown wide median stripe with reddish



Fig. 112: *Gymnocalycium valnicekianum*, Sierra Chica (Cordoba).

tip. Internal tepals white with carmine base and pink central line. Throat carmine. Filaments white with a pink base; anthers light yellow. Style greenish white; pale yellow stigma, with 9-10 lobes, under the stamens.

Fruit spherical to ovoid, of 1 to 1.5 cm long, bottle-green, scales with a white edge and a light brown point.

Seeds of the Microsemineum type, Mostiana series, 1300 in a single fruit.

Area of distribution: Surroundings of Capilla del Monte, province of Cordoba.

Species narrowly related to *G. mostii*, of which it could be only a form from low altitude.

G. vatteri Buining

Body flattened spherical, matt green, slightly olive or a little bluish, more or less hidden in the ground and easily passes unnoticed; reaching 10 cm diameter, and 5 cm high. Apex slightly depressed, woolly, with young spines. Ribs 9 to 11, divided into rounded to rhomboidal tubercles with very distinct chins. Areoles oval, 3 × 5 mm, furnished with yellowish-white wool passing to greyish. Radial spines 1 to 3, having the tendency to decrease in number with age; initially erect, they then bend towards the body. Young spines brown, passing quickly to yellowish with a brown base; length 15-20 mm. No central spines.



Fig. 113: *Gymnocalycium vatteri*, Las Rabonas (Cordoba).

Flowers on the apex: height 55 mm, diameter 45 mm. Pericarpel light green, with acuminate rounded scales, with a broad white border, lengthening gradually to pass to the external tepals. The latter are spatulate, with a tiny mucro, white with a green median stripe. Internal tepals lanceolate, pure white. Throat carmine-pink. Filaments yellowish-white; anthers light yellow. Style pale green; stigma white, with 10 lobes, beneath the stamens.

Bluish fruit, 3cm high and 1 cm diameter. Seeds of the type *Trichomosemineum*, series *Quehliana*.

Area of distribution: The Sierra Grande of Cordoba (Las Rabonas, Nono...) to the Sierra de Comechingones (San Luis), at an altitude between 700 and 1000 metres.

G. weissianum Backbg.: = **G. hossei**.

Culture

In spite of their great diversity and sometimes their very different origins, *Gymnocalycium*s are in general robust plants, not requiring particular precautions. A mixture of mineral substrate and humus, drained well, will be perfectly appropriate for them. Light should not be too intense, otherwise we will see them reddening, and they will even be burned. Watering should be generous in summer, and continued long enough (beginning-November) and begun again sufficiently early (end February), if one wants to avoid the atrophy of the roots

and the delay in resumption of growth which would result from it. In winter, one should mist the plants in sunny weather, preferably before midday, so that they will dry by the end of the day.

The majority of the species support without inconvenience a temperature close to 0 C, but *G. mihanovichii*, the species from Chaco is an exception, which should not be kept below 10 C.

HARRISIA Britt.

See *ERIOCEREUS*.

LEPISMIUM Pfeiff.

Epiphytes of pendant habit, thin segments and round section, polygonal or flattened. The ovary is deeply inserted in the flowering areole, and even the floral bud is the same up to a certain point. The flowers are generally small, white or yellowish to pink. The fruit is a round berry, white or red.

The area of dispersion of the genus extends from Venezuela to Brazil, Paraguay and Argentina.

The current tendency is to reintegrate the species of *Lepismium* in the genus *Rhipsalis*.

L. tucumanense (Web.) Backbg.

Cylindrical segments of 4 to 6 mm in diameter, and up to 30 cm long. Young shoots short, leaf-green, abundantly covered with bristles; older segments longer, becoming bald, yellowish green, dappled with darker green.



Fig. 114: Lepismium tucumanense, origin Dique Escaba (Tucuman).

Areoles with a small reddish scale, white wool and bristly spines first increasing in number from 1-2 to 8-9, then becoming bald.

Flowers lateral, one per areole, at the axil of a carminated scale and surrounded by a crown of short white wool at the base; height 10 mm, diameter 12-15 mm. External tepals greenish white, spatulate mucronate, slightly carminated at the end, with a brownish median stripe and a network of fine anastomosed lines of light brownish green colour. Internal tepals lanceolate, lighter, with the same network of fine pale greenish lines. Filaments yellowish white, anthers white. Style pale green; stigma with 5 white and strongly papillose lobes, with the extremity bent downwards.

Fruit sub-spherical, 8-10 × 7 mm, rosy white.

Elongated seeds, shiny brown around 1.2 × 0.8 mm; hilum oblique, whitish.

Area of distribution: Provinces de Tucuman, Catamarca, Santiago del Estero and Salta.

Culture

Considering their epiphytic character, *Lepismium* asks for a good compost well decomposed, and more significant quantities of water than for cacti in general. Never allow the compost to become completely desiccated, even in winter.

If one wants to enjoy their pendant habit fully, the use of hanging pots is essential.

LOBIVIA Br. & R.

The lumping of the species with round seeds in the genus *Echinopsis* certainly narrowed the genus *Lobivia* like the “*peau de chagrin*”¹, principally with regard to the Argentinean forms. The only species remaining are those with elongated or elliptical seeds, which are found at altitude in the North of the country.

They are small to average plants, solitary or offsetting, the floral-tube relatively short, woolly and funnel-shaped. Contrary to what is observed with *Echinopsis*, the amount of wool does not increase at the top of the tube.

The body is generally globular at the beginning, and can lengthen more or less with age. Ribs are acute to more or less rounded, straight, and divided into tubercles more or less merging together.

The flowers are generally of shiny colours, being able to vary within the very same species, but one finds also some forms with white flowers.

The geographical distribution of the genus extends from Peru to Bolivia (from where it is named!) and in the North of Argentina.

¹ “The magic skin”: novel by Honoré de Balzac.

L. chrysantha (Werd.) Backbg.

Body glaucous matt green sometimes tinted with mauve, solitary; height 5 cm, diameter 7 cm. Apex flattened, slightly woolly, spineless. Ribs straight, rounded, separated by shallow vertical furrows, 11-14. (Up to 26 according to Rausch!). Tubercles merging together, without distinct separation. Areoles rounded to oval, 2 × 3 mm, whitish. Radial spines strong, radiating to erect, 5-9, from 7 to 20 mm long. Young spines black with a reddish base, passing to pinkish grey, then to blackish-grey on the lower part of the body. No central spines.

Flower budding from side areoles; height 70 mm, diameter 50 mm. Tube reddish, furnished with light green scales and with abundant grey wool, more blackish at the base of the tube. External tepals lanceolate mucronate, reddish yellow with a green median stripe and brown point. Internal tepals golden-yellow, largely rounded, with a small mucro. Throat green, then dark-carmine deep inside. Filaments of primary stamens light yellow with carmine base; the secondary stamens light yellow with green base. Anthers white. Style dark carmine, 18 mm long; short stigma, of the same colour, with 13 lobes.

Seeds kidney-shaped, with the hilum oblique slightly convex.

Area of distribution: Puerta Tastil, Quebrada del Toro, Salta province.

L. famatimensis (Speg.) Br. & R.

Body sub-spherical to cylindrical, greyish-green often tinged mauvish brown, of a diameter of 35 mm and up to 70 mm high. Root napiform.



Fig. 115: *Lobivia chrysantha*, origin Puerta Tastil (Salta).

Apex umbilicate, little or no wool. Ribs thin, straight to slightly spiralling, 25 to 35, divided into relatively low small rounded tubercles. Very small elongated Areoles, from around 1×0.4 mm, furnished with brown wool. Short radial spines (1.5-2 mm), appressed, 12 to 14, white with brown base. No central spines.

Flowers lateral, funnel-shaped, as wide as high; 40-50 mm. Tube with thin and elongated scales, abundantly furnished with brown wool. External tepals lanceolate, pink carmine with a small mucro. Internal tepals egg-yolk-yellow to golden-yellow, with an orange point. Filaments light yellow; anthers of the same colour, or slightly paler. Style yellowish-white, 10-12 mm; stigma cream-coloured, with 8-12 lobes.

Area of distribution: Sierra de Famatina, Cuesta de Miranda, Huaco..., at altitude; province of La Rioja.

Backeberg was wrong when he believed that this species should be placed in synonymy with *Hymenorebutia kreuzingeri* (= *Echinopsis densispina* var. *pectinifera*), and he renamed it "Reicheocactus pseudoreicheanus"! Even nowadays, the species is still frequently confused with *E. densispina* to which there is however only a superficial resemblance.

L. ferox Br. & R.

Body light leaf-green, spherical to short-cylindrical, reaching 2 cm in diameter and 30 to 50 cm in height. Napiform root. Strongly spined apex. Ribs



Fig. 116: *Lobivia ferox*, Cuesta de Azul Pampa (Jujuy).

high, acute, 20 to 36; tubercles merging together, convex, but flattened laterally. Areoles large, oval, 10-15 × 6-10 mm, gray. Spines strong, erect, curved upwards. Radials 11-13, measuring 3 to 7 cm long; centrals 2-5, which can reach a maximum length of 18 cm. Young spines light brown to dark brown, becoming gray, then black with a reddish base.

Large side flowers, funnel-shaped; height 9-11 cm, diameter 6-8 cm. Tube olive-green to brownish, furnished with a mixture of white and black wool. All the tepals lanceolate. The externals white, with greenish or pink-brownish tint on the external face. The internals pure white. Throat greenish to yellowish. Filaments white; anthers yellowish-white. Style green; stigma greenish-white, with 8-10 lobes.

Fruit spherical or in the shape of a small cask, 15-20 mm in diameter.

Seeds around 1.5 × 1 mm, blackish-brown; hilum oval, oblique.

Area of distribution: From Purmamarca (Province of Jujuy) in the South, up to Oruro (Bolivia) in the North.

L. ferox var. longispina (Br. & R.) Rausch

Body leaf-green to dark-green, spherical to short-cylindrical, with a diameter of 7-10 cm, and 5-6 cm and more high. Apex spineless. Ribs 17 to 25, high, narrow, straight. Areoles elongated, 5 × 3 mm, grey. Radial spines strong, erect, straight, 4-6, at the bottom of the areoles, greyish-white to



Fig. 117: *Lobivia ferox var. longispina*, Cuesta de Toquero (Jujuy).

blackish-brown. Central spines 3-4, on the upper part of the areoles, straw-yellow becoming grey to black, measuring up to 5 cm.

Flowers lateral; height 65-80 mm, diameter 55-65 mm. Ovary dark green; tube olive-green to greyish-green, with pink to reddish-brown scales, furnished with wool white at the bottom, passing to black at the top. External tepals narrowly lanceolate, brownish-green with a pink point. Intermediate tepals lanceolate, pink to light orange, with a median stripe of olive-green to brownish-pink. Internal tepals shiny yellow to shiny orange, lanceolate or spatulate, with a small mucro. Throat green. Primary filaments white to light green; secondary filaments white with yellow or orange extremity. Anthers light yellow to cream. Style green; stigma light green to light yellow, with 8-10 lobes.

The colour of the flowers varies from pink to orange and red. The more significant dimensions mentioned by some authors come very likely from a confusion with the species-type.

This form is found in the extreme North of the province of Jujuy (La Quiaca, frontier of Bolivia) and in the South of Bolivia. The more southern localities cited by some sources (Tilcara...) come once more from confusion with the typical form.

L. grandiflora Br. & R.

Body leaf-green, spherical to short cylindrical, 15-20 cm high, 6-10 cm in diameter. Apex umbilicate. Ribs 12-15, sharp to more or less rounded, straight. Areoles 3-4 × 2-3 mm, 10-12 mm apart, light yellow becoming gray.



Fig. 118: *Lobivia grandiflora*, El Rodeo (Catamarca).

Radial spines short (4-6 mm), straight, erect, 7-8-(11). Central spines 1-3, reaching up to 10-14 mm long. Young spines light brown, becoming straw-yellow with a brown tip.

Flowers lateral, on the upper part of the body; height 10 cm, diameter 8.5 cm. Tube olive-green to reddish-green, with slim scales, furnished with dark-wool and some bristles. External tepals lanceolate, light red to median green. Internal tepals spatulate, with a mucro, shiny red, with a border slightly darker. Filaments crimson; anthers yellow. Style red; stigma yellow, with 11-13 lobes, exceeding the stamens.

Fruit globular, yellowish, around 3 cm in diameter,

Seed black, shiny, slightly incurved, of around 1.3×1 mm; hilum terminal, slightly oblique.

Area of distribution: Sierras de Graciana, Manchado and Guayamba; province of Catamarca.

Interesting species, because it constitutes a transition between the genera *Lobivia* and *Trichocereus*. (also Described by Kiesling under the synonymous name *T. Rowleyi*). Genus *Lobivia* was selected because of the presence of a hymen (annular thickening on which secondary stamens are inserted), characteristic of some *Lobivias*, but always absent with *Trichocereus*.

L. grandiflora var. lobivioides (Ritt.) Rausch

Differing from the type species by the lighter epidermis, the more elongated form of the body (up to 40 cm in height to 6 cm in diameter) and the single central spine, thinly aciculated.

Found in Cuesta de Totoral and on the heights between Andalgala and Conception. (Province of Catamarca).

L. haageana Backbg.: = **L. marsoneri**

L. jajoiana Backbg.

Body glaucous green; height 70 mm, diameter 50-60 mm. Apex slightly depressed, little or no wool, not overhung by the spines of the neighbouring areoles. Ribs 12-18, straight, acute, thin at the base of the plant. Tubercles elongated, separated by short transverse furrows. Areoles oval, 4×2.5 mm, whitish to yellowish. Radial spines 9-11, thin, straight, radiating, white to reddish-gray with a black point, measuring 1 to 2 cm long. Central spines 1-4, strong, erect, the lower slightly hooked, black with reddish base, becoming grey with a black point thereafter; length up to 35 mm.

Flowers lateral, with the external tepals radiating and the internal forming a cup; height equal with the diameter: 65 mm. Tube olive-green, more or less striated with reddish-brown above the scales, which are elon-



Fig. 119: *Lobivia jajoiana*.

gated, with a dark green point. Wool whitish to gray, blacker at the top of the tube. External tepals lanceolate, rosy-white or red, with a wide median stripe of brownish-green to blackish. Internal tepals spatulate mucronate, orange to fire-red, with a thin carmine border. Throat and hymen purple to blackish. Filaments violet; cream-coloured anthers. Style light green; stigmata of the same colour, with 9-11 lobes, on the level of the primary stamens.

Fruit ovoid, woolly, 1.5 cm long.

Oval seeds, of 1.5 × 1 mm; testa shiny-black, very finely warted; hilum oblique, elongated

Area of distribution: Quebrada de Humahuaca around Volcan, Jujuy province.

Several varieties have been described; I will quote the principal ones.

***L. jajoiana* var. *casपालasensis* Rausch**

Is distinguished from the typical form and other varieties by the fact that the hymen and the filaments are not purplish but pink to pinkish white.

This variety is found, as its name indicates, in the area of Caspala, province of Jujuy.

L. jajoiana var. elegans Rausch

Body glaucous green; height 70 mm, diameter 50-60 mm. Apex slightly depressed, little or no wool, not overhung by the spines of the neighbouring areoles. Ribs 12-18, straight, acute, thin at the base of the plant. Tubercles elongated, separated by short transverse furrows. Areoles oval, 4×2.5 mm, whitish to yellowish. Radial spines 9-11, thin, straight, radiating, white to reddish-gray with a black point measuring 1 to 2 cm long. Central spines 1-4, strong, erect, the lower slightly hooked, black with reddish base, becoming grey with a black point thereafter; length up to 35 mm

Flowers lateral; height 60 mm, diameter 50 mm, brownish. Tube green, covered with green scales and blackish-grey wool. External tepals lanceolate, carmine with a brownish green median band. Internal tepals spatulate, with a small mucro, dark red with a border of orange-red. Throat purplish-black. Primary filaments dark carmine; secondary filaments purple, inserted on a black hymen. Anthers cream. Style olive-green; stigmata light green, with 9-11 lobes.

The colour of the flowers can vary; one finds specimens with flowers of pink salmon to orange.

This variety is found in the mountains to the West of the portion of the Quebrada de Humahuaca which extends from Purmamarca to Tilcara. It is replaced more in the South by the variety *paucicostata*, an extremely close form.



Fig. 120: *Lobivia jajoiana var. elegans*: origin road to Abra de Pives (Jujuy).

L. jajoiana var. nigrostoma (Buin.) Backbg.

Contrary to what one could believe of its name, this variety does not have a blacker throat than the others; it is rather the lighter colour of the tepals which makes it appear darker by contrast.

As Backeberg points out, it was sometimes called "*L. jajoiana* with yellow flowers", although the colour of the flowers can vary from yellow to orange and even with red.

The origin of the plants is the region of Maimara (Quebrada de Humahuaca) and a little more to the North.

L. marsoneri (Werd.) Backbg.

Body light green, flattened to globular; height 55-80 mm, diameter 50-80 mm. Apex not very woolly, overhung by the spines of the neighbouring areoles. Ribs wide, high, rounded, slightly sinuous, 10 to 18. Areoles oval, 7 × 5 mm, covered with wool yellowish-white passing to grey. Radial spines thin, radiating, straight, 8-12, measuring up to 30 mm long. Young spines with a reddish base, becoming yellowish to light brown. Central spines 2-4-(5), erect, straight, sometimes slightly hooked; the lower the longest, up to 70 mm long,

Flowers lateral, funnel-shaped or more or less bell-shaped, 50 to 70 mm tall. Tube olive-green mixed with reddish, with elongated scales, and covered with greyish-brown wool. Tepals yellow to red; the externals lanceolate, with a mauve to brownish median band; internals spatulate mucronate. Throat and



Fig. 121: *Lobivia marsoneri*, origin Rio Yacoraité (Jujuy).

hymen purple. Primary filaments purple; secondary filaments yellow with a short base of violet or mauve. Anthers light yellow. Style olive-green; stigmata greenish-yellow, with 9-10 lobes.

Seeds reminiscent of those of *L. Chrysantha*.

Area of distribution: Quebrada de Humahuaca, between Huacalera and Humahuaca, province of Jujuy

L. multicostata Backbg.

Body light green to glaucous green, reaching 15 cm and more in diameter. Strong napiform root. Apex slightly depressed, non-woolly, spineless. Ribs acute, 18; very marked tubercles. Areoles small, 2×1 mm, whitish. Radial spines 5-7, the lower radiating, transparent with a reddish base, the two upper stronger, darker, erect and curved. Central spines 1-(2), erect, straight blackish-red, not longer than 35 mm.

Flowers lateral, 40-45 mm high and wide. Ovary bottle-green, the scales with a pink point and whitish wool. Tube olive-green with large long scales of pinkish-brown with a long pink point, covered with whitish wool, mixed with black in the top of the tube. External tepals pink, narrowly lanceolate. Internal tepals acuminate lanceolate, wider, white. Throat green. Filaments white; anthers cream. Style green, 40 mm; stigmata lighter green, with 11 lobes.



Fig. 122: *Lobivia multicostata*, road to Abra de Pives (Jujuy).

Area of distribution: Heights to the West of Purmamarca, province of Jujuy.

This species was described “of unknown origin” by Backeberg. I think of having found it, even if the flowers are whiter (less yellow) than in original description. The very particular aspect of the upper radial spines, of which I had made a sketch in my log book, seems characteristic of the species.

L. pugionacantha (Rose & Boed.) Backbg.

Body bottle-green, spherical to flattened spherical, up to 70 mm in diameter. Root napiform. Apex slightly depressed, not very woolly, spineless. Ribs thin, high, tuberculate, more or less distorted, 16-17. Areoles very small, rounded, from around 1.5 to 2 mm in diameter. Radial spines flattened, 3-7, initially erect, then radiating, white tinted with brown to a black point, passing to dirty yellowish-white. The odd spine is definitely shorter than the laterals, which measure 2 to 2.5 cm long. Central spines 0-1, erect towards the top when they are present, and measuring up to 5 cm long.

Flowers lateral, 40-45 mm high and 40-50 mm in diameter. Tube light green, with pink scales. External tepals brownish-green. Intermediate tepals salmon-pink with a brownish-green median band. Internal tepals orange. Throat green. Hymen light yellow. Primary filaments green; secondary filaments pale yellow. Anthers pale yellow. Style green; stigmata light yellow, with 6 lobes.



Fig. 123: *Lobivia pugionacantha*, East of Yavi (Jujuy).

The colour of the flowers varies; with some specimens, it is more cherry-red, with pink filaments.

Fruit spherical, green and woolly, of around 1 cm in diameter. Seeds kidney-shaped, 1.8×1.2 mm; testa irregularly warted, blackish-brown; hilum oblique, elliptic.

Area of distribution: Region of Villazon, La Quiaca, Yavi, at the border of Argentina-Bolivia.

L. rubescens Backbg.: = **L. marsoneri**.

Culture

Lobivias, originating in the high mountains, are robust plants, resisting well even the rigorous temperatures of winter. However, equally because of their origin, they will ask for much air and light in their growth period. They will thus need good ventilation in the greenhouse, or better still, to move the plants in the open air for the summer. At the time of a normal summer, a small amount of rain from time to time will be welcome, provided that they have been given a suitably drained soil.

The flowering is abundant and early (at the age of 3-5 years), except for *L. grandiflora*, which confirms in this way one of its affinities with *Trichocereus*.

MAIHUENIA Phil.

Plants strongly ramified, made up of cylindrical to sub-spherical segments, forming more or less compact cushions. Presence of little fleshy leaves, cylindrical to ovoid, persistent for a long time. Flowers terminal, rotate, coloured white, yellow or red. Pericarpel scaly; axils covered more or less with abundant wool and bristles. Large lenticular seeds, black, shiny, measuring up to 4 mm.

The genus is found in the southernmost part of the Andean cordillera, both in Chile and in Argentina, and in Patagonia.

M. patagonica (Phil.) Br. & R.

Dense cushions, flattened hemispherical. Large fleshy cylindrical root. Ovoid segments to cylindrical, of 10-15 mm in diameter and 2 to 8 cm long, of a very pale ash-green. Areoles rounded, 2-3 mm in diameter, white, becoming bald thereafter. Leaves very many, fleshy, cylindrical, with pointed end, dark green, measuring up to 9 mm long. Spines white, flattened sharp-edged, more or less flexible, 3. The two laterals shorter; 0.5-1 cm, the central definitely longer, measuring up to 35 mm.

Flowers at the end of the branches, 35 to 45 mm in diameter. Pericarpel light green; whitish scales with a pink point, deprived of wool but with some bristles in the axils. External tepals pale green; Internal tepals white.



Fig. 124: *Maihuenia patagonica*, Cuesta de Chihuido (Mendoza).

Filaments white; anthers egg-yellow. Style white; stigmata of the same colour, with 7-8 lobes.

Fruit globular, truncated, around 2 cm in diameter, yellowish-green.

Seeds lenticular, of 3 mm in diameter and 2 mm thick.

Area of distribution: South of the province of Mendoza to Patagonia.

M. valentinii Speg.

Cushions looser than with the preceding species, of 10 to 25 cm high. Smaller segments, claviform, greyish-green, of 5-8 mm in diameter and 10-35 mm long. Areoles rounded to oval, of 2 to 2.5 mm in diameter, white, becoming bald thereafter. Leaves ovoid to cylindrical, not more than 3 mm long. Spines 3, stiff and sharp-edged, tinted reddish-brown when young, becoming grey at the base of the tufts. Lateral spines short (3-10 mm); central spine reaching 6 cm.

Flowers at the extremity of the branches, around 20 mm high and wide. Pericarpel with green scales that have a crimson point, the axils covered with white wool and one or two bristles of brownish-pink colour. External tepals mucronate, pale red; internal tepals white to light yellow. White filaments; yellow anthers. White style; stigmata crimson, with 5 lobes.

Area of distribution: Provinces of Neuquen. Rio Negro and Chubut.

Kiesling puts this species in synonymy with *M. patagonica*. I do not share this view, and estimate that it is a good species, perfectly distinct. It is easily differentiated, inter alia, from the preceding one by the colour and the length of the spines, the woolly pericarpel, and the colouration of the stigmata.

A third species, *M. poeppigii*, is found as well in Argentina, in the West of the province of Neuquen. However I did not have the opportunity to observe it.

Culture

Plants resist the cold well, without requiring much light, and require a substrate of granulous structure. To be cultivated preferentially in a sufficiently roomy space or in the open ground. To this day, flowering was not obtained at our latitude.

MAIHUENIOPSIS Speg.

Plants ramified, in cushions, with thickened roots, tuberous. Segments ovoid to more or less claviform. Areoles small, woolly and armed with a

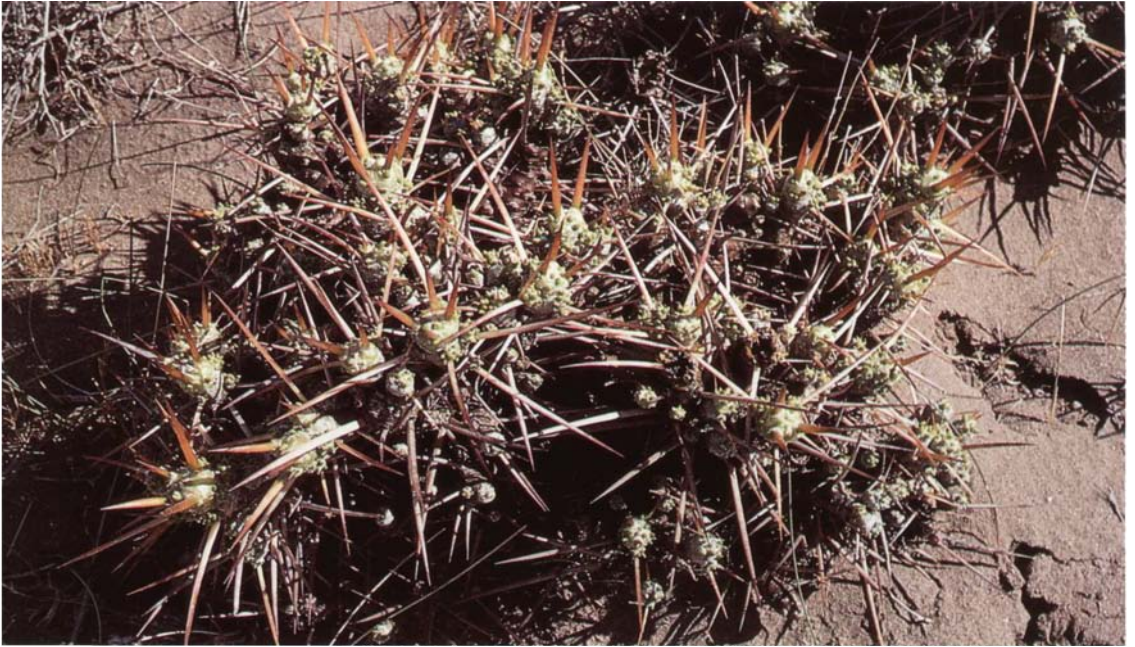


Fig. 125: Maihuenia valentinii, road to Zapala-Neuquen (Neuquen).



Fig. 126: Maihueniopsis boliviana, road to Abra de Pives (Jujuy).

tuft of yellow or brown glochids deprived of spines at the base of the segments, spiny or not at the top of those. Presence of small subulate leaves to conical, quickly disappearing. Flowers solitary, very similar to the flowers of *Opuntia*, yellow to red. Pericarpel fleshy, covered by areoles furnished with wool and glochids, and generally with spines at the upper row. Fruits ovoid or in reversed cone, initially green, becoming yellow to reddish at maturity. Seeds laterally flattened, of brown colour, woolly or not, with a hard and compact aril, never spongy, nor auriculate.

Genus widespread from the Andes to Patagonia; Chile, Peru, Bolivia and Argentina.

M. boliviana (S-D) Kiesling

Dense cushions, reaching 75 cm to 1 metre diameter. Thick roots, napi-form. Ovoid segments, of 5-7 × 3.5-4 cm, light green. Areoles round, of around 4 mm in diameter. Glochids established in a ring, brownish-yellow, with a little white or yellowish wool in the centre. Spines on the upper areoles only, 4 to 10 and more, measuring 5 to 10 cm; sometimes some weak shorter secondary spines (1 cm), whitish to transparent. The principal spines are yellow to brownish when young, and can or not turn grey or even black thereafter.

Flowers rotate, 50-60 mm in diameter and 40-55 mm high. Pericarpel green, with some scattered areoles, plus a continuous series at the upper edge: these latter covered with many yellowish bristles of around 1.5 cm long, in addition to whitish wool and yellow glochids. External tepals spatulate mucronate, some slightly tinted with red, otherwise completely light yellow. Stamens sensitive. Filaments and anthers light yellow. Style the same colour; stigmata paler, whitish or greenish, with 7-8 lobes.

Fruit globular truncated, around 3 cm in diameter, covered with flexible bristly spines of around 2 cm long.

Seeds of 3 × 2 mm, with shiny testa, with an aril with prominent annular edge.

Area of distribution: Bolivian altiplano to the puna and the precordillera Argentina. (At altitude, in the province of Jujuy in the North of the province of Mendoza).

M. darwinii (Hensl.) Ritter

Relatively loose cushions, of variable size; 10 cm to 1 metre and more. Ovoid segments, light green to olive-green, of 25-30 × 20 mm. Young segments with more marked tubercles, and with a small leaf triangular and pointed, reddish-brown, on the areoles. The latter rounded, yellowish-white, 2-3 mm in diameter, abundantly furnished with wool, from which emerge few glochids of pink colour. Spines present not only on the higher areoles, but also at the centrals, while only the basal ones are

deprived. The spines, unequal in length, attain a maximum of 6 cm, and number (1)-2-5 per areole; they are yellowish-white, flattened and striated, and exert an “effect of fish-hook” in case of catch. The young spines are white.

Flowers rotate to cup-shaped, 5 cm high and 6 cm in diameter. Pericarpel matt-green; areoles of the upper part carry glochids of around 4 mm, and some brownish spines, of 1.5 to 2 cm long. External tepals small and fleshy, green; Internal tepals spatulate, mucronate, yellow to orange, brownish at the end. Filaments yellowish-white; anthers light yellow. Style spindle-shaped yellowish to greenish; stigma green, more rarely red, with 6-10 lobes

Fruits elongated truncated, of 4×1.5 cm , yellow orange.

Seeds lenticular, of 3×5 mm; aril thick, brownish-yellow.

Area of distribution: South of the provinces of Mendoza, La Pampa and Buenos Areas up to all Patagonia.

Kiesling distinguishes the varieties *darwinii* and *hickenii* which are different primarily by larger dimensions of the second. The *darwinii* variety would be a coastal form, South of the province of Buenos Aires to Santa Cruz, whereas the *hickenii* variety would occupy all the remainder of the area of distribution.

The relevance of this separation is unfortunately called into question by our own collections. Plants as described above (with small segments



Fig. 127: *Maihueniopsis darwinii*, Puntilla de los Huincanes (Mendoza).

and spines relatively short) indeed come from the South of the province of Mendoza and the province of Neuquen, i.e. far inland. Moreover, they form extended cushions, in spite the reduced dimensions of the segments. Consequently, if the two forms are not geographically isolated, and if there are intermediaries between them, the creation of separate varieties is not justified.

M. glomerata (Haw.) Kiesling

Segments ovoid, dark green, of around 30×13 mm, forming compact cushions, covered with elastic spines. Areoles rounded, of 1-2 mm in diameter, covered with tufts of yellowish-white glochids, 2 to 3 mm long. The upper areoles carry moreover 2-(3) straight spines, flattened and striated, white with a brown tip, reaching 35 to 50 mm in length. The young spines at the top of the segments are blackish-brown. Secondary spines are absent or of 2 to 5, transparent, white or yellowish, 0,5 to 1 cm long.

Flowers 30-45 mm high, to 40-50 mm in diameter. Pericarpel conical, dark green. Areoles protected by a small triangular leaf, furnished with abundant white wool and yellow glochids; those of the upper edge with some yellow spiny bristles, of 0.5 to 1 cm long. External tepals short and thick, green to yellow border, with a small dark mucro. The internals rounded, mucronate, light yellow washed with golden-brown at the extremities. (Seldom red). Filaments yellowish-white; anthers light yellow to golden. Style white to greenish; green



Fig. 128: *Maihueniopsis glomerata*, Pampa Yalguaraz (Mendoza).

stigma. With 7-8 lobes

Fruit globular truncated, of 25-30 × 20 mm, green with reddish top, with the areoles furnished with white wool and yellow glochids.

Seeds comma-shaped, 3 × 4 mm, with dark brown testa; aril compressed piriform, creamy-white, with the surface covered with small excrescences.

Area of distribution: South of Bolivia, Chilean cordillera to the North of Santiago, and Argentinean provinces of Jujuy, Salta, Catamarca, La Rioja, San Juan and Mendoza.

The specimens from Jujuy and of Salta carry only one principal spine on the upper areoles, and no secondary spines; the plants of southernmost origin offer 1 to 3 principal spines, plus 2 to 5 lateral spines.

M. hypogaea (Werd.) Ritter: = ***M. glomerata***.

M. minuta (Backbg.) Kiesling

Small clumps 10 cm in diameter and 3-5 cm in height, made up of globular to ovoid segments of around 20 × 13 mm, light greyish-green to dark-green. Root carrot-shaped, 20 cm long. Areoles white with a diameter of 1 mm, becoming more or less bald thereafter. Tufts of yellow orange glochids. Young growth carries small reddish fleshy leaves, 1.5 mm long. Spines of yellowish colour, erect at the base, but quickly forming an angle to become



Fig. 129: *Maihueniopsis minuta*, Cuesta de Azul Pampa (Jujuy).

more horizontal, 2-3 per areole, measuring up to 3 cm long; sometimes 1 to 2 additional rudimentary spines. Lower Areoles deprived of spines, or with only some rudimentary spines.

Flowers cup-shaped, from 25 mm high and wide. Pericarpel light green, 10 mm, with a crown of fine silky spines on the upper edge. External tepals orange-yellow to pink, with a wide carmine median band. Internal tepals orange or pink, spatulate mucronate. Filaments yellowish-white; anthers white. Style yellowish-white; stigma slightly more greenish, with 6 lobes.

Area of distribution: Provinces of Jujuy and Salta, at altitude.

It seems that the Form described by Heinrich and Backeberg under the name of *Tephrocactus pentlandii* var. *rossianus*, and designated later by Ritter under the new combination "*Cumulopuntia rossiana*", is very close, if not identical to the present species.

On the other hand, in so far as *Tephrocactus mandragora* Backbg., is synonymous with *M. minuta*, as Kiesling postulates it, the plant collected by Ritter in the surroundings of Puerta Tastil, described and illustrated by him under the name of *Maihueniopsis mandragora*, could not belong to this species.

M. molfinoi Speg.: = **M. glomerata**.

M. molinensis (Speg.) Ritter: = **Tephrocactus molinensis**.

M. nigrispina (K. Schum.) Kiesling

Low plants, forming rather loose cushions. Little thickened roots. Segments elliptic to sub-cylindrical, of 1.5 × 3-4 cm, strongly tuberculate when young, but whose tubercles grow indistinct at the base of the plant; coloured greyish-green to brownish. Areoles oval, 2.5 × 1 mm, protected by a small fleshy conical leaf, deciduous, furnished with white wool and yellow to brownish glochids. Areoles basal and lateral spineless, upper with 4-7 erect spines, straight, blackish-brown with an orange base, reaching up to 45-60 mm long.

Flowers rotate, 20 mm high and 25 mm in diameter. Pericarpel 15 mm, reddish-olive-green, bearing small conical leaves of the same colour, and the areoles furnished with white wool, and a crown of yellowish-white bristles on the upper edge. External tepals narrow, lanceolate, carmine with a brownish median band. Internal tepals spatulate mucronate, carmine to cherry-red. Filaments carmine; anthers light yellow. Style white with pink, 16 mm; dark purple stigma, with 6 lobes of 2 mm.

Fruit more or less piriform, truncated, of 1.5-2.5 × 1.2-1.5 cm, dark red.

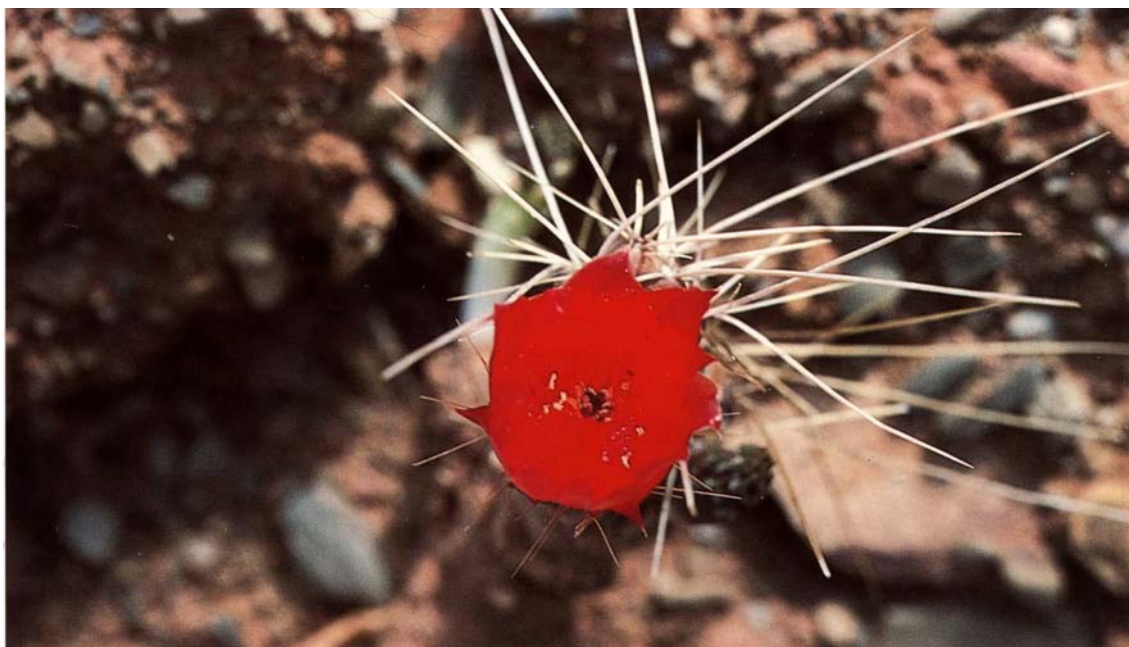


Fig. 130: Maihueniopsis nigrispina, Aroyo Ugchara (Jujuy).

Seeds comma-shaped, with light brown testa; aril whitish to light brown, presenting anfractuositities (cragginess) on the surface.

Area of distribution: Provinces of Jujuy and Salta, and the South of Bolivia.

M. ovata (Pfeiff.) Ritter

Dense cushions, but hardly exceeding 20 cm in diameter and a height of around ten centimetres. Segments ovoid, 30-(50) × 20 mm, olive-green; younger segments darker, with short conical leaves, deciduous, tinted with mauve. Areoles round, around 2 mm in diameter, not very woolly, but covered with compact tufts of yellowish glochids, of around 4 mm long. Lower areoles spineless, the higher with 4-6-(8) straight spines, acuminate, whitish, unequal length, reaching 30 mm long. The lower areoles (spineless) secrete small droplets of a viscous liquid in hot weather.

Flowers of 45 mm in height and 55 mm in diameter. Pericarpel conical, 15-20 mm, with the areoles protected by a small triangular leaf of 2-3 mm, and covered with white wool and brownish-yellow glochids. Upper edge with some bristles of around 13 mm long. External tepals fleshy, spatulate-lanceolate, mucronate, green. Internal tepals spatulate, with small mucro, yellow to orange tinted brownish. Throat lighter. Filaments and anthers creamy-yellow coloured. Style spindle-shaped, yellowish-white; stigma red-crimson, with 8-10 lobes.

Fruit sub-cylindrical, truncated, 2×3 cm.
 Seeds lenticular, of $3-4 \times 2$ mm; aril yellowish-white.

Area of distribution: Province of Mendoza and South of San Juan.

M. pentlandii (S-D) Kiesling

Cushions hemispherical, 10 to 30 cm in diameter and 10 to 20 cm in height. Segments ovoid $3-4 \times 2$ cm, light green, often tinted with reddish when young. Areoles with yellowish-white wool, with a ring of light yellow glochids. The lower spineless, the upper either spineless, or with 1-3 spines, straight, erect at the base, but quickly becoming curved and more horizontal (however, erect spines remain within some populations). Young spines yellowish passing to whitish, the longer around a maximum length of 2 cm. One observes besides, 2-4 secondary spines, whitish and flexible, of 3-7 mm long.

Flowers cup-shaped, from 40 mm high and wide. Pericarpel of 17 mm, initially green, passing to wine-red; upper edge covered with a crown of fine yellow thorny bristles of around 1 cm long. External tepals spatulate, yellow with a wide median stripe of carmine. Internal tepals spatulate mucronate, yellow tinted with orange, especially on the upper edge. Throat greenish. Filaments and anthers pale yellow; style white; stigma greenish, with very short lobes.

Fruit ovoid truncated, 2×1 cm, red.



Fig. 131: *Maihue niopsis ovata*, Rio Malarguë (Mendoza).

Area of distribution: Province of Jujuy and South of Bolivia.

Culture

Plants robust, with similar requirements to those of the preceding genus; soil well drained, and much light. The growth is slow, and it will be necessary to have patience if one wants to see it flower. Whereas flowering is more usually observed in Mediterranean areas, it is less easy to obtain under our more northern latitudes. Plants that have been given a privileged placement at the top of the greenhouse near the glass, have recorded positive results particularly with *M. darwinii*.

MALACOCARPUS S-D.

See *NOTOCACTUS*.

MEDIOLOBIVIA Backbg.

See *REBUTIA*.

MONVILLEA Br. & R.

Plants thinly columnar, crawling to more or less erect, of which some can reach considerable dimensions. Flowers in an elongated funnel, white, sometimes greenish tinted, nocturnal. Tube with small scales, but without wool or spines. Fruit spherical to ovoid, glabrous to more or less scaly. Seeds black, small.

Widespread genus from Brazil to Venezuela, Ecuador, Peru, Paraguay, and northern Argentina.

M. cavendishii (Monv.) Br. & R.

Stems leaf green, not very erect or crawling, ramifying and reaching up to 1 metre long and 3 cm in diameter. Ribs 6-10, separated by very shallow furrows. Areoles rounded, around 1.5 mm in diameter, furnished with brownish-white to greyish wool, inserted into the top of the flattened-conical nipples. Spines reddish-brown when young. One can distinguish 5-7 radial spines, radiating, acicular, greyish-white with a brown point, 5-6 mm long. Central spines, straight, erect, light brown with a dark point, the longer can reach 4 cm. (Generally 25 mm).

Flowers lateral; length 12 cm, diameter 10 cm. Ovary light green, with very small scales not thorny. Tube glabrous, greenish-brown, upper part



Fig. 132: *Maihueiniopsis pentlandii*, road to Abra de Pives (Jujuy).



Fig. 133: *Monvillea cavendishii*, origin San Pedro de Jujuy (Jujuy).

paler; scales have a carmine red point becoming gradually larger at the top of the tube, to pass to the external tepals, which are pink carmine with two edge lines of greenish-white to the base. Intermediate tepals ivory-white, slightly greenish, with a carmine pink median band. Internal tepals ivory to pure greenish white. All the tepals narrowly elongated, lanceolate, intermediaries larger than the internals. Stamens in only one series. Filaments white; anthers light yellow. Style greenish-white; white stigma, with 10 lobes, exceeding the stamens. Night flowering.

Fruit of variable form, ovoid to piriform, sometimes sub-spherical, of 30-50 mm high to 25-40 mm in diameter. Initially shiny bottle-green, with the extremity more blackish-green, with the desiccated remainders of the flower remaining attached to the upper part. Epidermis glabrous, with tiny pink scales. Ripe fruit becoming shiny carmine-red; lateral dehiscence by tearing of the skin as with *Eriocereus*. White flesh with sweet flavour.

Seeds kidney-shaped, flattened laterally and obliquely truncated at the hilum; height 1,8 mm, width 1 mm. Testa shiny black, finely spotted; hilum narrow, elongated, whitish, flat to slightly concave.

Area of distribution: South of Brazil, Paraguay and North of Argentina; provinces of Formosa, Chaco, Corrientes, Salta and Jujuy (low areas).

M. spegazzinii (Web.) Br. & R.

Stems very thin, bushy, diameter 25 mm, reaching several metres long and clinging to the trees. Epidermis bluish to light brownish, dappled or marbled with darker glaucous green, and tinted with carmine-red near the vegetative pole. Ribs 5, very apparent. Areoles rounded, with a diameter of 3 mm, 20 to 28 mm apart, furnished with white to greyish wool, inserted into the top of conical protuberances. Spines strong, erect, 4 to 6, one being more central; length up to 15 mm. Young spines red with black tip, becoming completely black.

Flowers lateral; length 105 mm, diameter 60 mm. Tube glaucous bluish-green, glabrous, finely dappled with darker. Scales very few, elongated, with a pink or brownish point, becoming gradually larger at the top of the tube, to pass to the external tepals. These with a median stripe of glaucous green, with a wide pinkish-brown border on both sides, and a greenish yellow edging on the outside. Intermediate tepals white with a wide median stripe of pink tinted brownish, sometimes with a yellowish-green edge. Internal tepals white. All the tepals lanceolate, the internal denticulate mucronate. Throat greenish. Stamens in two series; the primaries in a compact mass under the style, the secondaries in a ring around the perianth. Filaments white; anthers cream-coloured. Style greenish-white; stigma white, with 15-17 lobes.

Area of distribution: Paraguayan and Argentinean Chaco. (Provinces of Formosa and Chaco).

Culture

Considering their great dimensions, *Monvillea* must have a suitable space, which will be obtained best by planting them in open ground. They will appreciate a good exposure, as well as generous watering in the summer, without forgetting sufficient manure. Under these conditions, the growth will be fast, and flowering will be obtained in the third year. As the flowers are nocturnal, and fade after one night, it will be necessary to rise early to admire them...

If the plants become too invasive, there is no disadvantage in pruning them.



Fig. 134: *Monvillea spegazzinii*, origin Igr. Faure (Formosa).

NEOWERDERMANNIA Fric

Small globular cactus with napiform root, without constriction at the neck-level. Ribs divided into strongly chinned tubercles, with the areoles located in the axils of those. Spines more or less curved, the lower always hooked when young. Flowers relatively small, white to lilac-pink, with a short and glabrous tube, and an ovary deeply inserted between the tubercles, likewise with the fruit. The latter dehisces laterally.

On the basis of superficial resemblance, some authors have felt it reasonable to draw a parallel with *Weingartia*, or even *Gymnocalycium*. However, the structure of the flowers as well as that of the seeds excludes these species from any direct affinity with the aforesaid genera. Personally, I think that the type of seed points to a grouping with *Pyrrhocactus-Neoporteria*.

One knows only three species, rather rare, encountered at altitude in the North of Argentina to Bolivia, Chile, and even to the South of Peru.

N. vorwerkii Fric

Body flattened spherical, 80 mm in diameter and 50 mm in height. Root napiform. Apex depressed, woolly, spineless. Ribs spiralling, 13-17, divided into very prominent conical tubercles. Areoles in the axils, white, rounded, 4-5 mm in diameter. Spines strong, erect, flexible, 3-7; the lower, hooked, and also longer, and can reach 25 to 40 mm. Young spines straw-yellow with a brown point then becoming pinkish-grey with a brown to blackish point.



Fig. 135: *Neowerdermannia vorwerkii*, origin Santa Catalina (Jujuy).

Flowers funnel-shaped, 20-25 mm high & wide. Floral bud nearly black. Tube glabrous, dark green. External tepals lanceolate, white with a dark green wide median band. Internal tepals lanceolate, white, more or less tinted with lilac-pink. Filaments white; anthers cream-coloured. Style and stigma greenish-white, exceeding the stamens.

Seeds comma-shaped or like an elongated snail shell, 2.5×1.7 -1,8 mm. Testa greyish-brown, corrugated and blistered; hilum large, lateral, elongated, occupying 2/3 to 3/4 of the length of the seed.

Area of distribution: From North of the province of Jujuy to Bolivia (Area of Oruro, and even to lake Titicaca).

Culture

Plants not presenting any particular requirement. Flowers abundantly from the age of 4-5 years. Easy to multiply by seed.

NOTOCACTUS (K. Sch.) Backbg.

Plants of spherical or sub-spherical form, becoming more or less cylindrical with age according to the species. Ribs straight to spiralling divided into tubercles more or less marked. Spines generally thin, silky or acicular seldom stronger.

Flowers in a crown around the apex, funnel or bell-shaped, generally yellow, more rarely red, mauve or wine-coloured. Scaly ovary and tube; axils of the scales abundantly filled with wool and bristles.

Fruits covered with bristles and wool (except in sub-genus *Wigginsia*), dehiscing laterally, apically or basally.

Seed helmet-shaped to hemispherical; testa black or dark brown, warty covered with a caducous aril, except within *Wigginsia*, where it remains on ripe seed. Hilum basal, flat to slightly convex, the size slightly larger than the diameter of seed.

Widespread genus from the South of Brazil to Uruguay, Paraguay and to Argentina.

Several taxons previously regarded as separate genera are today incorporated in the genus *Notocactus*, such as *Brasilicactus*, *Eriocactus*, and *Wigginsia* (*Malacocarpus*).

In use since more than one century, the name of *Malacocarpus* was replaced by *Wigginsia* in the cause of homonymy; indeed, the name of *Malacocarpus* had been given before (and thus has priority) to a genus of another family of plants (*Zygophyllaceae*).

The enlarged *Notocactus* genus further subdivided into six sub-genera, namely; *Notocactus*, *Neonotocactus*, *Brasilicactus*, *Eriocactus* and *Notobrasilia*.

The sub-genera *Brasilicactus* and *Notobrasilia* being exclusively Brazilian, I will not consider them here.

On the other hand, the other sub-genera are found in Argentina; I give here the principal characteristics:

Notocactus: Not very woolly apex; flowers funnel-shaped or campanulate; stamens in two series, sensitive or not; nectar-chamber present; fruits dehiscent laterally.

Neonotocactus: Not very woolly apex; flowers in a wide-open funnel; stamens in only one series; no nectar chamber; fruits dehiscent basally.

Wigginsia: Strongly woolly apex; stamens in two series, sensitive; red stigma; the fruit is a berry of tender flesh (from where came the older name of *Mala-cocarpus*), remaining huddled under the wool of the apex for several months before emerging from it at maturity.

Eriocactus: Strongly woolly and more or less tilted apex; stamens in two series, non-sensitive; yellow or white stigma; Fruits dehiscent basally.

In the descriptions of the individual species, the sub-genus will be indicated in brackets, respectively by N, NE, W and E.

N. (W) *erinaceus* (Haw.) Krainz

Body dark green, spherical to short cylindrical, reaching 15 cm in diameter. Apex furnished with thick white wool. Ribs 14 to 20, straight to more or less spiralling; divided into tubercles with laterally compressed chins. Areoles more or less recessed, rounded, 4-5 mm in diameter, becoming bald quickly. Radial spines 7-9, straight, radiating, short (up to 1 cm long); young spines light brown, passing to grey. Single central spine, erect, brown to blackish, a little longer than the radials.



Fig. 136: *Notocactus erinaceus*.

Flowers on the apex, of 30-50 mm in height and 60-70 mm in diameter. Tube reddish-yellow, furnished with a brownish grey wool, plus a black bristle at the axil of each scale. External tepals spatulate, light yellow to greenish; internal tepals spatulate denticulate to lanceolate, shiny yellow. Throat light red. Filaments yellow; anthers yellowish-white, style yellowish-white; red stigma, 7-8 lobes.

Fruit pink to reddish, spineless.

Area of distribution. South of Brazil. Uruguay and regions bordering on Argentina.

N. (N) linkii (Lehm.) Herter

Body leaf-green, flattened spherical, reaching 15 cm in diameter. Apex not very woolly, spineless, slightly depressed. Ribs 10-13, high separated by straight vertical furrows. Tubercles indistinct; no transverse furrows. Areoles round, 3-4 mm in diameter inserted in a small depression furnished with white wool when young, but quickly becoming bald thereafter. Radial spines (7)-9-11, radiating, long spines of 6 to 13 mm; young spines reddish (Red when wet), becoming greyish-pink with a red base. Central spines 3-4 (seldom 6), erect, more or less curved, brownish-red, 10-15 mm long.

Flowers in a crown around the apex; height 25 mm, diameter 35-50 mm. Tube greenish-yellow, with light brown scales, with white wool, and 2-3 black bristles to the axil of scales. External tepals spatulate mucronate, yellow with a



Fig. 137: *Notocactus linkii*, Cerro Volcan (Misiones).

red point. Internal tepals spatulate and slightly denticulate, pure lemon-yellow. Filaments darker yellow; anthers white. Style yellowish; carmine stigma, with 8-10 lobes.

Fruit dark green to brownish, covered with thorny bristles.
Black seeds.

Area of distribution: South of Brazil, Eastern Paraguay, and province of Misiones (Argentina).

The assertion of Abraham, stating that *N. Linkii* does not exist in Argentina, where it would be replaced by *N. megapotamicus*, is supported by no convincing argument. Moreover, without wanting to make a final pronouncement, I strongly suspect *N. megapotamicus* is simply a synonym of *N. Linkii*.

N. (NE) mammulosus (Lem.) Berg.

Body glaucous green to dark green, spherical to short-cylindrical, reaching 13 cm in height and 8 cm in diameter. Apex slightly depressed, woolly, spineless. Ribs 13 to 25, divided into tubercles strongly chinned. Areoles recessed, wide, diameter of 3-4 mm, furnished with white wool passing to yellowish. Radial spines 11-13-(15), thin, yellowish-white with a reddish-brown base and tip, reaching 8 mm long. Central spines 2-4, rounded, acicular, yellow with a brown base and point, longest generally directed downwards, measuring 10 to 15 mm.



Fig. 138: *Notocactus mammulosus*.

Flowers near the apex, campanulate; height 40 mm, diameter 55 mm. Tube greenish-yellow, with brown scales, white wool and 3-4 black bristles in the axils of the scales. External tepals indented spatulate, yellow more or less tinted with red on the upper part, and with brownish on the exterior. Internal tepals spatulate-lanceolate, denticulate, canary-yellow, with olive-green dashes at the base. Stamens in only one series. Filaments light yellow; anthers yellow. Style light yellow; stigma carmine-red, with 8-10 lobes.

Area of distribution: Uruguay, province of Entre Rios and North of the province of Buenos Aires.

N. (N) ottonis (Lehm.) Berg.

Body light green, flattened spherical, measuring up to 50 mm in height and 80-110 mm in diameter. Napiform root. Plants forming numerous underground growths. Apex depressed, non-woolly, overhung by the spines of the neighbouring areoles. Ribs 9-12-(15), wide and low, rounded, very little bulging under the areoles. Furrows vertical, straight, not very deep; no transverse furrows. Areoles rounded, white, 4-5 mm in diameter, 10 mm apart, inserted on very flattened tubercles, without chins. Spines flexible, straight to more or less sinuous or curved. The radials appressed to semi-erect, 7 to 13 and more; centrals 3-4, erect, measuring up to 25 mm long. All the spines reddish, centrals with a darker base.

Flowers near the apex; height 35-45 mm, diameter 45-50 mm (about 60 mm



Fig. 139: *Notocactus ottonis*, Tres Cerros (Corrientes).

in height for 80 mm in diameter; according to Backeberg?). Tube light yellow with elongated greenish-brown scales, brown wool, and 3-4 black bristles at the axils of the scales. External tepals spatulate mucronate, lemon-yellow with a median stripe of carmine-red on the upper part. Internal tepals lanceolate and finely denticulate, pure lemon-yellow. Filaments yellow; anthers cream-white. Style yellowish-white; carmine stigma, with 11-14 lobes.

Area of distribution: South of Brazil, Uruguay, provinces of Misiones and Corrientes.

The aforesaid area of distribution having been explored in an intensive way, a whole series of authors and/or collectors are believed to have named not less than forty "varieties", plus a hundred "forms"! The majority of these names are "nomina nuda", and just underline the natural variability of the species.

N. (NE) pampeanus (Speg.) Backbg.: = **N. submammulosus**.

N. (E) schumannianus (Nic.) Fric

Body leaf-green, initially large spherical, becoming cylindrical with age; the old plants can reach up to 1 metre long, but lie down and become more or less crawling. Apex flat or slightly depressed, tilted, furnished abundantly with whitish wool, through which point the young spines, which are reddish-brown. Ribs 30 and more, acute, divided into slightly marked tubercles, indistinct at the base of the plant. Areoles round, around 2 mm in diameter, becoming bald thereafter. Radial spines thin, straight to slightly curved, not very sharp-pointed, 4-7-(10); the lower longer, reaching 5 cm. Young spines reddish-brown, passing to brownish-yellow then to blackish grey. No central spines.

Flowers near the apex, widely infundibuliform, with a height of 35-45 mm and a diameter of 40-50 mm. Tube short and wide, with scales terminating in a brownish mucro, the axils furnished with brown wool and bristles. External tepals spatulate, light yellow with a small brown mucro. Internal tepals spatulate, slightly denticulate or mucronate, light yellow. Filaments and anthers light yellow. Style pale yellow; stigma white to yellow, with 10-12 lobes, exceeding the stamens.

Fruit short and fleshy, light yellow tinted with reddish, furnished with wool and bristles, dehiscent basally.

Seeds small, around 1 mm; testa finely warted, brown; large basal hilum, flat to slightly bent, dirty white to yellowish.

Area of distribution: Paraguayan species, that I found on the Argentinean bank of the Rio Parana, in Peñon de la Reina Victoria. (Province of Misiones).

N. (NE) submammulosus (Lem.) Backbg.

Body light green, flattened, more or less elongated thereafter, reaching 15 cm in diameter. Apex depressed, not very woolly, spineless, Ribs 13, straight, separated by deep vertical furrows, and divided into angular tubercles strongly chinned. Areoles more or less recessed, with a diameter of 4 mm, white but becoming bald thereafter. Radial spines straight, fine, acuminate, radiating to erect, 7-9, yellowish-white with a reddish base and brown point; length of 15 to 25 mm, Central spines 2, strong, erect, flattened, longer (25 mm) one directed downwards, the other upwards.

Flowers widely campanulate, near the apex; height 40-45 mm. Tube yellow with green scales and blackish-brown point, furnished with white wool and brown or black bristles. External tepals spatulate, with a carmine-red median band, especially towards the end. Internal tepals spatulate-lanceolate, light yellow with a darker base, with stripes of brownish-green or carmine. Filaments light yellow; anthers yellow. Style white; stigma carmine-red, with 8-10 lobes.

Area of distribution: Doubtless the most widespread Argentinean *Notocactus*, in the provinces of Buenos Aires, Cordoba, San Luis, Mendoza, La Pampa and Rio Negro.

The separation of the *var. pampeanus* does not seem to be justified.



Fig. 140: *Notocactus submammulosus*, Manzano Historico (Mendoza).



Fig. 141: *Notocactus tephracanthus*.

N. (W) tephracanthus (Lk. & Otto) Krainz

Body dark green to glaucous green, flattened spherical, reaching 15 cm in diameter. Apex strongly woolly. Ribs 15-17, straight, pointed, separated by deep vertical furrows; tubercles merging together, elongated vertically. Areoles wider than high, 5-6 × 3-4 mm, recessed, white, becoming bald thereafter. Radial spines straight radiating to slightly erect, 5-7, sometimes with 1 or 2 small additional spines at the top of the areole; length 15-25 mm. Central spines absent, or only one, straight or bent at the base, from around 20 mm long. All the spines greyish-white.

Flowers short infundibuliform, on the apex; height 35-40 mm, diameter 50 mm. Tube light yellow slightly mixed with orange, furnished with wool white at the base and brown at the top. Scales green with a small blackish brown mucro; bristles brown to black. External tepals lanceolate, yellow; with a greenish-yellow median stripe and a small reddish point. Intermediate tepals widest, spatulate denticulate, light yellow. Internal tepals shiny yellow with a lighter median stripe and base. Throat light red. Filaments yellowish-white with a reddish base; anthers white to cream. Style yellowish-white to pinkish; stigma red, with 8 lobes.

Area of distribution: South of Brazil, Uruguay, province of Buenos Aires.

Culture

Observe the general rules for cacti; keep dry in winter, however without leaving the substrate completely dry, and water liberally in summer. *Notocactus* are plants of fast growth, flowering easily and abundantly. The reproduction by seed is easy.

OPUNTIA Mill.

Plants shrubby or in low tufts to crawling, seldom arborescent. Segments articulate, generally compressed, sometimes more or less cylindrical. Areoles always covered with glochids, and covered when young by small conical, caducous leaves. Flowers lateral or sub-terminal rotate. Pericarpel fleshy, with areoles similar to those of the segments or more or less reduced. Stamens more often sensitive. Fruits fleshy, green or variously coloured. Seeds covered with a hard aril, sometimes woolly, whitish to light brown.

It is a widespread genus of Cactus, through the two Americas, from Canada to Patagonia.

It goes without saying that in comparison with the great number of species and such a wide dispersion, many attempts at subdivision of the genus have been proposed.

Thus, certain well characterized groups were separated to constitute distinct autonomous genera. Let me quote, with regard to the Argentinean species: *Austrocylindropuntia*, *Maihueniopsis* and *Tephrocactus*, genera whose acceptance does not pose any problem, even if obstinate people still consider them as Opuntias.

Among Opuntias themselves, various regroupings in sections or subgenera have steadily been advanced, but the definitions were not always satisfactory.

An interesting exception seems made up by the *Airampoae*, characterised by the apical-lateral dehiscence of the fruit, which opens "like the cover of a book", and by the corky aril and wrinkled seed.

O. anacantha Speg.

Long ramified branches measuring up to 2.50 metres, lying-down to erect (whilst leaning on the neighbouring vegetation). Segments elliptic, 15-40 cm long for 3,5-7 cm wide, leaf-green, rarely stained with mauve under the areoles. These are oval, small, 3 × 2 mm, white to greyish, and spineless; very exceptionally with a short white spine of around 10 mm.

Many flowers, inserted on the edge of the segments, rotate to cupuliform, 50 mm in diameter. Pericarpel elongated, more or less turbinate, 40-65 mm in height and 20-22 mm in diameter, carrying 12 to 15 areoles. Young tepals golden-yellow, some of the externals stained a little reddish. Filaments white; anthers sulphur-yellow, style white or rosy; stigma the same colour, with 6-9 lobes.

Fruit of 45 × 30 mm, carmine-red with white flesh.

Seeds lenticular, 3 mm in diameter, brown and woolly.

Area of distribution: Southern Chaco (provinces of Formosa and Chaco) and Santiago del Estero.



Fig. 142: *Opuntia anacantha*, Pres. Roque Saenz Peña (Chaco).



Fig. 143: *Opuntia brunnescens*, Martinez del Tineo (Salta).

O. brunnescens Br. & R.

Low bushes, not passing a maximum height of one metre. Segments elongated, reaching 25-30 cm long and 11-12 cm wide, pure green, with darker spots under the areoles. These oval, 3-4 × 2-3 mm, white, inserted on rounded bulges. Spines initially 1-2, then up to 3-4; young spines red with a lighter median part and dark point, becoming white with a brownish point then grey; length up to 15 mm.

Flowers borne from the areoles on the top of the segments; height 65 mm, diameter 60 mm. Pericarpel 30 mm long, light green, a little darker under the areoles; these are furnished with white wool and a reddish leaflet. Upper edge of pericarpel with a crown of very few brownish-red spines. External tepals triangular, small, green with a reddish point, then becoming wider, indented, yellowish-green with a thin reddish edge. Internal tepals golden-yellow, rounded-off and more or less indented. Stamens sensitive. Filaments and anthers white. Style white, bulging, 20 mm long; stigma pale greenish-yellow, with 9 lobes.

Fruit red, not very spiny, without glochids.

Area of distribution: Province of Cordoba in the South-East of the province of Salta, in the areas of average altitude; often associated with *O. sulphurea*.

O. cordobensis Speg.

Plants shrubby erect, that can reach 1 to 2 metres high and form a trunk



Fig. 144: *Opuntia cordobensis*, Capilla del Monte (Cordoba).

20 cm in diameter. Segments elliptical-rhombic, measuring up to 30-40 cm long and 18-20 cm wide, not very thick, glaucous-green, without spots under the areoles. The latter inserted into the top of small rounded bulges. Spines white, 1-6, generally 3, of which more than two are directed towards the base, and the shortest erect perpendicular to the segment.

Large flowers of 8 cm in diameter and 6 cm in height, inserted on the edge of the segments. Tepals sulphur-yellow, the externals sometimes stained with red orange. Stigma yellow-orange.

Fruit light yellow, tinted with pink.

Area of distribution: Province of Cordoba and regions bordering the provinces of Catamarca, La Rioja and San Juan.

***O. corrugata* S-D.**

Plants forming clumps around 80 cm in diameter. Root with a small tuber. Segments leaf-green, globular, slightly ovoid, measuring up to 3.7×1.9 cm. Areoles brown, their central and lower parts with white spines, the upper part with very few glochids. Presence of a small reddish leaf, caducous, of around 1 mm. Diameter of the areoles 1.5-2 mm; 5-6 mm apart. Spines in extremely variable numbers (3 to 10), maximum length 17 mm.

Flowers of 4 cm height and slightly wider. Pericarpel with scales recalling the leaflets of the segments, with the areoles covered with small whitish



Fig. 145: *Opuntia corrugata*, Volcan (Jujuy).

spines. Tepals rounded, dark red or orange. Filaments red; anthers pink. Style white; stigma dark green.

Fruit around 2×1.5 cm, light red, spiny.

Seeds covered with a corky and wrinkled aril.

Area of distribution; Provinces of Jujuy, Salta, Catamarca, La Rioja and Mendoza.

Species close to *O. microdisca*, from which it is distinguished by the darker epidermis, smaller areoles, and the shorter and whiter spines.

O. discolor Br. & R.

Species crawling or climbing, with the segments long and thin, reaching 50 cm long and 30 mm wide and 15 mm thick. Young growth fresh light green, with stripes of dark purple under the areoles. Spines 1-6 (1 principal and 4-5 smaller) white, with a brown point directed downwards; length 25-30 mm.



Fig. 146: Opuntia discolor,
Quebrada de Escabra (Tucuman).

Flowers of 40 mm high and wide. Tepals shiny lemon-yellow. Filaments white; anthers light lemon-yellow. Style white; stigma pale yellow, with 6 lobes.

Area of distribution: from Chaco in the South-West of the province of Tucuman.

O. kiska-loro Speg.

Plants caespitose, crawling to more or less erect. Segments leaf-green, without stains under the areoles, of 25-28 cm long, 5-8 cm wide and 1.5 cm thick. Areoles oval, 4-5 × 2-3 mm, 25 to 30 mm apart, furnished with white wool and armed with a crown of glochids brownish-red at the upper part. No spines on the areoles at the base of the segments; at the top of these, 1 to 3 large erect spines with whitish point and brownish-red base, becoming grey and directed downwards. Sometimes 1 to 2 additional rudimentary spines; the longest spine is 35 to 50 mm long.

Flowers of a diameter of 45 to 50 mm in nature, reaching 70 mm in culture, and a height of 35 to 45 mm. Pericarpel 25-35 mm, green, with small areoles: the latter like those of the segments show very small green leaves with a mucro. Upper edge of pericarpel with a crown of fine brown spines. Tepals rounded, indented, with a very small mucro, yellow or orange, with a more intense median stripe and a lighter base, sometimes slightly greenish. Throat light green. Stamens sensitive. Filaments white with a greenish base; anthers white to cream. Style bulging at the base, white; stigma white to slightly greenish, with 6-8 large and short lobes, of 4-5 mm.



Fig. 147: *Opuntia kiska-loro*, Las Lomitas (Formosa).

Fruits around 50 × 25 mm, carmine with white flesh.
Seeds lenticular, 5 mm in diameter and 1.5 mm thick, woolly.

Area of distribution: Provinces of Formosa, Chaco, Corrientes, Santiago del Estero, La Rioja, Catamarca and Salta.

O. microdisca Weber

Low tufts, crawling, formed of light-green segments, ovoid to flattened, 35-40 × 20-25 mm. Areoles brownish, with a diameter of 2-3 mm, 6-7 mm apart. Young areoles located at the axil of a small reddish leaf, caducous; glochids many, of around 5 mm, at the top of the areoles. Spines white, sometimes with a yellowish or brownish base, becoming grey thereafter, 8 to 11 (15), the externals radiating in a rosette, centrals stronger, erect, generally 4, reaching 30 mm long.

Flowers 40 mm in diameter and 3 mm high. Pericarpel light green, 15 mm, with some areoles protected by a little red leaf and armed with about ten small white spines (semi-glochids). The edge of the pericarpel covered with brownish triangular scales of 2-3 mm, passing gradually to the external tepals, which are light brownish-red. The internal tepals rounded, scarlet-red. Stamens sensitive. Filaments red; anthers cream-coloured. Style white, cylindrical, 15 mm; stigma blackish-green, with 7-8 lobes of 2.5 mm.



Fig. 148: *Opuntia microdisca*, Cuesta de Capillitas (Catamarca).

Fruit pale green, of around 3×2 cm.
 Seeds covered with a corky aril with a wrinkled surface.

Area of distribution: Provinces of Salta, Catamarca, La Rioja, San Juan and Mendoza, at altitude.

The colouring of the flowers can vary according to populations. Thus, in Quebrada del Toro, one finds plants with yellow to orange flowers, with a clearer throat and yellow filaments, tinted or not with pink.

It is probable, considering the great dispersion of the species, that there are geographical races deserving varietal status.

The name *O. longispina*, which is still sometimes used to indicate this species, is based on an erroneous interpretation by Backeberg, and it must be rejected.

***O. paraguayensis* K. Sch.**

Bushy species with densely ramified branches, reaching 1 to 2 metres high. Segments oblong, light green, $15-20 \times 5-8$ cm, slightly darker around the areoles. The basal segments ("trunks") are a little compressed to subcylindrical. Areoles yellowish-white, oval, 5×3.5 mm. Spines completely absent at the beginning, appearing only on the older segments, but only one per areole. White passing to greyish, they can measure up to 5 cm long.

Flowers established on the edge of the segments, at their upper parts; 75 mm high 45 mm diameter. Pericarpel 45 mm, light green, with rounded ar-



Fig. 149: *Opuntia paraguayensis*, Cuesta del Totoral (Catamarca).

coles of 2-3 mm diameter, furnished with white wool and an arc of brownish-red glochids. External tepals spatulate, greenish yellow with a brick-red wide median stripe. Intermediate tepals of the same colour, longer (30 mm), spatulate and indented. Internal tepals a little narrower, golden yellow with a lighter median stripe. Throat greenish. Stamens not sensitive. Filaments and anthers white. Style white, swollen, 18 mm long; stigma greenish-white, with 7 lobes of 6 mm.

Also described in 1901 by Spegazzini under the name of *O. bonaerensis*, the species was put in synonymy with *O. paraguayensis* by Britton & Rose, which Spegazzini himself recognized in 1925.

Sometimes confused with *O. vulgaris*, it is however characterized by the slimmer shape of the segments, different colouring of the external and intermediaries tepals, non-sensitive stamens, and the more abundant tufts of glochids on the areoles of the fruits.

Area of distribution; Extending from the province of Buenos Aires to Paraguay, the species forms a "continuum" in which it does not appear advisable to distinguish subspecies or varieties.

O. quimilo K. Sch.

Imposing shrubs, reaching a height and a diameter of 4 metres, and developing a trunk 30 cm in diameter. Fleshy segments, leaf-green to glaucous green, of 15-30-(50) cm long and 8-15-(25) cm wide, rounded at the top. Areoles of 3-4 mm in diameter, white to greyish, becoming bald thereafter; glochids greyish-yellow, of 2-4 mm, not very abundant young areoles in the axil of small chocolate-brown leaves, caducous. Spines absent on the young segments, appearing sporadically on the older segments, of 1-(3) on the areoles where they are present. Of ivory-white colour passing to grey with a light brown point, the longest can reach 7 to 14 cm. The older areoles on the trunk can develop a more significant number of spines.

Flowers 50-70 mm high and 35-50 mm in diameter. Pericarpel of 40-50 mm, with white areoles, those of the upper edge covered with yellowish glochids and scales. External tepals wine-red to blood-red, then yellow with a blood-red point. Internal tepals vermilion. Throat whitish with a green ring to the base of stamens. Stamens sensitive. Filaments pink with a white base; anthers white to cream. Style white; stigma greenish-white, with 7-8 lobes.

Fruit of 6-7 × 3-4 cm greenish-yellow passing to wine-red at maturity.

Seed elliptic, around 8 × 6 mm, white to brownish, glabrous; aril hard and woody.

Area of distribution: Very widespread species at low and average altitude in the provinces of Formosa, Chaco, Salta, Tucuman, Catamarca, La Rioja, Santiago del Estero, Santa Fe, Cordoba and San Luis. Often in partnership with *Stetsonia coryne* and *Cereus forbesii*.



Fig. 150: *Opuntia quimilo*, road to Cruz del Eje (Cordoba).

Ritter stated that he found the species in Bolivia, in the Region of Sucre (Puente Arce)

My observations are in contradiction with one or two points of the original description of Schumann: diameter of the areoles not exceeding 4 mm (instead of 1 cm), and white style (instead of red).

***O. retrorsa* Speg.**

Segments crawling, interlaced, reaching up to 15-25 cm long and 25-35 mm wide; light green when young, darkening thereafter, with bands of violet under the areoles. Leaves conical, light green, of around 2 mm, at the vegetative points. Areoles rounded to slightly oval, of 2.5×3 mm, 25-28 mm apart, furnished with white wool, with reddish glochids in a circular arc on the upper part. Spines strong, acicular, erect, in non-differentiated tufts, 4-6 per areole, the longest reaching 30-40 mm. Young spines reddish-brown, passing to greyish white, tinted more or less red at the base and the point.



Fig. 151: *Opuntia retrorsa*: origin Pozo del Tigre (Formosa).

Flowers of 40-50 mm high and 45-60 mm in diameter. Pericarpel 17-25 mm, with the areoles covered with white wool and brownish-red glochids. Tepals largely rounded, mucronate, sulphur-yellow to orange-yellow. Throat slightly greenish. Stamens sensitive. Filaments and anthers creamy-white. Style white; stigma greenish-white, with 5-7 lobes.

Fruit ovoid, of 30-35 × 10-25 mm, dark carmine-red with pink flesh.

Seeds of 2.5 to 3 mm, whitish, woolly.

Area of distribution: South of Bolivia in Paraguayan and Argentinean Chacos, and also in the province of Jujuy.

O. salagria Cast.

Bushes reaching a maximum height of 2 metres, generally not forming a trunk. Segments leaf-green, rounded to elliptic, measuring up to 30 cm long and 17 cm wide. Areoles oval, 5 × 3 mm, covered with short brown glochids. Spines 1-(2) per areole, yellowish white, stiff, variable length, reaching (seldom) a maximum 35 mm.

Flowers inserted on the edge of the segments; height and diameter around 40 mm. Pericarpel 22 mm, light green, with very few areoles, covered with white glochids and 2 to 3 tiny brown spines. Pericarpel top bordered with scales wider than high, green with a brown mucro, with 2-3 blackish-brown bristles at the axils. These scales pass gradually to the external tepals, which are light green with a stripe of orange and a tiny brown mucro. Internal tepals wide and rounded, orange with a slightly greenish



Fig. 152: *Opuntia salagria*, La Cumbrecita (Cordoba).

median stripe and a carmine mucro. Throat light green. Filaments white; anthers pale yellow. Style white, bulging at the base; stigma light green, with 6 lobes.

Area of distribution: Sierra Chica de Cordoba and North of San Luis.

O. salmiana Parm.

Small tufts of segments vertically erect, ramifying or not, more often 60 cm high, seldom up to 1 metre. Segments clear green to olive-green, cylindrical, 25 to 40 cm long and 10 mm in diameter. The "trunk" can reach 17 mm in diameter; it lignifies and is coated with a brown bark which cracks and is scaled. Tubercles absent. Areoles round, white, 1-1,5 mm in diameter. Young areoles with small reddish leaves around 1 mm, caducous. In addition to the small white glochids, the areoles are also furnished with spines, of which the number increases with age, reaching a maximum of 8; the length hardly exceeds 4 to 5 mm, the young spines are white, but become more reddish thereafter.

The flowers appear all over the segments; they are around 20 mm in height and 25 mm in diameter. The pericarpel is leaf-green, ovoid, 9-15 mm high and 8-9 mm in diameter; it is covered with small areoles and outlines of shoots. The upper edge with small triangular scales around 2 mm, pink with a carmine mucro. External tepals yellowish-white with a pink median band. Internal tepals pure white, spatulate, with a small mucro. Throat greenish. Stamens sensitive. Filaments and anthers white. Style white; stig-

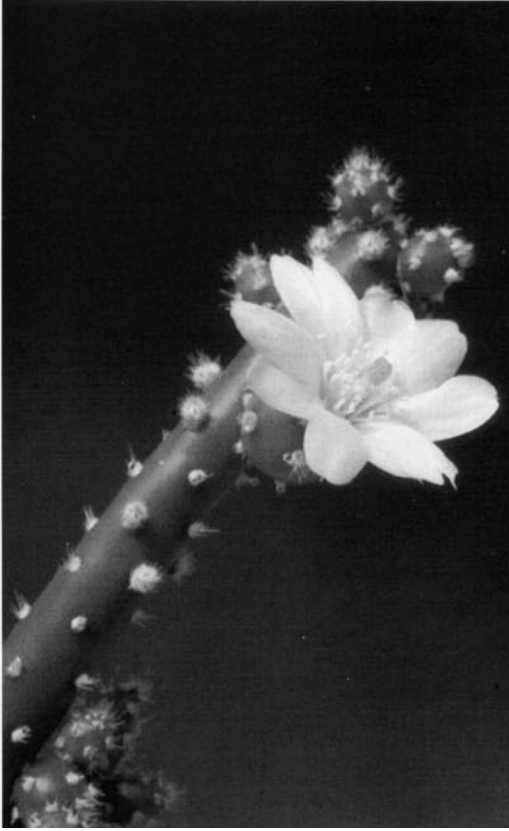


Fig. 153: Opuntia salmiana,
origin Avia Terai (Chaco).

ma emerald-green, with 6 lobes.

The fruits, red at maturity, are sterile, but produce shoots which ensure the vegetative multiplication.

Area of distribution: From South of Bolivia, to all the northern parts of Argentina, from the provinces of Jujuy, Salta and Chaco up to those of Córdoba and of San Luis.

O. schickendantzii Weber

Bushes ramified reaching 1 to 2 metres in height, with a trunk of 4 cm in diameter and more. Young plants have cylindrical segments, but form flattened side segments thereafter; the length of the segments can reach 55-60 cm, the diameter of the cylindrical segments reaching around 15 mm. The young segments are bluish-green to glaucous-green, but evolve to a darker green, sometimes even with a reddish tinge. The areoles, inserted into the top of small strongly flattened tubercles, are rounded to sometimes oval, with a diameter around 2 mm, and furnished with white wool. The spines appear very early, but increase in number with the age of the areoles, passing from 2 to 8 principal spines, plus some small secondary spines. The longest spines measure 1 to 2 cm; the colour is white to

yellowish. The little leaves of the young areoles are green and caducous, and measure around 1 mm.

Flowers at the top of the segments; 45 mm high, diameter 25-40 mm. Pericarpel spherical with a diameter of 2 cm, light green, with small areoles covered with dirty-white glochids. External tepals yellow with a red median band. Internal tepals shiny yellow. Stamens sensitive. Filaments white; anthers light yellow. Style white, 12 mm; stigma dark green, with 5-6 lobes of 2 mm.

Fruit spherical, green passing to mauve at maturity.

Area of distribution: Border of the provinces of Salta and Tucuman.

O. soehrensii Br. & R.

Low plants, crawling, formed of elongated to discoidal segments, strongly tubercled, 4-12 cm long and 2-10 cm wide; epidermis light glaucous green. Areoles oval, grey, 2 × 3.5 mm, with yellow to brownish red glochids. Young areoles with small red leaves, caducous, around 1 mm.



Fig. 154: Opuntia schickendantzii,
Cuesta El Lajar (Salta).



Fig. 155: *Opuntia soehrensii*, Tilcara (Jujuy).

Spines acicular, erect, 4-5 and more per areole, measuring up to 60-70 mm long, young spines with reddish base, becoming straw-yellow with a brown point.

Flowers of 45-55 mm high and 35-45 mm in diameter. Pericarpel 15-25 mm, light green with reddish scales, upper scales with 4-5 reddish-yellow bristles at the axils. The scales pass gradually to the external tepals, which are light yellow with a reddish median band. Internal tepals lemon-yellow. Stamens not sensitive. Filaments white; anthers yellow. Style white; green stigma, with 10 lobes.

Fruit of 15-25 × 12-20 mm, brownish-green to red; areoles with brown glochids, the upper with some fine silky spines.

Seeds 3-4 × 2-3 mm, yellowish.

Area of distribution: From South of Bolivia to the provinces of Jujuy, Salta and Catamarca, at altitude.

***O. spgazzinii* Weber**

Segments cylindrical vertically erect, ramified or not; flattened side segments can appear on the older plants. Length of the segments up to 40 cm, for a diameter of 17 mm; epidermis bluish green, with flattened and rounded tubercles, but nevertheless quite distinct, Trunk 20 mm in diameter, remaining green. Areoles round, white, around 2 mm in diameter. The young shoots are spineless, but the spines develop progressively



Fig. 156: Opuntia spegazzinii,
origin road to Valle Grande
(Jujuy).

afterwards; initially 1 to 3, one counts finally 6 principal spines, plus a certain number of small secondaries. The longest spines measure 12 mm, and remain white, just like the glochids. The leaflets quickly fall from the green young areoles, and measure 1 to 2 mm.

Flowers are formed at the top of the segments; height 45 mm, diameter 35 mm. Pericarpel bluish-green, ovoid, 20 mm high with a diameter of 13 mm, with small areoles covered with white to brownish glochids, and some temporary leaflets on the upper part of the pericarpel. External tepals small, triangular greenish-yellow with a small blackish-brown mucro. Intermediate tepals yellow with a red median stripe widening towards the extremity and ending in a little red mucro. Internal tepals golden-yellow, largely spatulate, slightly denticulate and mucronate. Stamens sensitive. Filaments and anthers white. Style white; stigma green, with 5 lobes.

Fruit ovoid, bluish-green, more or less tinted mauve at maturity.

Area of distribution: Hills of the province of Salta.

Species close to *O. schickendantzii*, from which it is characterized by its smaller dimensions, the fewer and shorter spines, and the more elongated fruit.

***O. sulphurea* Gill.**

Form bushy crawling, not exceeding 50 cm in height, but can spread the ramifications until forming sets 2 metres in diameter. Tubercles strongly marked conferring a corrugated aspect on the segments, which are leaf-green to glaucous-green, elliptic to ovoid, and measure 15 to 20 cm long and 10 to 13 cm wide. Areoles rounded to oval, 4 × 3 mm, furnished with white wool passing to grey and with a crown of light brown glochids, and practically all spiny. Young areoles with 1 or 2 conical leaves, light brown, around 2 mm. Spines strong, erect, 2 to 9, reaching 75 mm long. Young spines pink with a red base and brown point, passing to greyish-white with a light brown point.

Flowers inserted on the edge of the segments; height 30-35 mm, diameter 50-55 mm. Pericarpel of 25-30 mm, with very few areoles on the upper part. External tepals light green with a brown mucro. Intermediate tepals spatulate, yellow with a green median stripe and a reddish-brown mucro. Internal tepals canary-yellow to stronger yellow. Throat pale yellow to greenish-yellow. Filaments white; anthers light yellow. Style white, bulging at the base, 22-23 mm; stigma pale green to greenish-yellow, with 8-9 lobes of 4 mm.

Fruit yellowish to reddish, around 35 mm long.



Fig. 157: *Opuntia sulphurea*, Santa Cruz (La Rioja).

Seeds of 4 mm in diameter, brownish-yellow.

Area of distribution: Most widespread of all the Argentinean *Opuntias*, from the low plains to the mountains, liking arid situations. (Provinces of San Juan, La Rioja, Santiago del Estero, Catamarca, Salta and Jujuy...). Replaced more in the South by the close species *O. pampeana*.

O. tilcarensis Backbg.: = ***O. soehrensii***.

O. utkilio Speg.

Low bushes, more or less crawling, hardly exceeding 40 cm in height, with branches reaching 1.50 metres long. Segments elliptic elongated, 12-30 cm long and 5-6 cm wide, leaf-green to shiny olive-green, with purplish spots around the areoles. These oval, of 3-4 × 2-2,5 mm, furnished with white to greyish wool and reddish-brown glochids. Spines initially 2, then



Fig. 158: Opuntia utkilio, Sierra de Sumampa (Santiago del Estero).

5-7 per areole, erect and acicular, longest reaching 50-60 mm. Young spines red with a blackish point, passing to light pinkish-grey with a brown point.

Flowers rotate to cupuliform, inserted on the edge of the segments; height 45 mm, diameter 35-40 mm. Pericarpel of 20-25 mm, the upper areoles covered with one or two bristle-like spines. External tepals greenish-yellow with a reddish mucro. Internal tepals spatulate mucronate, yellow orange. Stamens not sensitive. Filaments and anthers yellowish-white. Style white slightly tinted with yellow or pink; stigma light yellow, with 6-7 lobes.

Fruit of around 30 × 15 mm, with the areoles deprived of spines.

Seeds of 4 mm in diameter, white to brownish, woolly.

Area of distribution: Provinces of Santiago del Estero, Tucuman, and Catamarca.

O. vulgaris Mill.

Shrubs of 2 metres high and more, strongly branching with a trunk 15 cm in diameter. Segments light green to shiny-green, 10-30 cm long and 8-15 cm wide. Areoles grey, 4.5 × 2-3 mm, with brownish-yellow glochids. Spines rare, appearing late, 1-2 per areole when they are present, reaching 6 to 7 cm long. Young spines yellow to reddish-brown, becoming grey with a blackish point.

Flowers rotate to cupuliform, inserted on the edge of the segments; 60-90 high and 45-70 mm in diameter. Pericarpel 30-55 mm. External tepals small, triangular, wine-red to blood-red, with a small black mucro. Inter-



Fig. 159: *Opuntia vulgaris*, Gobernador Candiotti (Santa Fe).

mediate tepals orange yellow with a green median stripe and a red terminal stain. Internal tepals spatulate indented yellow orange. Throat greenish-white. Sensitive stamens. Filaments white; anthers light yellow to cream. Style white; stigma the same colour, with 7-9 lobes.

Fruit ovoid, wine-red, of 6 × 3.5 cm.

Area of distribution: From South of Brazil to Uruguay, and in the areas bordering Argentina; provinces Entre Rios, Santa Fe, and North of the province of Buenos Aires.

Culture

Many *Opuntias* offer a certain number of disadvantages in culture; they are very cumbersome for the greenhouse of an amateur, flowering is obtained with difficulty if at all, and the manipulation of the plants is made painful by the presence of the glochids.

Nevertheless, a certain number of species of moderate size, particularly amongst the *Airampoae*, will thrive perfectly in pots or in the open ground, and will flower more or less readily to the occasion. Other species (e.g. *O. Sulphurea*) resist the cold, and can be cultivated in the open in our gardens; in this case take care to ensure good drainage of the ground, and if possible a protection against the too abundant rain.

Seed-sowings are difficult to succeed, considering the hardness of the arils which wrap around the seeds; it will be necessary to resort to one or other trick, like the softening by steeping in acid, or the practice of small cuts...

OREOCEREUS (Berg.) Ricc.

Columnar forms, strong, woolly, branching from the base or laterally, with strong central spines variously coloured. Flowers tubular-zygomorphic, with the stigma generally exceeding the stamens. Fruit globular, hollow, greenish-yellow, with basal dehiscence. Seeds rather large, black and matt.

The genus is found in the South-West of Peru and the North of Chile to the high plateaus of Bolivia and Argentina.

O. celsianus (Lem. in S-D p.p.) Ricc.

Stems of 1 to 3 metres and more high, generally branching from the base but also laterally; diameter of 6 to 20 cm. Epidermis dark-green to glaucous-green. Ribs 10-17-(25), round, separated by vertical furrows very apparent. Areoles oval, large, furnished with white to brownish wool, fairly dense, interlaced and more or less curled, able to reach 5 cm long. Radial spines



Fig. 160: Oreocereus celsianus,
Cuesta de Toquero (Jujuy).

9, erect, reaching up to 2 cm long. Central spines 1 to 4, stronger, yellow to orange or brownish-red, measuring up to 8 cm long.

Flowers of 7-9 cm long. Tube compressed laterally, covered with pointed scales and wool. External tepals brownish-green. Internal tepals narrowly spatulate, mauvish-pink. Filaments red with a violet end; anthers purple. Style old-rose; stigma green, with 8 lobes.

Area of distribution: province of Jujuy and South of Bolivia.

O. maximus Backbg.: = **O. celsianus**.

O. trollii (Kupp.) Backbg.

Stems of 60 cm high (seldom more), branching at ground level and forming more or less compact groups. Ribs 15-25, low. Areoles furnished with dense wool, fine, white and curled, measuring up to 7 cm long. Radial

spines bristly to acicular, 10-15. Central spines 1 to 4, strong, erect, shiny brownish-red when young passing to golden-brown thereafter.

Flowers lateral, 4 cm long, with a curved tube; tepals carmine-red. Stamens purplish-red, just over the stigma, which are green.

Area of distribution: Departments of Potosi, Chuquisaca and Tarija in Bolivia; province of Jujuy in Argentina.

Culture

Considering their dimensions, *Oreocereus* should preferably be cultivated in the open ground. They are plants of slow growth, and flowering is seldom obtained at our latitudes. However, the combination of the abundant wool and the coloured spines makes them more decorative, largely justifying their presence in a collection.

Their reproduction starting from seeds is obtained easily.



Fig. 161: *Oreocereus trollii*, Cuesta de Azul Pampa (Jujuy).

PARODIA Speg.

Cacti of small to average size, solitary or proliferating, with the spherical body that often elongates with age. Ribs straight to spirally, divided into rounded tubercles. Areoles round, more rarely oval, abundantly furnished with wool in the area of the apex. Covered with dense spines, made up of fine and appressed radial spines, and of stronger central spines, variable in form and colour. Flowers highly coloured, offering all the possible nuances and combinations from pale-yellow to carmine-red; campanulate or infundibuliform, established on the apex. Ovary and tube variously covered with scales, wool and bristles.

The genus is composed of three sub-genera, as follows:

- *Sub-genus Parodia Speg.*: Seeds very small, spherical, less than 0.5 mm, with a smooth and shiny testa, with a very significant strophiole, exceeding the seed size itself. Flowers opening more or less in a large funnel, bristles restricted to the top of the tube. Ribs spiralling in a Fibonacci series. Fruits small, dry, with a thin wall.
- *Sub-genus Protoparodia Buxbaum*: Seeds of more than 0.5 mm, cap-shaped, more or less curved, with warted testa; strophiole little developed. Flowers of variable form, not carrying bristles on the upper part of the tube, or all not much more than in the basal part. Fruits as in sub-genus *Parodia*, with basal dehiscence.
- *Sub-genus Obtectospermae Buxbaum*: Seeds of more than 0.5 mm, hemispherical truncated, coated with a brownish cuticle divided into a network of small star-like patterns; strophiole hemispherical to flattened, pad-like not very prominent. Flowers strongly woolly, with bristles only on the upper part of the tube, and remaining hidden under wool. Fruits red, hairy, elongated like a tube, the upper part hollow, and with basal dehiscence.

The two first of these sub-genera were in their turn subdivided into series or sections, on which the opinions differ according to the author. I will not enter here into these details.

The area of dispersion of *Parodia* is limited to Bolivia and Argentina.

Sub-genus *Obtectospermae* includes only a limited number of species, all Bolivian.

Sub-genus *Protoparodia* is found mainly in the South of Bolivia, but also in the North of Argentina.

As for Sub-genus *Parodia*, the very large majority of the species are Argentinean (from the Bolivian border to the provinces of La Rioja and Santiago del Estero), however with some forms in the South of Bolivia.

For the sake of clarity, I will gather the Argentinean species described hereafter according to their respective sub-genus.

Since the publication of the first edition of this work, many changes have intervened in the systematics of the genus *Parodia*, mainly due to the strict application of article 37.1 of the International Code of Botanical Nomenclature, invalidating a series of names introduced by Backeberg in the third part of his "Descriptiones Cactacearum Novarum" (1963).

With the approval of the I.O.S., Weskamp profited by renaming several species in the second volume of his monograph of the genus (1992). It is a step which I personally regret: it would have been more elegant to preserve the old names by indicating neotypes, as allowed by article 7.4 of the I.C.B.N.

In addition, it would have avoided the amateurs having to give up the familiar names established by 30 years of use

As announced in the foreword, the reader will continue to find the old names in the alphabetical list of the species, but will be referred each time to the new valid name, under which the detailed description will be given.

1. Sub-genus *Protoparodia*.

P. aureicentra Backbg.

Body light green, spherical to short cylindrical, reaching up to 15 cm in diameter. Ribs straight, high, acute, 13-15, tubercles not very marked. Areoles oval, of 5 × 4 mm, furnished with white wool, but becoming more or less bald thereafter. Radial spines fine, appressed and interlaced, 25-40, reaching 15 mm long. Young spines light yellow, passing to whitish. Central spines strong, straight to curved, initially golden-brown, becoming brown with a darker point, 4-9; the lower are the longest and can reach 6 cm; hooked when young, it becomes simply curved thereafter.

Flowers on the apex, 35-40 mm high. Ovary pink, 7 mm in diameter, covered with small brown scales and white wool. Tube lilac-pink, 17 mm high; scales small, pointed, red, with white wool in the lower part, and brown at the top of the tube; presence of brown bristles only on the upper areoles. Tepals lanceolate, pointed, with a median stripe of lilac-pink more or less significant with a brownish-yellow border, giving an overall impression of vermilion to blood-red. Filaments white with a lilac-pink end; anthers light yellow. Style pale yellow, 27 mm; lemon-yellow, stigma yellow, with 10 lobes.

Fruit of around 15 mm long, greenish-yellow to pale pink, covered with scales and wool like the ovary.

Seeds of 0.7-0.8 × 0.5 mm; testa black and shiny, finely warted; strophiole small and brown.

Area of distribution: Heights of Cachipampa, province of Salta.



Fig. 162: *Parodia aureicentra*, Cachipampa (Salta).

***P. aureicentra* var. *albifusca* Ritter**

Body long cylindrical, measuring up to 20 cm in height and 10 cm in diameter. Central spines more shiny, light brown passing to straw-yellow, measuring up to 45 mm long; the lower 3 to 4 are hooked. Seeds slightly more elongated than with the type.

Area of distribution: to the West of San Jose de Escalchi.

The differences with the type form are so tiny that one can wonder whether the varietal status is really justified.

***P. aureicentra* var. *lateritia* Backbg.:** is synonymous with the type form.

***P. aureicentra* var. *muhrii* (Brandt) Lambert comb. nov.**

Basionym: *Parodia muhrii* Brandt, K.O.R., 1, 17-10, 1978.

Body light green to glaucous green, cylindrical to elongated, reaching 50 cm in height and 15 cm in diameter. Ribs straight to slightly spiralling, separated by fairly deep vertical furrows. Tubercles rounded; no transverse furrows. Areoles rounded, 7 mm in diameter, 12 to 13 mm apart, abundantly furnished with white wool, but becoming bald at the base of the plant. Radial spines fine, radiating, slightly sinuous, white to slightly yellowish, 15



Fig. 163: *Parodia aureicentra* var. *albifusca*, road to Brealito (Salta).

in number. Central spines 9, strong, erect, interlaced, more or less hooked, reddish-brown, measuring 15-30 mm long.

Flowers on the apex; height 32 mm, diameter 35 mm. Tube light orange, with pink or yellow scales, abundantly furnished with white wool, hiding the bristles, which are brownish. External tepals orange-yellow with a median stripe of orange-red. Internal tepals of a more uniform orange yellow. Filaments orange red with a lighter base; anthers light yellow. Style pale greenish-yellow; stigma light yellow, with 11-12 lobes.

Fruit of around 15 mm long and 9 mm in diameter, strongly woolly, initially yellowish, passing to lilac-pink at maturity.

Seeds of 0.6×0.5 mm; testa black, finely warted; strophiole creamy-white.

Area of distribution: Surroundings of Angastaco in the South of Molinos.

***P. aureicentra* var. *omniaurea* Ritter**

Radial spines light yellow, 24-28; central spines golden-yellow. 4 to 9, the lower hooked measuring 3-5 cm. Flowers of 40-45 mm high; a little devel-



Fig. 164: *Parodia aureicentra* var. *muhrii*, Sud de Molinos (Salta).

oped median stripe on the tepals, giving an overall impression of brownish-orange.

Area of distribution: South of Cachi.

P. aureicentra* var. *rauschii (Backbg.) Lambert comb. nov.

Basionym: *Parodia rauschii* Backbg., Descr. Cact. Nov., III, p. 11, 1963.

Body light bluish-green, reaching 25 cm in height and 15 cm in diameter. Apex woolly, with a strong tuft of dark-brown spines. Ribs spiralling, high, divided into conical tubercles, 8/13. Areoles rounded, 5 × 4 mm, white, becoming bald thereafter. Radial spines fine, radiating, 23-25, white but with 3 or 4 spines more coloured (yellow to brown) at the top of the areole; length of 10 to 15 mm. Central spines 6, strong, erect, light brown with a darker point; the lower the longest, hooked, measuring up to 45 mm.

Flowers on the apex; height 30 mm, diameter 25 mm. Tube red, with little scales of the same colour and a darker point, furnished with brownish-



Fig. 165: *Parodia aureicentra* var. *rauschii*, origin Cachi Adentro (Salta).

white wool, plus 1 to 2 black bristles on the upper areoles. Tepals narrowly spatulate, blood-red with a carmine median band. Filaments carmine with a light pink base; anthers pale-yellow. Style yellowish; Stigma yellowish-white, with 9-11 lobes with slightly pink points.

Fruit of around 25 mm, light pink, covered with reddish scales.

Seeds of 0.9×0.6 mm; testa shiny-black, finely warted; strophiole flat, brownish.

Area of distribution: From Cachi Adentro to Rumihuasi (West-North-West of Cachi).

P. aureicentra* var. *variicolor (Ritter) Lambert comb. nov.

Basionym: *Parodia variicolor* Ritter, Taxon, XIII (3), p. 117, 1964.

Body leaf-green, reaching 30-40 cm in height and 18 cm in diameter. Ribs straight to spiralling, round, 13-16; tubercles indistinct, merging together, growing indistinct at the base of the plant. Areoles $5-8 \times 4-6$ mm, white to brownish. Radial spines fine, radiating, 15-25, 1 to 3 cm long, with a white base and point with the colouring of the central spines. These latter 9-12, the lower more or less hooked, measuring from 20 to 35 mm long; variable colouring, from brownish-yellow to blackish-purple, and through to reddish-brown.

Flowers on the apex; height 40 mm. Tube red, with thin and elongated



Fig. 166: *Parodia aureicentra* var. *variicolor*, road to Potrero (Salta).

scales of same colour that have a blackish point, and are furnished with white wool on the lower part, and brown at the top of the tube. Some bristles on the upper areoles. Tepals narrowly spatulate, blood-red with a border of brownish-red. Filaments carmine with a yellowish-white base; stigma light yellow, with 12 lobes.

Fruit sub-spherical, around 7-10 mm, carmine, abundantly furnished with white wool.

Seeds of 0.7×0.5 mm; testa shiny black finely warted; strophiole whitish.

Area of distribution: road of Payogasta to Potrero.

***P. chrysacanthion* (K. Sch.) Backbg.**

Body light leaf-green to slightly bluish, in a flattened sphere; maximum dimensions observed: 10 cm in diameter and 5-6 cm tall. Apex slightly depressed, woolly, with a tuft of yellow spines. Ribs spiralling, 13/21, divided into small rounded conical tubercles. Areoles yellowish-white, 1-1.5 mm in diameter, 4-5 mm apart. Radial spines fine, radiating, white to pale yellow,



Fig. 167: *Parodia chrysacanthion*, Volcan (Jujuy).

25-30, 8 mm long. Central spines 6-8, straight, erect, bristly, golden-yellow with a reddish-brown base; the longest measuring up to 20 mm.

Flowers on the apex; height 25-28 mm, diameter 25 mm. Ovary pale green, glabrous. Tube light golden-yellow, with greenish-yellow scales, fine and elongated, furnished with white wool and 2-3 light brown bristles, measuring up to 7 mm. Tepals golden-yellow, spatulate mucronate. Filaments yellow; anthers white. Style yellow, 18 mm; stigma with 6-8 lobes of 3 mm.

Seeds of 0.6-0.8 × 0.5-0.7 mm; testa black, not very warted or striated; strophiole of 0.3-0.4 mm, conical, sometimes with two points.

Area of distribution: Surroundings of Volcan, province of Jujuy.

As with *P. nivosa* (see further), the present species constitutes a form of transition between subgenus *Protoparodia* and *Parodia*. Thus one will be able to find it classified sometimes in one, sometimes in the other of these sub-genera, according to the author. Weskamp allotted it to the subgenus *Parodia*, under pretext that the bristles of the tube are present on all the areoles. I prefer to follow the concept of Buxbaum, who gives priority to the characteristics of the seed; the cap-shape as well as the rough surface of testa pleads in favour of *Protoparodia*.

***P. faustiana* Backbg.**

Body light green, flattened spherical; height 40 mm, diameter 60 mm.



Fig. 168: *Parodia faustiana*.

Ribs spiralling, 13/21, divided into tall conical tubercles. Areoles white, 2 mm in diameter, becoming bald thereafter. Radial spines fine, white, transparent, 15-20. Central Spines 4; the 3 upper ones transparent with a reddish base, the lower longer (25 mm), straight, erect, light reddish-brown with a darker base. Young spines black, gradually passing to dark brown then to light brown.

Flowers on the apex; height 25 mm, diameter 30 mm. Tube light red, with scales of a stronger red with a blackish point; white wool with 1-2 black bristles on the upper areoles. External tepals spatulate, orange with a large median stripe of carmine. Internal tepals lanceolate, red with orange yellow base. Filaments orange with a red end; anthers cream, style yellowish-white, stigma white, with 9-10 lobes.

Fruit from around 5 mm in diameter, pink passing to olive-brown, furnished with white wool.

Seeds of 0.6 × 0.5 mm; testa shiny black, warted with some furrows; strophiole conical, brownish.

Area of distribution: Quebrada del Toro, province of Salta.

P. maassii (Heese) Berg.

Body leaf green to light glaucous green, sometimes more or less brownish tinted, sub-spherical, 6-20 cm in height and 12 cm in diameter, but lengthening with age. Ribs sinuous to slightly spiralling, 13-



Fig. 169: *Parodia maassii*, North of Humahuaca (Jujuy).

15, separated by deep vertical furrows. Tubercles rounded, more or less merging together; some transverse furrows near the apex, blurring quickly thereafter. Apex strongly woolled, with vertical tufts of erect brown spines, between which the flowers will appear. Areoles rounded to oval, of 3-4 mm in diameter (passing to 6 × 4 mm in older plants), 14 mm apart, white, becoming bald thereafter. Radial spines fine but non-bristly, straight, erect, 9-11-(15), 10-15 mm long; initially light yellow, they pass to greyish with a black point. Central spines 4; the lower longest, bent and hooked, reaching 4 cm. Young spines reddish-brown to golden-brown, passing to straw-yellow with a reddish base then to greyish-brown with a black point.

Flowers on the apex, of around 25 mm high and wide. Tube fleshy, carmine-red; scales small and triangular, yellow to orange-yellow with a red point, furnished with long white then brown wool, plus 1-2 dark-brown bristles on the upper areoles. Tepals lanceolate mucronate, copper-red. Filaments pink with cream-coloured base; anthers pale yellow. Style whitish, 20 mm; stigma pale yellow, with 10 lobes of 2 mm.

Fruit ochre-yellow to olive-brown, 5-6 mm in diameter, furnished with white wool.

Seeds of 0.9 × 0.8 mm; testa black, little shiny, warted; strophiole flat to slightly conical, brownish-white.

Area of distribution: the most widespread of all *Parodias*. South of Bolivia to the province of Jujuy. (the southernmost locality; Huacalera).

P. nivos Fric ex Backbg.

Body leaf-green, spherical to slightly cylindrical; height 80 mm, diameter 70 mm. Apex depressed, strongly woolly, covered with short white spines. Ribs spiralling, 13/21, divided into conical tubercles. Areoles rounded, diameter 5 mm, 7-8 mm apart, abundantly furnished with white wool. Radial spines fine, radiating, white, 18-25, reaching around 10 mm long. Central spines 4, straight, erect, white, measuring up to 20 mm long.

Flowers on the apex, around 35 mm high and wide. Tube carmine-red; yellow scales small and narrow, yellow with a darker point, furnished with white wool, plus 1-2 black bristles only on the upper areoles. Tepals lanceolate, pointed, blood-red to carmine-red. Filaments white with a carmine end; anthers sulphur-yellow. Style pale yellow, 17 mm; stigma with 12 lobes of 5 mm, pale yellow and sometimes the extremities tinted with pink.

Fruit with a diameter of 3 mm, initially lilac-pink, passing to greyish-brown at maturity, furnished with white wool.

Seeds of 0.5 × 0.4 mm; testa shiny dark-brow, not very warted and partially smooth; strophiole hemispherical, brownish.

Area of distribution: Quebrada del Toro, province of Salta.

As indicated by the structure of the seed, this species occupies a position of transition between subgenus *Protoparodia* and *Parodia*. (See also *P. chrysacanthion*).



Fig. 170: *Parodia nivos*, origin Chorrillos (Salta).

P. pseudostuemei Backbg.

I had believed, in the previous edition, that this species was synonymous with *P. tilcarensis*. Following new observations in habitat, I now share the opinion of Weskamp, who sees a form close to *P. tumbayana* (previously *setosa*).

P. schuetziana Jajo

Body initially spherical to sub-spherical, becoming cylindrical with age; maximum size observed; 18 cm in height and 12 cm in diameter. Epidermis light green to glaucous green. Apex flattened, furnished with white wool and young spines in black tufts. Ribs sinuous to spiralling, passing in the latter case from a formula of 8/13 for the young plants, to a formula of 13/21 as the plants age. Tubercles rounded, more or less merging together. Areoles oval, 7 × 5 mm, abundantly furnished with white wool, becoming brownish and becoming bald thereafter. Radial spines fine, white, erect, 21-25. Central spines straight, erect, light-brown with a darker point, 7-8, reaching up to 13 mm long.



Fig. 171: Parodia schuetziana,
Tumbaya (Jujuy).

Flowers on the apex; height 25 mm, diameter 25 mm. Tube light red, with red scales with a black point, furnished with white wool, and 1-2 black bristles on the upper areoles. External tepals cherry-red to carmine-red, with a black little mucro. Internal tepals light red with a median stripe of cherry-red. All the tepals lanceolate. Filaments red; anthers light yellow. Style pinkish-white; stigma pale yellow, with 8-10 lobes.

Seeds of 0.8×0.5 mm; testa black, shiny, warted; strophiole brown.

Area of distribution: Area of Huajra-Volcan-Tumbaya, province of Jujuy.

P. stuemeri (Werd.) Backbg.

Body matt glaucous green, with a light-green head, spherical to short cylindrical, reaching 10 cm in diameter, seldom more. Apex woolly, with a tuft of brown spines. Ribs round, not very high, separated by more or less sinuous furrows, 20-22. Areoles oval, $5-6 \times 3-4$ mm, around 10 mm apart, yellowish-white passing to brownish and becoming bald thereafter. Radial spines fine, straight, radiating, around 25, and measuring up to 18 mm long; the upper more erect and resembling the central spines. Young spines yellowish, passing to greyish-white. Central spines 4, erect, brownish-pink with a darker point; the lower stronger, slightly hooked, reaching up to 25 mm long.



Fig. 172: *Parodia Stuemeri*, Quebrada del Toro (Salta).

Flowers on the apex; height 25-40 mm. Tube yellowish to light red, with small pointed scales, furnished with white to reddish-brown wool; presence or not of 2-3 brown bristles. External tepals narrowly lanceolate, orange with a median stripe of carmine. Internal tepals lanceolate, denticulate and mucronate, golden-yellow to orange, with a terminal median stripe of carmine to brownish. Filaments pink or light yellow with a golden-yellow end; anthers pale yellow. Style pale yellow; stigma the same colour, with 9-11 lobes.

Fruit of around 15×5 mm, greenish-yellow passing to yellowish-brown at maturity, furnished with white wool.

Seeds of $0.8-1 \times 0.7$ mm; testa black, not shining, finely warted; strophiole flat, brownish.

Area of distribution: Quebrada del Toro, province of Salta.

P. tilcarensis (Werd. & Backbg.) Backbg.

Body leaf green, initially sub-spherical, then cylindrical, reaching up to 15 cm in height. Apex woolly, with an abundant tuft of young spines of light brown with a darker point. Ribs spiralling, 13/21, separated by sinuous furrows and divided into rather high conical rhomboidal tubercles. Areoles oval, 6×4 mm, abundantly furnished with greyish-white wool, becoming bald at the base of the plant. Radial spines fine, whitish, radiating, 13-15. Central spines 4, reddish-brown to greyish-pink; the lower longest, slightly hooked, reaching up to 13 mm long.



Fig. 173: *Parodia tilcarensis*: origin Purmamarca (Jujuy).

Flowers on the apex; height 23 mm, diameter 38 mm. Tube pink, furnished with white wool then reddish-brown, and with small scales with a black point. No bristles. Tepals long and narrow (18×3 mm), silky-pink. With a median stripe of red, darker at the base, and the extremity tinted with mauve; the externals with a small blackish mucro, the internals indented. Filaments pink; anthers light yellow. Style yellowish-white; stigma light yellow, with 9 lobes.

Fruit around 4 mm in diameter, ochre-yellow, with a little white wool.

Seeds 0.7×0.6 mm; testa shiny black, warted; strophiole conical, brownish.

Area of distribution: Surroundings of Tumbaya in the North of Tilcara, province of Jujuy.

2. Sub-genus *Parodia*.

P. albo-fuscata Brandt

Body wider than high; height 40 mm, diameter 55 mm, but able to lengthen thereafter. Epidermis green, more or less dark, the top of the tubercles darker than the furrows, and more or less tinted with reddish to brownish. Ribs spiralling, 13/21, divided into conical rounded tubercles, high and very apparent. Areoles rounded to oval, initially white and large (4 mm), then becoming yellowish-white and of a reduced size (2×1.5 mm).



Fig. 174: *Parodia albo-fuscata*, La Punta (Santiago del Estero).

Radial spines fine, white, radiating, 13-(15), reaching up to 5-7 mm long. Central spines typically laid out in a cross, 4; the 3 upper straight to slightly curved, the lower one hooked, measuring up to 10-12 mm long. All the central spines blackish-brown when young, passing to brownish-red with a lighter base, orange. One observes sometimes 2 to 5 small additional spines in the top of the areole.

Flowers on the apex; height 27-30 mm, diameter 30-40 mm. Tube pale-yellow, pinker at the base; elongated, scales pink with a red point, furnished with white wool and 1-3 reddish-brown bristles. External tepals indented spatulate, lemon yellow with a median stripe then a red point. Intermediate tepals pure lemon-yellow, denticulate mucronate. Internal tepals of the same colour, lanceolate. Filaments dark golden-yellow; anthers white to cream. Style yellowish-white; pale yellow stigma, with 8-14 lobes.

Seeds around 0.3 mm; testa smooth and shiny, dark chestnut-brown (blackish); strophiole well developed, creamy white.

Area of distribution: Sierra of Guasayan, province of Santiago del Estero.

P. aureispina Backbg.

Body green slightly bluish, reaching 12 cm high and 10 cm in diameter. Ribs spiralling, 13/21, divided into conical tubercles. Areoles round, white, 4-5 mm in diameter. Radial spines fine, white, 20-25. Central spines 4 (with



Fig. 175: *Parodia aureispina*.

sometimes 1-2 additional spines at the top of the areole), golden-yellow. The lower hooked with a light brown point, measuring up to 12-15 mm long.

Flowers on the apex, with a diameter of 30 to 50 mm. Tube light yellow, furnished with white to brownish wool and brown bristles. External tepals yellow, with a paler median band. Internal tepals golden-yellow to orange-yellow. All the tepals lanceolate. Filaments golden-yellow; anthers light yellow. Style cream; stigma white, with 10-12 lobes.

Seeds around 0.3-0.4 mm; testa smooth and shiny, light brown; strophiole reaching around half the height of seed, is one the third of the whole.

Area of distribution: Rio Mojotoro, province of Salta

In the second volume of his monograph, Weskamp proposed the creation of a variety "*mojotoroensis*" n.n. for spinier plants of a lighter yellow, and the flowers with more yellow and less orange.

According to my observations, it is about a simple phenotype, for which a varietal status is by no means justified. The type-form is indeed found on the northern slopes of the Rio Mojotoro, whereas the paler form grows on cliffs exposed to the West, at the same place.

It is because of its variability that the species was also described under the synonymous name of *P. mutabilis* by Backeberg.

Also let me raise as an error the principal distinctive characteristic claimed by Weskamp: the type-species by no means has 40 radial spines, but 20 to 25, as Brandt stated, and as I could verify myself.

P. belenensis Weskamp

Body olive-green to brownish-green, short cylindrical, but elongating with age, until it reaches 10 cm high and 45 mm diameter. Root napiform. Apex woolly, without concentration or particular colouring of the spines. Ribs spiralling, 8/13, divided into rounded tubercles 4-5 mm in diameter. Areoles rounded, around 2 mm in diameter, yellowish-white, becoming bald at the bottom of the plant. Radial spines fine, white, sometimes with a brownish point, 7-9-(11), up to 7 mm long. Central spines 3-4, brownish-pink; the lower the longest, directed downwards, hooked, 9-10 mm long.

Flowers on the apex: height 30 mm, diameter 40 mm. Tube light yellow, with elongated scales, reddish-brown with a darker point, furnished with white wool and 2-3 black bristles. External tepals lanceolate, yellow with a reddish median stripe. Internal tepals spatulate mucronate, brilliant yellow with a paler base. Filaments dark yellow; anthers canary-yellow. Style yellowish-white; stigma the same colour, with 8-10 lobes of 4-5 mm long.

Fruit sub-spherical, 5-6 mm in diameter, wine-red passing to brownish.



Fig. 176: *Parodia belenensis*, origin Quebrada de Belen (Catamarca).

Seeds of 0.3×0.4 mm; testa dark brown, nearly black, smooth and brilliant; strophiole yellowish, from around 0.1 to 0.15 mm.

Area of distribution: Quebrada and Sierra de Belen, province of Catamarca.

***P. betaniana* Ritter: = *P. setifera*.**

***P. cabracorralensis* nom. prov.**

Body leaf-green, short-cylindrical, reaching 9 cm high and 5 cm in diameter. Apex non-depressed, furnished with white wool and blackish-brown spines. Ribs slightly spiralling, 13, divided into rounded conical tubercles. Areoles rounded, from 3-5 mm in diameter, white, becoming bald thereafter. Radial spines fine, white, radiating, tangential to semi-erect, 9, measuring up to 10 mm long. Central spines 4, in a cross, strong, erect, straight to slightly curved, light brown passing to pink with a black point. The lower are the longest, and can measure 20 to 35 mm.

Flowers on the apex; height 25 mm, diameter 35 mm. Tube light yellow; scales very small, pointed, yellow-orange, furnished with not very abundant white wool and 3 blackish-brown bristles. External tepals lanceolate, light yellow, sometimes a little spotted with red close to the end. Internal tepals lanceolate, light pure-yellow. Filaments sulphur-yellow; anthers white. Style yellowish-white; stigma white, with 9-11 lobes.



Fig. 177: *Parodia cabracorralensis*, Cabra Corral (Salta).

Seeds of 0.5×0.4 mm; testa smooth and shiny, light brown; strophiole of 0.35 mm, brownish.

This form could be only a local breed of *P. Setifera*.

Area of distribution: Lake of Cabra Corral dam, province of Salta.

***P. cachiana* Weskamp**

Body leaf-green to glaucous-green short cylindrical, reaching 90 mm high and 70 mm diameter. Apex furnished with white wool. Ribs spiraling, 13/21, divided into rounded conical to rhomboidal tubercles. Areoles rounded to oval, 2 to 3 mm diameter, white passing to yellowish then becoming bald. Radial spines 7-(9), fine, appressed, initially pink, then white, up to 6 mm long. Central spines 4, erect, brownish-red with a brown point then blackish: the lower the longest, hooked, one reaching up to 12 mm.

Flowers on the apex: height 20-25 mm, diameter 33-40 mm. Tube red-orange to carmine-pink, the scales with a green point, furnished with light grey wool and from 2-3 blackish-brown bristles. External tepals lanceolate mucronate, narrow, fire-red with a greenish to brownish median stripe. Internal tepals lanceolate and denticulate, broader, velvety red, more or less suffused with orange on two sides at the base. Throat carmine. Filaments carmine; anthers light yellow. Style whitish with a carmine-pink tip; stigma creamy-white more or less tinted with pink, with 12-15 lobes.



Fig. 178: *Parodia cachiana*, El Vallecito (Salta).

There is also a form with yellow flowers.

Seeds of 0.35-0.4 mm; testa smooth and shiny, light brown; strophiole irregular form, yellowish, 0.15 mm high.

Area of distribution: From Molinos to Cachi, province of Salta.

P. cardenasii Ritter

Body flattened spherical, reaching 8 cm in diameter and 3 to 5 cm in height. Epidermis leaf-green to olive-green. Ribs spiralling, 13/21, divided into conical to rhomboidal tubercles; wider than high. Areoles very small, white to brownish, becoming bald thereafter. Radial spines fine, white, radiating, 7-9. Central spines 3 to 5, pale yellow with a reddish base and point, not measuring more than 5 to 10 mm.

Flowers on the apex, around 25-30 mm high and wide. Tube light yellow with elongated scales with a red end, furnished with white wool and 1-2 black bristles. External tepals very pale yellow, with the extremity tinted pink-carmine and with a small carmine mucro. Internal tepals pale pure-yellow. All the tepals lanceolate. Filaments yellow with a yellowish-white base; anthers yellow, stigma creamy-white, with 10-12 lobes.

Seeds of 0.3 × 0.4 mm; testa light reddish-brown, shiny, with little longitudinal furrows; strophiole creamy-white.



Fig. 179: *Parodia cardenasii*: origin Itiyuro (Salta).

Area of distribution: South-East of Bolivia (Angosto de Villamontes) to the extreme Northern of the province of Salta (Pocitos).

P. catamarcensis Backbg.

Body light green, initially sub-spherical, becoming cylindrical with age, reaching 15 cm and more high, and a diameter of 10 cm. Apex woolly and spiny. Ribs spiralling, 13/21, divided into rhomboidal-conical tubercles, wider than high. Areoles round, yellowish, around 1.5 mm in diameter. Radial spines 9-10, white, fine, radiating, (Young spines have a brown tip). Central spines 4, light chestnut-brown; the three upper erect and straight, the lower one hooked, measuring up to 8 mm long.

Flowers on the apex; height and diameter 35 mm. Tube light yellow, with pink scales and a red point, furnished with white wool and 2-3 blackish bristles. External tepals lanceolate shiny yellow with a thin red median stripe towards the end. Internal tepals spatulate denticulate, pure yellow. Filaments golden-yellow; anthers pale yellow. Style whitish; yellowish-white stigma, with 10 to 11 lobes.

Seeds of 0.3 mm; testa smooth and shiny, dark-brown; strophiole of 0.15-0.25 mm, greyish-white.

Area of distribution: occupying a vast perimeter around the town of Catamarca, from Dique de Catamarca and El Rodeo in the North, until Cuesta de Los Angeles and Cuesta del Portezuelo in the South.



Fig. 180: *Parodia catamarcensis*, Cuesta de Portezuelo (Catamarca).

P. catamarcensis* var. *riojensis (Ritter & Weskamp) Lambert comb. nov.

Basionym: *Parodia riojensis* Ritter & Weskamp, in Weskamp, Die Gattung Parodia, p. 474, 1987.

Body sub-spherical; height 70 mm, diameter 65 mm, the old specimens can however lengthen considerably, and adopts a crawling or pendant shape. Epidermis light leaf-green to olive-green. Apex slightly depressed, furnished with white wool. Ribs spiralling, 13/21, divided into rounded to rhomboidal tubercles around 4 mm in diameter. Areoles oval, white, 3 × 2 mm, becoming bald at the base of the plant. Radial spines fine, white, 7-9, measuring up to 8 mm long. Central spines 4, brownish-pink; the lower the longest, hooked, reaching up to 10 mm long.

Flowers on the apex; height 30 mm, diameter 35 mm. Tube light yellow, with mauvish-red scales, furnished with white wool and 1-3 blackish-brown bristles. (At the base of the tube, the scales are yellow, and the bristles light brown). External tepals yellow with a reddish median band. Internal tepals yellow with an upper border slightly orange. All tepals narrowly spatulate; internals a little wider, with a small mucro. Filaments yellow; anthers white. Style yellowish-white; stigma of the same colour, with 9-10 lobes, exceeding the stamens.

Seeds of 0.3 mm; testa brown, smooth and shiny; strophiole yellowish, irregularly deformed, not reaching more than 0.1 mm.



Fig. 181: *Parodia catamarcensis* var. *riojensis*,
Quebrada de Cebila (Catamarca).

Area of distribution: Quebrada de Cebila and area of Mazan, to the limit of the provinces of Catamarca and La Rioja.

Ritter already regarded this form as a variety of *P. catamarcensis*, and it is Weskamp who decided to raise it to the level of a separate species. The differences are however so tiny that a varietal status seems to me amply sufficient.

***P. cebilarensis* Weskamp**

Body leaf-green to olive-green, flattened spherical: 40 mm diameter and 25 mm high. Apex depressed, non-woolly. Ribs spiralling, 13/21, divided into rounded relatively low tubercles. Areoles light yellow, 1 to 1.5 mm in diameter. Radial spines appressed, fine, white, 10. Central spines 3 to 4: the higher 2-3 smaller, straight, white with a brown tip; the lower the longest, up to 12 mm, hooked, pinkish-brown with a brown tip.

Flowers on the apex: height 30-35 mm, diameter 40-55 mm. Tube red; scales with a light green point, furnished with greyish-brown wool and two long black bristles, up to 10 mm. Tepals bright red with a more or less orange border. All the tepals lanceolate, some indented. Throat a velvety carmine-red. Non-sensitive stamens. (Contrary to the majority of species in



Fig. 182: *Parodia cebilarensis*, Cuesta El Lajar (Salta).

the subgenus **Parodia**). Filaments red; anthers cream. Style pink with a light yellow base; stigma pale yellow to whitish, with 8-9 lobes.

Seeds of 0.35 mm; testa light brown, smooth and shiny; strophiole pale yellow, hemispherical, 0.5 mm.

Area of distribution: Cuesta El Lajar, province of Salta.

P. dextrohamata Backbg. = **P. tolobana**.

P. dichroacantha Brandt & Weskamp

Body spherical to slightly elongated, leaf green, diameter 55-60 mm, height 60 mm. Ribs spiralling, 13/21 divided into rounded tubercles of around 5 mm in diameter. Areoles white, rounded, 3 mm in diameter, becoming bald thereafter. Radial spines fine, white, 7, measuring up to 8 mm long. Central spines 4, brownish-pink; the lower the longest, hooked, reaching up to 15 mm long.

Flowers on the apex; height 30 mm, diameter 35 mm. Tube yellow orange, with the scales olive-green, furnished with greyish-white wool and 3 to 5 black bristles. External tepals red with a median stripe of olive-green. Internal tepals vermilion-red with a more intense median band. All tepals



Fig. 183: *Parodia dichroacantha*: origin San Isidro (Salta).

narrowly lanceolate. Filaments carmine-red; anthers cream. Style pink; stigma with 12-13 lobes, white base and a median stripe of lilac-pink.

Seeds of 0.25 mm; testa smooth and shiny, brown; strophiole hemispherical to rounded conical, yellowish.

Area of distribution: Area of Cafayate, province of Salta.

The name of the species rests on a misunderstanding. Indeed, in the original description, the authors mention 10 radial spines, “whose upper, a little stronger, are of brownish-red colour”, whereas they also recognise only one central spine. In a later note (“ergänzende Beschreibung”), Weskamp rectifies this error by mentioning 5-7 radial spines and 4-5 central spines.

It is evident that confusing the upper central spines with radials, one arrives at the conclusion that the radial spines were of two different colours, “an unknown characteristic up to now within the genus”. This is evidently not the reality.

There are also populations with yellow flowers in this species.

P. fechseri Backbg. = **P. mesembrina**.

P. fuscato-viridis Backbg. = **P. belenensis**.

***P. herzogii* Rausch**

Body light leaf-green, sub-spherical; height 70 mm, diameter 65 mm, (reaching 90 mm). Apex occupied by a strong tuft of vertically erect spines, made up of white and straight radials as well as brown and hooked centrals, reaching up to 35 mm long. Ribs spiralling, 13/21, divided into rather high rounded rhomboidal tubercles. Areoles round, diameter of 2-3 mm, furnished with white wool. Radial spines 20 and more, white, fine, radiating and erect, reaching up to 15 mm long. Central spines of 3 to 5, white with a brownish-red point; the lower longer, hooked, reaching 50 mm long.

Flowers on the apex; height 35 mm, diameter 45 mm. Tube yellowish, concealed by the spines tufting on the apex; scales yellow, furnished with a little white wool and 4-5 blackish-brown bristles. Tepals of a bright red-orange, with a blood-red median band; the externals lanceolate, the internals more rounded, the upper edge denticulate. Filaments carmine-red; anthers light-yellow. Style yellowish-white; white stigma, with 12 lobes, exceeding the stamens.

Seed of 0.4×0.5 mm; testa brown, smooth and shiny; strophiole light brown, conical.

Area of distribution: Heights of Santa Barbara, Quebrada de Cafayate, province of Salta.



Fig. 184: *Parodia herzogii*: origin Santa Barbara (Salta).

P. horrida Brandt

Body dark greyish-green, slightly cylindrical, but lengthening with age and reaching 20 cm high. Apex strongly woolly, spineless. Ribs spiralling, 13/21 divided into rounded tubercles. Areoles of 3.5×2.5 mm, abundantly furnished with white wool becoming yellowish and bald thereafter. Radial spines fine, radiating, white, 8-11, measuring up to 8 mm. Central spines 4, brownish pink with a blackish grey point; the lower the longest, hooked, reaching up to 10-15 mm long. Young spines with a brown base.

Flowers on the apex; height 30 mm, diameter 32 mm. Tube light yellow, with thin elongated scales of brick-red, furnished with an abundant grey wool plus 3-5 black bristles. External tepals yellow with a wide median stripe of brick-red. Internal tepals lemon-yellow. All the tepals lanceolate. Filaments yellow; anthers cream. Style white; stigma the same colour, with 9-11 lobes.

One notes the presence of unisexual female flowers on some plants; curiously, the sterile stamens remain sensitive!

Seeds of around 0.3 mm; testa chestnut-brown to blackish-brown, smooth and shiny; strophiole reaching around 2/3 of the seed.

Area of distribution: North of Cafayate to Seclantas, province of Salta.



Fig. 185: *Parodia horrida*: origin San Lucas (Salta).

P. hummeliana Lau & Weskamp

Body leaf-green slightly glaucous, flattened spherical: diameter 40-70 mm, height 25-60 mm. Ribs spiralling, 8/13 in the young specimens, passing to 13/21 in the older plants; tubercles rounded, strongly prominent. Areoles furnished with white to brownish wool, not very abundant. Radial spines 20-25, fine, white, appressed, overlapping; 5 to 8 mm long. Sometimes 2-3 spines longer, transparent to pink, forming a transition towards the centrals. Those numbering 4, straight, reddish-brown; the lower the longest, darker, hooked, measuring up to 15 mm.

Flowers on the apex: height and width 35 mm. Tube pink-carmine, with light green scales with a small blackish mucro, furnished with white to light-brown wool, and 2-3 black bristles. All the tepals lanceolate mucronate, orange-red to vermilion-red, with a more carmine central line. Stamens not sensitive. Filaments carmine-pink with an orange base; anthers yellowish-white. Style pink; stigma with 8-10 white lobes and pink tip.

Fruits around 4 mm diameter, olive-green. Seeds 0.5 mm, with dark brown testa, smooth and shiny; strophiole yellowish, measuring about half of the seed itself.

Area of distribution: Area of Amblayo (Salta).

Weskamp wonders about the affinities of this species. Stamens not sensitive could indicate a certain degree of relationship with *P. cebilarensis*.



Fig. 186: *Parodia hummeliana*, origin area around Amblayo (Salta).

P. kilianana Backbg. = *P. cachiana*.

P. lembcke Weskamp

Body light matt green, initially like a flattened sphere, becoming cylindrical with age, to reach 10 cm in height and 7-8 cm in diameter. Ribs spiralling, 13/21, divided into relatively large rhomboidal tubercles, measuring up to 9 mm wide. Areoles round, around 2 mm in diameter, 6-8 mm apart, white. Radial spines 9 to 10, fine, white, radiating and erect, reaching up to 6-7 mm long. Central spines 4 to 7, erect, brownish-pink. The lower, hooked, is not much longer than the others, and measures up to 13 mm.

Flowers on the apex; height 30 mm, diameter 40 mm. Tube short, cherry-red, with scales of the same colour, and a small blackish mucro, furnished with greyish-white wool and 3 blackish-brown bristles. External tepals shiny red with a small black mucro; internal tepals of the same colour, finely denticulate. All the tepals lanceolate. Filaments carmine; anthers light yellow. Style rosy-white; stigma the same colour, with 8-12 lobes.

Seeds of 0.3 mm; testa brown, smooth and shiny; strophiole yellowish, almost as large as the seed.

Area of distribution: Region of Tafi del Valle, Sierra del Aconquija and Cumbres de Narvaez. (Provinces of Tucuman and Catamarca).



Fig. 187: *Parodia lembcke*, origin Condor Huasi (Catamarca).

P. lohaniana Lau & Weskamp

Body matt green, spherical to short-cylindrical, reaching 60 mm in diameter. Apex slightly depressed, furnished with white wool. Ribs spiralling, 13/21, divided into rounded tubercles becoming rhomboidal thereafter. Areoles round, around 2 mm in diameter, white, becoming bald at the base of the plant. Radial spines 7, appressed to semi-erect, white with a brown tip measuring up to 4-5 mm. Central spines 6-8 with the young areoles, reducing to 4 thereafter, brownish-red with a darker tip; the lower the longest, hooked, reaching up to 8 mm long, Young spines with a reddish-brown base.

Flowers on the apex; diameter 30 mm. Tube pink, with small yellow scales with an orange point, furnished with greyish-white wool and 2-3 black bristles. External tepals spatulate, fire-red. Internal tepals lanceolate orange-yellow with a red median stripe at the extremity. Filaments orange-yellow with red end; anthers cream. Style yellow slightly tinted with red; stigma yellow, with 10 lobes.

Seeds of 0.3-0.4 mm; testa smooth and shiny, light brown; strophiole yellowish-white, hemispherical, as large as the seed.

Area of distribution: Road from Payogasta to Potrero, province of Salta.

P. macrancistra (K. Sch.) Weskamp = ***R. microsperma*** var. ***macrancistra***.



Fig. 188: *Parodia lohaniana*, origin road to Potrero (Salta)

***P. malyana* Rausch**

Body leaf-green, slightly blue, initially sub-spherical to short cylindrical, reaching 15 cm in height with age, and 5.5 cm in diameter. Ribs straight to slightly spiralling, 20-24, divided into rounded tubercles. Areoles round, with a diameter of 2 mm, white to brownish. Radial spines 15-20, white, more or less transparent, fine, bristly, interlaced, established in the lower part of the areola, reaching 7 mm long. Central spines 4 to 6 (8), straight, erect, pinkish-brown, with a darker point, measuring up to 10 mm long.

Flowers on the apex; height 25-35 mm, diameter 35-45 mm. Ovary greenish-yellow. Tube light yellow to pink, with small light brown scales with a reddish point, furnished with long and abundant white wool, with 2 to 5 brown bristles. External as well as internal tepals vary from yellow flamed or not with red to orange-red with more carmine extremities. (the "average" dominant colouring is the yellow red-flamed). All the tepals lanceolate. Filaments yellow to carmine-red; anthers cream. Style yellowish-white; stigma the same colour, with 9 lobes.

Seeds of 0.4 mm; testa brown, smooth and shiny; strophiole hemispherical, white to yellowish, almost as large as the seed.

Area of distribution: Sierra de Ancasti, province of Catamarca.



Fig. 189: *Parodia malyana*: origin Anquincila (Catamarca).

The variable colouring of the flowers within a population does not justify the creation of varieties such as "*citriflora*" (Backeberg) or "*rubriflora*" (Brandt)

P. mercedesiana Weskamp

Body dark green slightly glaucous, flattened spherical: height 25 mm, diameter 45 mm. Apex weakly depressed, spiny. Ribs spiralling, 13/21, divided into conical rounded tubercles. Areoles oval, white, 2×2.5 mm. Radial spines white, fine, appressed, 9-15. Central spines 4; the lower the longest, hooked, reaching 15 mm long. Young central spines brown with a black point, passing to greyish-pink with a black point.

Flowers on the apex: height 30 mm, diameter 35 mm. Tube yellow, with lilac-red scales, fine and elongated, furnished with white wool and 2 blackish brown bristles. External tepals lanceolate to narrowly spatulate, yellow with a red median stripe and end. Intermediate tepals of the same colour, but larger. Internal tepals a brilliant silky yellow, with the tip still tinted with red. Filaments light yellow with a more orange tip; anthers white. Style yellowish-white; white stigma, with 14 lobes.

Seeds 0.4 mm; testa light brown, smooth and shiny; strophiole brownish-yellow, more or less conical, 0.3 mm.

Area of distribution: In the North-West of Las Curtiembres (Province of Salta).



Fig. 190: *Parodia mercedesiana*.

Species very variable, with regard to the colour of the flower (yellow to red) as well as to the spination. The present description is based on specimens of DH-106 stock.

***P. mesembrina* Brandt**

Body leaf-green to glaucous-green, initially subspherical, but lengthening strongly with age, and reaching 20 cm high and 8 cm diameter. Apex woolly, with a dense tuft of young blackish-brown spines. Ribs Spiralling, 13/21, divided into rhomboidal rounded tubercles. Areoles rounded, 4-5 mm in diameter, abundantly furnished with white wool, becoming more or less bald at the bottom of the older plants. Radial spines fine, white, appressed, 9-11, up to 8 mm long. Central spines 4-6, erect, flexible, straight to slightly curved, pinkish brown with a blackish tip, becoming grey with a black tip at the bottom of older plants; length up to 20 mm.

Flowers on the apex: height 45 mm, diameter 35 mm. Tube light green: scales narrow and elongated, reddish, furnished with white wool and 2 blackish-brown bristles. External tepals lemon-yellow with a median terminal stripe of cherry-red. Internal tepals pure lemon-yellow. All the tepals lanceolate. Filaments brilliant-yellow; anthers cream. Style white slightly greenish, 16 mm long; stigma yellowish-white, with 8 lobes of 4 to 5 mm.

Fruit around 4 mm in diameter, dark red passing to olive-brown at maturity, furnished with white wool.



Fig. 191: *Parodia mesembrina*, Anzulon (La Rioja).

Round seeds, around 0.3 mm; testa brown, smooth and shiny; strophiole yellowish-white, reaching half to two thirds of the seed.

Area of distribution: South of the province of La Rioja.

P. microsperma (Weber) Speg.

Body light green, solitary, flattened spherical, measuring up to 7 cm in diameter, which can become cylindrical thereafter. Apex slightly depressed, woolly, with a tuft of young vertical erect spines. Ribs spiralling, 13/21, divided into conical tubercles of 4-5 mm in diameter and 3 mm high. Areoles round, around 1.5 mm in diameter, furnished with yellowish-white wool, and afterwards becoming bald. Radial spines 11-13, established on the lower part of the areole, radiating, fine, white, measuring up to 8 mm long. Central spines 4, the three upper straight, white with a reddish point, the lower longer and stronger, hooked, completely reddish, reaching up to 30 mm long on the old plants.

Flowers on the apex, funnel-shaped; height 30 mm, diameter 40 mm. Tube pink, with greenish-yellow scales, furnished with white wool and 1 to 3 bristles, becoming darker on the top of the tube. External tepals spatulate to lanceolate, yellow orange with a pink median band; internal tepals lanceolate denticulate, yellow orange with a vermilion median band. Throat shiny red. Filaments red; anthers cream. Style yellowish-white, 12 mm; stigma white, slightly rosy, with 12 lobes.

The colouring of the flowers can vary considerably even within a given population. One observes all the combinations imaginable of red to yellow, and passing to orange. For example, red flowers with a greenish tube, red scales, throat yellow and filaments red with a yellow base; flowers yellow with a pale yellow tube, reddish scales and yellow filaments; flowers yellow with a pink tube and filaments red, etc.

Weber, in his original description, noted this variability of the flower colours.

It follows that varieties such as "*rubriflora*", "*thionantha*", "*erythrantha*" or "*aurantiaca*" are rejected as null and void.

Fruit ovoid, of 6 × 5 mm, basal dehiscence.

Seeds of 0.3 mm; shiny chestnut-brown, smooth testa; strophiole yellowish-white, 0.2 mm.

Area of distribution: Basin of Rio Choromoro and the higher sources of the Rio Acequiones, province of Tucuman.

P. microsperma var. macrancistra (K. Sch.) Borg.

Body leaf-green to olive-green; height up to 80 mm, diameter up to 65 mm. Apex slightly depressed, woolly and spiny. Ribs spiralling, 13/21, di-



Fig. 192: *Parodia microsperma*, origin Las Tancanas (Tucuman).



Fig. 193: *Parodia microsperma* var. *macrancistra*: origin El Tala (Salta).

vided into rounded conical tubercles. Areoles rounded, 2.5 mm in diameter, and 5 mm apart, initially white, shrinking and becoming yellowish thereafter. Radial spines fine, white, radiating, 11, reaching up to 10 mm long. Central spines 4, of which three spines are straight and directed to the top, and one strong hooked spine directed towards the outside, measuring up to 30-35 mm. All the central spines brownish-red, the large spine hooked, more blackish when young. The difference to the type-form, whose central spines lengthen with age, lies more in the colour than in their size.

Flowers on the apex, height 30 mm, diameter 45 mm. Tube light yellow, with narrow scales of cherry-red, with white wool and 2-3 blackish-brown bristles. External tepals spatulate to lanceolate lemon-yellow with a median stripe of cherry-red; internal tepals mucronate, lanceolate, lemon-yellow with a small red point. Filaments sulphur-yellow; anthers white to cream. Style yellowish-white; stigma white, with 10-12 lobes.

Seeds of 0.4 mm; testa brown, smooth and shiny; strophiole yellowish, conical, of 0.2-0.3 mm.

Area of distribution: Extreme South of the province of Salta to the North-East of the province of Tucuman.

Weskamp wanted to make this variety a separate species, but his argument is hardly convincing; the colouring of the scales on the tube and the tepals are indeed not utilisable as a criterion for separation, considering their very great variability within the *P. microsperma* species. (see above).

P. microsperma* var. *weberiana (Brandt) Lambert comb. nov.

Basionym: *Parodia weberiana* Brandt, K.u.a.S., 20 (11), p. 206, 1969

Offsetting form, forming tufts in nature. Body light green reaching a diameter of 10 cm and height of 7 cm. Ribs spiralling, 13/21, divided into conical tubercles. Areoles yellowish-white, 3 × 2 mm. Radial spines fine, yellowish-white, radiating, 10 to 18. Central spines 4, of which three small spines are directed upwards, yellowish with a brownish-red point, and one stronger spine directed downwards, hooked, yellowish-brown with a darker point, measuring up to 20 mm long.

Flowers on the apex; height 30-35 mm, diameter 40 mm. Tube light yellow, with red scales, furnished with short white wool, not very abundant, and of 2-3 blackish bristles. External tepals spatulate to largely lanceolate, yellow with a red central line. Internal tepals yellow to orange. Filaments yellow with a red upper part; anthers cream. Style white, 16 mm; stigma creamy-white, of 5 mm, with 9-10 lobes.

One also sees flowers of lighter yellow, with a greener tube and more brownish scales. For contrast, the specimens collected in the more northern area of dispersion present shiny orange flowers, with a red median stripe on all of the tepals.



Fig. 194: *Parodia microsperma* var. *weberiana*:
origin Rio Grande de Sauce (Salta).

Seeds of 0.3 mm; testa brown, smooth and shiny; strophiole reaching around 3/4 of the seed.

Area of distribution: Rio Grande de Sauce, province of Salta.

***P. mutabilis* Backbg.: = *P. aureispina*.**

***P. parvula* Brandt: = *P. cardenasii*.**

***P. penicillata* Fechsner & V. d. Steeg**

Body light green, sub-spherical, reaching 12 cm in diameter; older plants becoming cylindrical, nearly up to one metre long, and adopting a crawling to pendant aspect. Ribs spiralling, 8/13, divided into rounded tubercles. Areoles around 5 mm in diameter, 12 to 15 mm apart, furnished with abundant white wool but becoming bald afterwards. The spines are little differentiated. One distinguishes up to 40 appressed radial spines, long and flexible, yellow to whitish or transparent. One strong central spine, thicker and slightly pinkish, more or less curved, erect in the middle of the areole and can measure up to 5 cm. Between this spine and the radials themselves, one observes about fifteen intermediate spines, semi-erect, of which about eight, of the same thickness as the central spine but very short, are laid out in



Fig. 195: *Parodia penicillata*.

crown around these. The others become finer, and constitute a transition with the appressed radial spines. On the apex, the young spines form tufts that resemble artists' brushes, hence the name of the species.

Flowers on the apex; height 30-40 mm, diameter 40 mm. Tube lilac-pink; elongated scales, with a yellow point, furnished with white wool and 1-2 brown bristles. External tepals orange red with a darker median band. Internal tepals fire-red with a carmine median band. All the tepals lanceolate. Filaments carmine red with a lighter base; anthers pale yellow. Style yellowish; stigma white, with 8-12 lobes.

Seeds slightly elongated, 0.6 mm; testa brown, shiny, slightly striated; strophiole whitish, conical to double-conical, reaching a good half of the seed.

The structure of seed indicates to me that it is, here again, as in the case of *P. chrysacanthion* and *P. nivosa*, (see under **Protoparodia**), of a transitional form between sub-genus **Parodia** and **Protoparodia**.

Area of distribution: Region of Cafayate, province of Salta.

P. piltziorum Weskamp: = **P. horrida**.

P. pluricentralis n.n. Backbg. (non Brandt): = **P. wagneriana**.

P. pusilla Brandt: = **P. cardenasii**.

P. rigida Backbg. = **P. tolobana**.

P. rigidispina Krainz

Body light leaf-green, like a flattened sphere, reaching 75 mm in diameter and 50 mm tall. Apex not spiny, slightly depressed, furnished with white wool. Ribs spiralling, 13/21, divided into rhomboidal-conical tubercles strongly prominent, 3 mm high, round, 1.5-2 mm in diameter. Areoles white to light brown, becoming bald thereafter. Radial spines fine, white, 9-11, measuring 5 mm long. Central spines 4; the three upper shorter, white with a brown point, the lower light brown, directed downwards, curved, reaching up to 8 mm long. When young, the principal central spine is brownish-red, and more or less hooked.

Flowers on the apex; height 30-35 mm, diameter 35 mm. Ovary pale green, furnished with white wool. Tube light yellow, the scales with a red point, furnished with white wool and 2 blackish-brown bristles. External tepals lanceolate, narrow, yellow with a red point. Internal tepals golden yellow. Filaments yellow with a white base; anthers creamy-white. Style white; stigma pale yellow, with 8-10 lobes.

Seeds of 0.3 mm; testa smooth and shiny, brown-maroon; strophiole conical, 0.1 mm.

Area of distribution: Quebrada de Escaba, province of Tucuman.



Fig. 196: *Parodia rigidispina*, Quebrada de Escaba (Tucuman).

P. riojensis Ritter & Weskamp: = ***P. catamarcensis*** var. ***riojensis***.

P. rubellihamata Backbg. = ***P. cebilarensis***.

P. rubriflora Backbg.: = ***P. sanguiflora***.

P. sanagasta (Fric) Weingart

Body spherical to flattened spherical; the largest diameter observed 7 cm. Epidermis olive-green to reddish-brown (coppered), according to the lighting conditions. Apex depressed, furnished with white wool and young red spines. Ribs spiralling, 8/13, divided into rather high rounded tubercles. Areoles rounded to oval, 2-3 mm, 4-5 mm apart, furnished with white to yellowish wool, becoming bald thereafter. Radial spines 7-11, white, fine, appressed to semi-erect, straight to slightly sinuous, interlaced, measuring 6 to 10 mm. Central spines 4, pruinose-pink with a reddish-brown point; the three upper straight to slightly curved, the lower hooked, measuring up to 12 mm long.

Flowers on the apex; height 25-30 mm, diameter 33-40 mm. Tube lemon-yellow, with elongated scales tinted with pink and a red point, furnished with white wool and 2 black bristles of 5 mm. External tepals lanceolate, lemon-yellow with a fine red median band, with a small mucro. Internal tepals lanceolate and denticulate, pure lemon-yellow. Filaments lemon-yel-



Fig. 197: *Parodia sanagasta*, Cuesta de Huaco (La Rioja).

low to golden-yellow; anthers pale yellow to cream. Style yellowish white; whitish stigma, with 8-12 lobes.

Fruit wine-red, 4 mm in diameter.

Seeds of 0.25 mm; testa blackish-brown, smooth and shiny; strophiole brownish, 0.15 mm.

Area of distribution: Sierra de Velasco, Cuesta de Huaco to Agua Blanca, between 1400 and 1650 m. (Province of La Rioja).

P. sanguiniflora (Fric) Backbg.

Body light leaf-green, initially like a flattened sphere, then short cylindrical; height 11 cm, diameter 9 cm. Apex furnished with white wool and short reddish-brown spines. Ribs spiralling, initially 8/13, passing then to 13/21, divided into rounded rhomboidal tubercles, wider than high. Areoles strongly woolly, yellowish-white, with a diameter of 1.5-3 mm, and 5 to 6 mm apart, becoming bald thereafter. Radial spines 9 to 15, fine, white, radiating and interlaced, established on the lower part of the areole, meas-



Fig. 198: Parodia sanguiniflora,
Cuesta de la Chilca (Catamarca).

uring 5 to 8 mm. Central spines 3-4, the upper straight and erect, pale pink, the lower hooked, reddish-brown to light red, with a brownish-red to blackish point, reaching up to 17 mm long. (12 mm with young plants).

Flowers on the apex; height 25-40 mm, diameter 35-45 mm. Tube light red, with scales with a yellowish point, furnished with white wool and 2-3 black bristles of around 5 mm. All the tepals lanceolate; externals narrow, blood-red to carmine, with a greenish-yellow point and black mucro; Internals wider (5 mm), indented, blood-red with an orange border. Throat carmine. Filaments carmine to orange-red, with a lighter base; anthers light yellow. Style yellowish-white to pinkish, 20 mm; stigma pale yellow, with 8-12 lobes of 5 mm, exceeding the stamens.

Flowers remain smaller on the young specimens; their tonality varies from fire-red (more or less orange) to more carmine-red.

Area of distribution: Cuesta de Chilca, Cuesta de Totoral and Cuesta de Portezuelo, province of Catamarca.

P. setifera Backbg.

Body light-green to leaf-green, initially sub-spherical, but lengthening with age and becoming twice as high as wide. Apex strongly woolly, with some spines. Ribs straight to more or less oblique, 18 to 20. Areoles small, rounded to slightly oval, 1-2 mm in diameter, white, becoming grey and



Fig. 199: *Parodia setifera*, Lumbreras (Salta).

bald. Radial spines fine, white, appressed, of silky aspect, 18 to 22. Central spines 3-4, greyish-pink to reddish-brown; the upper upwards, the lower longer hooked, downwards directed, and measuring up to 20 mm.

Flowers on the apex; height 20 mm, diameter 25 mm. Tube pale yellow, with small red scales and a darker base, furnished with abundant white wool and 2-3 blackish-brown bristles. External tepals lemon-yellow and red extremity with a small dark mucro. Internal tepals pure lemon-yellow. All the tepals lanceolate. Stamens non-sensitive (exceptional in sub-genus **Parodia**). Filaments sulphur-yellow to golden-yellow; anthers creamy-white, style white slightly yellowish, 12 mm; stigma white, with 11-15 lobes.

Seeds of 0.3-0.4 mm; testa brown-maroon, smooth and shiny; strophiole yellowish-white, hemispherical, almost as large as the seed.

Area of distribution: From Betania to Lumbreras (East and South-East of the town of Salta).

P. spegazziniana Brandt

Body glaucous green, spherical, reaching 7 cm in diameter. Apex with a blackish tuft of brown spines. Ribs spiralling, 13/21, divided into rounded relatively low tubercles. Areoles round, with a diameter of 3 mm, and 6 mm apart, abundantly furnished with white wool, becoming somewhat bald at the base of the plant, but not totally bald. Radial spines fine, white,



Fig. 200: *Parodia spegazziniana*, Cuesta de Capillitas (Catamarca).

radiating, 7-9. Central spines 3-4, the upper whitish with a pink base, the lower, stronger and longer, hooked, brownish-pink, measuring up to 25 mm long.

Flowers on the apex; height 30-40 mm, diameter 50-60 mm. Ovary olive-green. Tube red, with light green to yellowish scales, furnished with greyish white wool and 3.5 blackish-brown bristles. Tepals lanceolate, shiny red. Throat carmine. Filaments carmine-red; anthers light yellow. Style yellowish; stigma yellowish-white, with 11 lobes.

There are also flowers of a more orange tone. Seeds of 0.25-0.3 mm; testa light brown, smooth and shiny; strophiole creamy-white, as large or larger than the seed.

Area of distribution: Cuesta de Capillitas, province of Catamarca.

***P. tafiensis* Backbg. = *P. lembckei*.**

***P. talaensis* Brandt: = *P. microsperma* var. *macrancistra*.**

***P. tolombana* Weskamp**

Body dark green, initially sub-spherical, but lengthening thereafter, to reach up to 80 mm high and 55 mm in diameter. Ribs spiralling, 8/13, divided into rounded conical tubercles. Areoles round, yellowish-white passing to brownish, around 1 to 1.5 mm in diameter. Radial spines fine, white, appressed, 9-10. Central spines 2 to 4, pink, the lower the longest, slightly hooked, reaching up to 8 mm.

Flowers on the apex, height 22 mm, diameter 25 mm. Tube light yellow mixed with pink; scales reddish then yellow with a red point, furnished with white wool and 2-3 blackish-brown bristles. External tepals largely lanceolate, yellow largely tinted with red towards their end. Internal tepals spatulate, shiny yellow. Filaments yellow; anthers cream. Style whitish; white stigma, with 6-8 lobes.

Seeds of 0.3 mm; testa smooth and shiny, light brown; strophiole hemispherical to truncated conical, whitish to slightly brownish.

Area of distribution: The extreme North-West of Tucuman to South of Cafayate (province of Salta).

***P. tuberculosi-costata* Backbg.**

Body glaucous green rather light, flattened spherical, but becoming gradually cylindrical; height 90 mm, diameter 65 mm. Apex woolly, white. Ribs spiralling, 13/21, divided into rounded polygonal tubercles. Areoles small, round, whitish, 3 mm in diameter. Radial spines fine, appressed to semi-erect, white, 18 to 20, around 5 mm long. Central spines generally 4, 1 (2), strong, directed towards the base, hooked, pink with a brownish red to carmine point, 7-9 mm long; 3 smaller, straight and directed towards the top, white with a brownish-pink point. Young spines on the apex light brown; central spines on the base of the plant with a blackish point.



Fig. 201: *Parodia tolobana*: origin Ruinas de Quilmes (Tucuman).



Fig. 202: *Parodia tuberculosi-costata*: origin Alemania (Salta).

Flowers on the apex; diameter 35 mm, height 30 mm. Tube reddish-yellow, with elongated scales, light red with a green point, furnished with brownish-white wool and 3-4 black bristles, becoming longer on the upper part of the tube. External tepals lanceolate, yellow with a red median band, especially marked at the terminal part. Internal tepals lanceolate mucronate, yellow with a whitish base. Throat slightly reddish. Filaments yellow; anthers cream. Style pale yellow; yellowish-white stigma, with 10-12 lobes.

Seeds of 0.3-0.4 mm; Testa brown, smooth and shiny; strophiole brownish, irregular, around 0.15 mm.

Area of distribution: Region of La Viña, Alemania, Santa Barbara, province of Salta.

P. wagneriana Weskamp

Body leaf-green, reaching 15-18 cm high, and 7 cm in diameter. Apex depressed, woolly. Ribs spiralling, 8/13 with young specimens, passing to formula 13/21 when adult. Tubercles conical, fairly high. Areoles white, round, 2-3 mm in diameter, 8-11 mm apart, not uncovering until very late. Radial spines fine, white, radiating, overlapping, 9-11, measuring up to 5 to 8 mm. Central spines brownish-red, erect, 4-7; the lower, longest, hooked, reaching 13-18 mm long. Older spines passing to purplish-brown.



Fig. 203: *Parodia wagneriana*: origin East of Andalgala (Catamarca).

Flowers on the apex; height 20 mm, diameter 25 mm. Tube light yellow with a pinkish base, with very small reddish scales, furnished with abundant white wool and 2-3 blackish-brown bristles. External tepals spatulate, lemon-yellow with a reddish tinted tip. Internal tepals lanceolate, pure lemon-yellow. Filaments golden-yellow; anthers cream. Style yellowish, stigma white; 9-10 lobes.

Seeds of 0.4 mm; testa brown, smooth and shiny; strophiole yellowish, conical.

Area of distribution: East of Andalgalá, province of Catamarca.

P. weberiana Brandt: = **P. microsperma** var. **weberiana**.

Culture.

Compact and very floriferous plants, the Parodias deserve a place of choice in any cactus collection. Where the species of sub-genus *Protoparodia* are content in theory with a mineral substrate, the Parodias themselves will on the other hand appreciate a good amount of humus in the ground which in any event must be suitably drained. A quite sunny site will be appropriate in all cases, even if some species more or less grow in the shade in their area of origin. To water generously in summer; to take account of the fact that the Argentinean species require more water than their Bolivian co-generics.

The major problem remains the sowing of the microsperme species. The best results are obtained with a sterilized or disinfected substrate, in an atmosphere saturated with moisture. (Method imagined by Z. Fleischer). Even thus, it will be necessary to have patience, the seedlings being pick-outable only after several months. A final disadvantage: the growth of the plants remains very slow during the first year. The flowers appear at 2-3 years of age with Parodias themselves, but very late with *Protoparodias*.

PFEIFFERA S-D.

Plants of cereoid aspect, with an erect to pendant habit, growing as epiphytes or on stones. No aerial roots. Ribs generally 4, seldom 3. Flowers lateral, bell-shaped, with a very short tube. Spiny ovary and fruit. The genus is limited to Argentina and to Bolivia.

The current tendency consists of integrating the genus *Pfeiffera* within the genus *Rhipsalis*, just as with *Lepismium*.

P. ianthothele (Monv.) Weber

Plants moderately branching, erect to hanging. Stems light green, with 4 acute ribs, more or less sinuous; diameter 12-15 mm, length up to 50 cm. A reddish stain at the base of the areoles. These latter rounded, yellowish-



Fig. 204: *Pfeiffera ianthothele*: origin Alemania (Salta).

white, of around 1 mm in diameter, and 7 to 9 mm apart. Spines fine, yellowish-white, transparent, 5-7, measuring 4 to 5 mm.

Flowers on the ribs, height 15-(20) mm, diameter 12 mm. Ovary globular, dark brown, more greenish at the base, diameter of 5 mm, with angular tubercles that bear the areoles, furnished with 6 to 9 fine spines of 5 mm long. Floral bud cherry-red to carmine. External tepals short (up to 5 mm), tinted with carmine. Internal tepals pink to white-pink. All the tepals lanceolate. Filaments pale pink; anthers light yellow. Style white, 4 mm; stigma yellowish white, with 6-7 lobes.

Fruit spherical, reddish, translucent, 1 cm in diameter. Pulp viscous, sticky.

Seeds small, elongated, kidney-shaped, from around 1 mm long, and 0.4 mm wide. Testa shiny black, striated longitudinally. Hilum narrow, whitish, slightly convex.

Area of distribution: South of Bolivia to the North of Argentina. (Provinces of Chaco, Santiago del Estero, Jujuy, Salta, Tucuman, Catamarca and La Rioja.)

Culture.

Plants appreciating a substrate with humus, and a little more water than cacti in general, not offering any particular difficulty. They form pretty clumps when cultivated in a bowl. Self-fertile, they multiply with ease from seeds.

PSEUDOLOBIVLA Backbg.

See *ECHINOPSIS*.

PTEROCACTUS K. Sch.

Remarkable genus, well defined by a series of very particular characteristics. First of all is the tuberous root, being able to reach the dimension of a fist, and constituting a significant reserve in the event of drought or of bad weather temporarily destroying the overhead parts. These latter, which start to develop from the underground stems by the root, are made up of generally cylindrical to claviform segments, more rarely globular, that do not exceed hardly 15 cm long and 2 cm in diameter, with an epidermis of green, brown, or mauve. Spines acicular, flattened or paper-like. Flowers apical on the end of the segments, rotate, yellow to brown or reddish, with sensitive stamens. Fruits dry, spiny, dehiscing transversally. Seeds dispersed irregularly within the fruit, or on the contrary laid out in ordered layers as the pages of a book, smooth, with a very characteristic winged membrane. (From where, the name of the genus, Greek *pteron* = wing).

Genus confined to Argentina, from Patagonia towards West and North-West.

P. fischeri Br. & R.

Segments dark olive-green to bottle-green, measuring up to 13 cm long and 18 mm in diameter. Tubercles rhomboidal, with the areoles at the top of a small bulge. Areoles white, oval, around 2 × 3 mm. Radial spines 9-13, white, appressed, straight, fine. Central spines 1-2, dirty-white more or less brownish tinted, erect, flattened, paper-like at the upper areoles, measuring up to 20 mm. Glochids abundant, yellowish, in tufts on the upper parts of the areole, from 3-4 mm long.

Flowers terminal, 40 mm in diameter and 30 mm high. External tepals reddish-brown with a wide brown median band, more or less fleshy. Internal tepals lustrous brownish-pink, with a fine central line of brown and the extremity shadowed with fine brown scratches, with a more reddish tone on the internal face. Throat (base of the tepals) more orange-yellow. All the tepals widely spatulate and mucronate. Filaments pale pink; anthers shiny yellow. Style pinkish-white; stigma carmine, with 4 double lobes.

Fruit apical, 20-25 mm in diameter, tubercled and spiny.

Total diameter of the seeds, 6-9 mm, (4 mm without the wing), winged membrane well developed but incomplete.

Area of distribution: South of the province of Mendoza to the provinces of Neuquen and Rio Negro.



Fig. 205: Pterocactus fischeri,
Rio Malargüe (Mendoza)

P. gonjani Kiesling

Plants caespitose, with a tuberous root of 15 cm long and 6 cm in diameter; underground stem creamy-yellow, 12 to 15 cm long, forming from 3 to 4 successive segments. Above ground segments cylindrical, greyish-brown to purple, measuring up to 10 cm long and 13-15 mm in diameter. Tubercles in rounded rhombuses, around 6 mm long and 4 mm wide. Areoles established on the apex of the tubercles, rounded to more or less elongated in the form of an "8", in a diameter of 2 mm, abundantly furnished with white wool. Spines non-differentiated, 6-10-(12), yellowish-white to pale brown, reaching 5 to 9 mm long. (The longest at the extremity of the segments). Many glochids, 1.2 mm long, on the upper part of the areoles.

Flowers apical, cupuliform, with a diameter of 50 mm and a height of 20 mm. External tepals ochre-yellow with a wide median stripe of blackish-brown. Intermediate tepals with only a fine brown line. Internal tepals with a light yellow base and an ochre yellow extremity, with a central line of pale brown. All tepals widely spatulate, with a small mucro. Filaments green-



Fig. 206: *Pterocactus gonjaniii*: origin Llanos de Chita (San Juan).

ish-white; anthers canary-yellow. Style green; stigma carmine, with 5-9 lobes.

Fruit slightly wider than the segments, around 25 mm long and 20 mm wide.

Seeds with a regular and well developed winged membrane, of a total diameter of 10 to 13 mm.

Area of distribution: Region of Iglesia, in the West of the province of San Juan.

***P. kuntzei* K. Sch.**

Plants caespitose to erect, connected by a long underground stem with the tuber hidden deeply in the ground. (Underground stem being able to become very short to missing in culture). Above-ground segments brown to greyish-green, with a characteristic violet stripe under the areoles, reaching 13 to 20 cm long and 13-15 mm in diameter. Tubercles in diamond-shape, 10 × 6 mm, slightly convex, separated by not very marked furrows. Areoles small, white, rounded, around 1 mm in diameter. Spines fine, straight, whitish, 8-10, erect in a funnel, measuring 5 mm long; some areoles with a more brownish central spine. Glochids of 1 to 2 mm long, on the upper part of the areoles.

Flowers cupuliform; diameter 15 mm, height 20 mm. External tepals pale yellow with a wide stripe of brownish-grey. Internal tepals wider,



Fig. 207: *Pterocactus kuntzei*: origin Llanos de Chita (San Juan).

rounded mucronate, pale yellow, pinkishly suffused, and with a median stripe of pink on the internal face, brownish towards the exterior. Filaments yellowish-white; anthers shiny yellow. Style yellowish-white; stigma dark red, with 6-8 lobes.

Seeds with a large winged membrane, regular and complete; diameter of 10-12 mm.

Area of distribution: Most widespread of the species, from South of the province of Salta to the North of Rio Negro, through the provinces of Tucuman, Catamarca, La Rioja, the West of Cordoba, San Juan, Mendoza, La Pampa, the Southern extremity of Buenos Aires and the North of Neuquen.

P. kuntzei fa. lelongii (Ruiz Leal) Kiesling

Differs from the type by the thinner segments, with a diameter not exceeding 5 to 8 mm.

Found in company of the type form in the North-West of Mendoza and the South of San Juan.

P. megliolli Kiesling

Plants caespitose, with a tuberous root reaching 15 cm long and 8 cm diameter. Cylindrical segments, 6-13 mm diameter and 5 to 10 cm long, with a greenish-grey epidermis. Tubercles hexagonal to irregularly rounded, laid



Fig. 208: *Pterocactus megliolii*.

out in spirals, without clearly separating furrows. Areoles very small (0.5 mm), woolly, white. Radial spines 9-11 and more, appressed and spread out, white to transparent, short, maximum 2 mm. Central spines 3-4, erect, light brown to blackish brown, even shorter than the radials. Few or no glochids.

Flowers terminal, rotate; diameter 50 mm, height 30 mm. Perianth base with a crown of yellowish-white and blackish bristles. External tepals small, lanceolate, with a blackish mucro. Intermediate tepals spatulate, denticulate and mucronate, lemon-yellow with a brown median stripe. This latter attenuates gradually to the internal tepals, which are bright lemon-yellow, spatulate, denticulate and mucronate. Sensitive stamens. Filaments yellow; anthers lighter, sometimes with a brown spot. Style yellowish-white: stigma carmine, with 6-(8) papillose lobes.

Fruit apical, with similar areoles to those on the segments, but spaced wider. Seeds from around 3×4 mm, with an irregular winged membrane, conferring a total diameter of 7-12 mm.

Area of distribution: Arid and stony places surrounding the city of San Juan. (low parts of the Sierras de Zonda and de Villicun).

P. reticulatus Kiesling

Segments piriform to cylindrical, greyish-green to brownish, measuring up to 125 mm long and 18 mm in diameter, divided into rhomboidal tubercles around 7×5 mm. Areoles tiny, with a half-dozen very short radial spines



Fig. 209: *Pterocactus reticulatus*, origin Llanos de Chita (San Juan).

(approx. 2 mm.) and a central spine hardly longer, all whitish. Few or no glochids.

Flowers apical, cupuliform; diameter 55 mm, height 45 mm. External tepals yellowish-white with a brownish-purple median band. Intermediate tepals with a fine brownish band. Internal tepals ivory-white, with a very slightly pink median band, pearly. Filaments white; anthers canary-yellow. Style white; stigma carmine, with 5-9 lobes.

Fruit occupies a lateral position, the segments continuing to grow after flowering; globular form or in a reversed cone, of 20 to 25 mm in diameter, with a flattened upper face.

Seeds with a regular winged membrane, with a total diameter of 10 mm.

Area of distribution: Region of Iglesia and the valleys of Calingasta and Uspallata. (Provinces of San Juan and Mendoza).

***Pterocactus* sp. JL-101**

Segments cylindrical to more or less conical, light olive-green to brownish-green, measuring up to 12 cm long and 20 mm in diameter, and divided into rhomboidal tubercles. Areoles small, round, white, 1 mm in diameter. Spines fine, straight, appressed, yellowish-white, 16 to around 20, measuring up to 4-5 mm long. One distinguishes the central spines, as more erect, brown to blackish, maximum of 4. The upper part of the areoles carry an abundant tuft of whitish glochids, erect, measuring 3 to 5 mm long, the



Fig. 210: *Pterocactus* sp. JL-101: origin Bajada del Agrio (Neuquen).

young spines confer a reddish brown aspect at the extremities of the segments.

Flowers apical, funnel-shaped, 35 mm in diameter and 25 mm high. External tepals brownish-pink with a brown median band. Internal tepals pink striated with brown, more intensely towards the end. (Base of the tepals carmine-pink). All tepals spatulate with a small mucro. Filaments sweet-pink; anthers shiny yellow. Style brownish-pink; stigma shiny carmine, with 6 lobes.

Fruit and seeds not observed.

Area of distribution: Bajada del Agrio, province of Neuquen.

I was wrong when I had believed that I should allot the present form to *P. araucanus*, which is clearly different from it by its much more globular segments, as well as by its stamens and its yellow style.

In spite of the absence of some details that does not allow a complete description, I have not resisted the pleasure of this pretty species appearing here, discovered by me in 1983.

***P. tuberosus* Br. & R.: = *P. kuntzei*.**

***P. valentinii* Speg.**

Root sometimes tuberous, sometimes simply napiform. Segments cylindrical, olive-green, measuring up to 12 cm long and 13 mm in diameter. Tubercles little differentiated, merging together. Areoles round, whitish, of



Fig. 211: *Pterocactus valentinii*, Sierra de Portezuelo (Neuquen).

1 to 2 mm in diameter. Radial spines fine, bristly, straight, erect to radiating, whitish, around 20. One distinguishes 3 to 4 central spines, stronger and brownish. The radial spines as well as the centrals, strongly lengthen at the end of the flowering segments, to reach 20 to 25 mm long.

Flowers rotate, apical; height 25 mm, diameter 45 mm. External tepals small, mucronate, brown with a wide blackish green median band. Internal tepals very widely spatulate, indented, silky brown, with a darker terminal band, sometimes tinted with a little carmine. Filaments salmon-pink to orange; anthers yellow. Style pale brown; stigma carmine-pink, with 5 lobes.

Fruit yellowish-pink, with a diameter of 2 cm, covered with spines like those of the segments, with sometimes some additional papery centrals.

Area of distribution: Provinces of Neuquen and Chubut.

Culture.

Pterocactus easily multiply vegetatively, from the beginning of the tuberous roots as well as from the segments. They require a sandy substrate, not too humus-bearing and well drained. Under the less rigorous conditions of culture, they hardly develop underground stems, the tubercles being level to the surface of the ground or even slightly emerging from it. One should reserve a quite sunny place, and regular watering in summer, in consideration of which they will develop without problems. However, the growth remains relatively slow, and it will take a few years to see the appearance of your first flowers.

PUNA Kiesling

Small plants made up of not very many cylindrical segments or in a reversed cone, at the top of a napiform or tuberous root. Glochids rare or absent; spines pectinate. Flowers lateral, solitary, actinomorphic and funnel-shaped. Pericarpel with small fleshy triangular scales, covered with wool and bristles to the axils. Fruits dry, piriform, with irregular dehiscence.

Seeds surrounded by an aril with a distorted surface, spongy and rather soft. (Characteristic also observed with some *Tephrocactus*, the genus from which *Puna* seems to derive by specialization.)

Genus of altitude, encountered on the altiplano of Jujuy and the border areas of Bolivia, as in the precordillera provinces of San Juan and Mendoza.

P. clavarioides (Pfeiff.) Kiesling

Low bushy plants, 40 cm high, with the segments branching as antlers of a stag, connected to the tuberous root by an underground cylindrical stem. Segments light greyish-brown, variable length, cylindrical or in a reversed cone. Areoles tiny, without glochids, with a little white wool and about ten fine spines, white, appressed, of 3-4 mm long. Young areoles with reddish leaflets of 1.5 mm, very rapidly falling away.

Flowers brownish yellow, 65 mm high and 45 mm in diameter. Pericarpel cylindrical, dark olive-green, with red scales, furnished with white wool and white to pink bristles 8 mm long. External tepals lanceolate, olive-brown tinted with red, the extremity reddish. Internal tepals narrowly spatulate, denticulate and mucronate, light silky-brown. Filaments white, anthers yellow. Style white; stigma yellowish, with 7 lobes.

Area of distribution: Plateau of the precordillera, region of Iglesia and valleys of Calingasta and Uspallata. (Provinces of San Juan and Mendoza).

Species widespread in culture under the label of *Austrocyliandropuntia clavarioides*, and commonly called "hand of negro", alluding to its colour and to the digital branches of the segments.

P. subterranea (R.E. Fries) Kiesling

Heads of 20-30 mm high and 15 mm in diameter, with a napiform root of 10 to 12 cm. In culture, the above-ground part can lengthen notably, to reach 15 cm (Phenomenon analogous to that which one observes with *Austrocyliandropuntia verschaffeltii*). Epidermis glaucous green, divided into rhomboidal tubercles forming 10 to 12 vertical lines. Areoles tiny (0.5 mm), whitish; the lower with a tuft of yellowish glochids and 2 to 3 white rudimentary spines, the upper without glochids, but with 2-3 stronger spines,



Fig. 212: *Puna subterranea*, East of Yavi (Jujuy).

straight, reddish-brown, of 4-5 mm long, and 3-4 small bristly spines, white and sinuous. Young areoles protected by a conical leaflet around 1 mm, dark green with a reddish point.

Flowers lateral: height 25-30 mm, diameter 25-35 mm. Pericarpel pink at the base, dark green at the top, with small reddish-brown scales, and a crown of white bristles 1-2 cm long at the upper edge. External tepals lanceolate, pink with a brownish-green median band. Internal tepals spatulate mucronate, rosy-white to pale carmine. Throat white. Filaments white to pink; anthers white. Style white with a pink extremity; stigma cream, with 4-5 lobes.

Fruit truncated sphere, around 15 mm in diameter, covered with bristles around the upper face, crateriform.

Seeds irregular, of around 3 mm.

Area of distribution: Province of Jujuy and South of Bolivia; El Moreno, North of Humahuaca, Yavi, Villazon.

Culture.

It is current practice among amateurs to graft *Punas* on one or the other understock, in order to accelerate the development and flowering. It is an artifice to which I do not like to resort, and I prefer to have patience by cultivating the plants on their own roots. A substrate of fine granules, with the addition of a little silt, is what is most appropriate for them.

PYRRHOCACTUS Berger

Body generally solitary initially flattened spherical then cylindrical. Ribs straight, strongly tuberculate. Areoles large, elliptic, woolly. Many spines, strong, often curved upwards and thickened at the base, reddish-brown to grey or black. Central spines generally 4, in a cross. Flowers apical or subapical, funnel-shaped or cupuliform, with the scales more or less abundantly furnished with wool and bristles. Fruits small, globular, dehiscent basally. Seeds generally with a rough covering; hilum oblique.

Widespread genus in the provinces of the North-West (Salta...) in the North of Patagonia. Replaced in Chile by the close genus *Neoporteria*, to which some authors would like to integrate it.

P. bulbocalyx (Werd.) Backbg.

Body light green to light glaucous green, spherical to short cylindrical, reaching 20 cm in height and 15 cm in diameter. Ribs high and rounded, 12 to 19. Areoles large, oval, around 15 × 5 mm, greyish-white to brownish. Radial spines 7-11, strong, acicular, curved, reaching up to 20 mm long. Central spines 4, grey to blackish, sometimes with a reddish tinted point, strong and curved upwards, measuring about 25 mm.

Flowers urn-shaped, inserted on the circumference of the apex; height 30-40 mm, diameter 30 mm. Ovary and tube abundantly furnished with white wool. Scales on the tube dark green with a yellow point, furnished with white wool and brown bristles, 1 cm long. External tepals yellow more



Fig. 213: *Pyrrhocactus bulbocalyx*, Los Colorados (La Rioja).

or less fire-red, especially towards the end. Internal tepals pure light yellow. All the tepals narrow and lanceolate. Throat light carmine. Filaments pale green; anthers light yellow. Style white; stigma greenish-white, with 10-12 lobes.

Area of distribution: Los Colorados, province of La Rioja.

P. catamarcensis (Web.) Backbg.

Body matt leaf-green, short cylindrical, lengthening with age to reach 40-50 cm in height and 12 cm in diameter. Ribs high, 13-17 and more, strongly tuberculated. Areoles greyish-white, rounded to oval, 7-10 × 4-6 mm. Radial spines 10-12, pinkish-grey with a brownish-red point, strong, acicular, curved, reaching up to 20 mm long. Central spines 3-4, stronger and more curved than the radials, yellowish-brown to shiny chestnut-brown, measuring up to 30 mm.

Flowers urn-shaped, height 35 to 45 mm. Ovary and tube furnished with greyish-white wool and 5-9 brownish pink bristles at the axils of the scales.



Fig. 214: Pyrrhocactus catamarcensis, Quebrada de Mazan (La Rioja).

External tepals lanceolate, light yellow tinted with pink. Internal tepals mucronate, lanceolate, golden-yellow with a brownish mucro. Filaments yellowish-white; anthers ochre-yellow. Style white; stigma yellow, with 10 lobes.

Area of distribution: North of Mendoza to the provinces of San Juan, La Rioja and in the South of Catamarca.

Kiesling was wrong when he believed that he should allot the plants from North of La Rioja (Border of Catamarca) to *P. bulbocalyx*; compare amongst other things our photographs, both taken in nature.

P. marayesensis (Backbg.) Lambert comb. nov.

Basionym: *Pyrrhocactus umadeave* var. *marayesensis* Backbg., Descr. Cact. Nov., III, p. 13, 1963.

Body light glaucous-green, finely punctured, short cylindrical, becoming longer with age. Apex flattened, woolly, covered by blackish-grey spines with a chestnut-brown base, curved towards the top. Ribs 16, straight to slightly sinuous, flattened, separated by very shallow vertical furrows, and divided into rounded tubercles merging together. Areoles oval, 6-8 × 4-5 mm, yellowish-white passing to dirty-white. Radial spines strong, erect, curved and interlaced, (7)-9-11. Central spines of same type, curved towards the top, 3-4. Colour of the spines greyish pink to pearl-grey, with a black point.

Flowers urn-shaped, in a crown around the apex; height 30 mm, diameter 35-40 mm. Ovary green, furnished with white wool and short brown bristles. Tube reddish-brown, with scales that have an olive-green extremity with a black mucro, furnished with white wool and 2-3 light brown bristles. External tepals white with a beige median band; the point with a hint of carmine and a small black mucro. Internal tepals silky-white with an old-pink base and a carmine extremity with a very small mucro. All tepals lanceolate. Throat violet-pink. Filaments white with a pink base; anthers light yellow. Style white; carmine stigma, with 12 lobes.

Area of distribution: Hills of Marayes, province of San Juan.

P. megliolii Rausch

Body simple, spherical to cylindrical, diameter 10-12 cm, and reaching 45 cm high according to Rausch. Epidermis glaucous green to greyish, furnished with a white pruinose coating, especially at the top of the plant. Apex depressed, not very woolly, covered by the spines of the neighbouring areoles. Ribs 10 to 14, straight, rounded, divided into not very prominent tubercles, and separated by moderately deep vertical furrows. Areoles large, in rounded shield-shape, 7-10 × 5-6 mm, yellowish-white passing to dirty-white. Radial spines 5-7(9), appressed, straight to more or less curved,



Fig. 215: *Pyrrhocactus marayesensis*: origin Marayes (San Juan).



Fig. 216: *Pyrrhocactus meglioli*, Origin Marayes (San Juan).

reaching 20 mm long. Central spines 1-4, erect, curved at the top, reaching 25 mm long. Young spines black, becoming gray with a black tip more or less purplish.

Flowers near to the apex, urn-shaped: height 27-30 mm, diameter 25 mm. Tube wine-red, with brownish-yellow scales furnished with white wool. External tepals lanceolate, pink, tinted a little brownish, with a small black mucro. Internal tepals lanceolate mucronate, pink with a carmine median stripe. Throat dark-carmine. Filaments white with a pink base; anthers light yellow. Style pink; stigma white, with 8 lobes.

Fruits sub-spherical, wine-red, around 10 mm diameter.

Seeds ovoid, not very compressed laterally, measuring 1.5 mm long. Testa finely warted, shiny-black; lateral hilum, oblique, depressed in a crater, with a prominent edge.

Area of distribution: Hills of Marayes (province of San Juan), where this species occurs together with the preceding one, but it prefers a quartziferous soil, whereas *P. marayesensis* seems to prefer a basaltic soil.

***P. pachacoensis* Rausch**

Body glaucous green; diameter 60-80 mm, height 90-100 mm, becoming more elongated with age. Apex weakly depressed, woolly, overhung by the spines of the neighbouring areoles. Slightly sinuous ribs, rounded, separated by shallow furrows, 13. Areoles elongated, 8 × 4 mm, yellowish-white passing to greyish-white and becoming more or less bald. Radial spines strong, appressed to erect, 9-11-(13); young spines straw-yellow with a pinkish pruinose coating, passing quickly to pearl-grey with a black point. Central spines 2-(3), erect, curved at the top, grey with a black tip, up to 32 mm long.

Flowers near the apex: height 30 mm, diameter 35-40 mm. Ovary dark green, with small scales of the same colour, furnished with white wool. Tube greenish-yellow, with elongated scales, light brown with a darker tip and black mucro, furnished with white wool and brown bristles. External tepals lanceolate, light yellow with a pink-carmine broad median stripe. Internal tepals denticulate lanceolate, pale yellow with a terminal line of pink-carmine to wine-red. Throat pale greenish-yellow. Filaments the same colour, in only one series; anthers creamy-yellow. Style white; stigma yellowish-white, with 8-10 lobes.

Fruit keg-shaped, 8 mm high and 5 mm diameter, reddish-brown, furnished with white wool and brown bristles.

Seeds of 1.7 × 1.4 mm, with black testa, warted and shiny. Lateral hilum, dirty-white to light brown, strongly recessed in a crater, conferring the seed a characteristic shape of a small snail shell.

Area of distribution: Rock slopes bordering the Rio San Juan, upstream from Pachaco.



Fig. 217: *Pyrrhocactus pachacoensis*, Pachaco (San Juan).
Photo H. Vertongen.

N.B. Some older plants can lie down on the ground in the manner of a gherkin, as with *P. umadeave*.

***P. strausianus* (K. Sch.) Berg.**

Body glaucous-green to dark-green, initially short cylindrical, but becomes column-like with age, and reaching 20 to 25 cm high. Apex a little depressed, little or no wool, covered with reddish-brown young spines. Ribs 13, straight to slightly spiralling, divided into rounded conical tubercles, acute when young, and separated by very slightly sinuous vertical furrows, growing indistinct at the base of the plant. Areoles oval, 8-11 × 4-5 mm, strongly woolly, yellowish-white passing to greyish. Radial spines 9-13, strong, straight, greyish pink with reddish base and point. Central Spines 4-6, strong, straight to more or less curved upwards, more rarely hooked, initially black, passing to grey with reddish base blackish-red point, measuring up to 25-30 mm long. Young spines reddish-brown with darker point.

Flowers around the apex; height 35 mm, diameter 45 mm. Tube light green, with dark green scales and a blackish-brown, small mucro, furnished with white wool and 4-5 transparent to yellowish bristles, with a reddish point, directed upwards or more or less towards the outside. External tepals slightly yellow orange, with a wide reddish-brown median band. Internal tepals light yellow with a darker end, slightly orange, and an indistinct central line. All the tepals lanceolate mucronate. Throat greenish. Filaments yellow slightly greenish; anthers creamy-yellow. Style yellowish-white; stigma the same colour, with 9-12 lobes, exceeding the stamens.

Area of distribution: From the South of the provinces of Mendoza and La Pampa, to the North of the provinces of Neuquen and Rio Negro.

P. strausianus* var. *sanjuanensis (Speg.) Lambert.

The northern form of *P. strausianus*, differing from the type form by the more flattened radial spines and its centrals generally more numerous, bulbous at the base.



Fig. 218: Pyrrhocactus strausianus, Manzano Historico (Mendoza).



Fig. 219: *Pyrrhocactus strausianus* var. *sanjuanensis*, road to Arrequintin (San Juan).

P. umadeave (Fric) Backbg.

Body matt glaucous-green, spherical to more or less elongated, reaching 20 cm in diameter and more. Some old plants can lengthen "like a gherkin" and lie down on the ground; I thus observed a specimen of 50 cm long and 17 cm in diameter. Apex slightly depressed, not very woolly, spineless, but overhung by the spines of the peripheral areoles. Ribs round, 16-18, divided into bulging tubercles, with chins under the areoles. Areoles elliptic, of 10-12 × 5-7 mm, yellowish passing to grey. Strong spines, not differentiated, all curved at the top, 17-19 (more with older plants), and reaching 35 mm long. Young spines straw-yellow with a brown tip, becoming greyish-pink with a darker tip. The spiny covering of the adult plants differs notably from that of the younger specimens, where it is less dense and where one distinguishes 2 to 3 central spines.

Flowers in a crown around the apex; height 30-35 mm. Tube funnel-shaped; scales furnished with white wool and 1-3 yellowish bristles of 15 mm. Tepals lanceolate, mucronate, pale yellow; the externals with a terminal median stripe of olive-green. Filaments light yellow; anthers cream. Style and stigma yellowish-white.



Fig. 220: *Pyrrhocactus umadeave*,
Puerta Tastil (Salta).

Area of distribution: Upper part of Quebrada del Toro, province of Salta

***P. umadeave* var. *marayesensis* Backbg.: = *P. marayesensis*.**

***P. vertongenii* Lambert**

Body solitary, flattened spherical, lead-grey, measuring up to 35 mm high and 55 mm diameter. The older plants can elongate, but without ever exceeding the size of a fist (approx. 10 cm). Apex slightly depressed, woolly and spiny. Roots diffuse. Ribs 8-13, slightly sinuous, separated by definite vertical furrows. Tubercles rounded, with small chins only on the higher part of plant; the transverse furrows are short. Areoles oval, relatively large, of 5-6 × 4-5 mm, initially furnished with yellowish-white wool, passing to dirty-white and becoming more or less bald thereafter. Radial spines 5-9, in 2-4 lateral pairs and with the odd spine directed towards the base, strong, with circular section, acuminate, semi-erect and not very curved, grey with



Fig. 221: *Pyrrhocactus vertongenii*, Baños La Laja (San Juan).

a black point. (Entirely black when wet). Central spine absent or single, when present, erect and directed upwards. All the spines are short, reaching to the maximum 15 mm.

Flowers near to the apex, funnel-shaped; around 40 mm long and diameter. Tube conical, olive-brown, with brown scales with a dark point and blackish mucro, furnished with abundant white wool and 3-5 black bristles, reaching 10 mm on the upper part of the tube. External tepals lanceolate and mucronate, salmon-pink with a brown broad median stripe. Internal tepals very largely lanceolate or spatulate mucronate, light yellow with a salmon-pink median stripe and carmine mucro. Throat and filaments greenish-yellow; anthers sulphur-yellow. Style light pink; stigma white, with 10 lobes.

Fruit keg-shaped, reaching up to 17 mm high and 14 mm diameter, dark-brown to blackish, covered with scales with a black point, and furnished with white wool and blackish bristles.

Seeds in snail shell form, around 1.7 mm long and 1 mm broad. Testa black, warted, moderately shiny, mainly largely covered with the remainders of the aril; hilum lateral, recessed, rounded to weakly oval, white.

Area of distribution: Baños La Laja (San Juan).

***P. villicumensis* Rausch**

Plant slightly higher than wide: 65-80 mm high, 55-70 mm in diameter. Root napiform. Epidermis lead grey to slightly greenish. Ribs 7-11, rounded, separated by shallow vertical furrows, straight to slightly sinuous.

Tubercles conical, flatter at the base of the plant. Areoles oval, dirty white to greyish, $7 \times 4-5$ mm. Young spines black with a reddish base, quickly becoming grey. All the spines strong, erect, frequently difficult to define as radial or central. Radial spines 8-10, pinkish grey, up to 17 mm long. Central spines 2-3, darker, up to 20 mm, erect upwards near to the apex, then lateral, straight to slightly curved.

Flowers on the apex: 30 mm high, 35-40 mm in diameter. Tube light olive-brown, densely covered with darker scales that have a small blackish mucro. Abundantly furnished with white wool at their axil, plus 2 black bristles with a brown base at the upper scales. External tepals lanceolate, yellowish brown with a reddish brown median stripe and a carmine extremity, with a small black mucro. Internal tepals lanceolate, light yellow with a pinkish median stripe. Throat brownish green. Filaments greenish yellow; anthers yellow; stigma white, with 10-12 lobes.

Area of distribution: Sierra de Villicun and close surroundings, province of San Juan.

Culture.

Pyrrhocactus appreciate a well drained ground, of finely granular texture, predominantly mineral. They will need a quite sunny site, and should be watered moderately, as an excess of water can be fatal for them. The growth is slow, but flowering is obtained easily after a few years. The reproduction by seed does not offer particular difficulties.



Fig. 222: Pyrrhocactus villicumensis, North of Albardon (San Juan)

REBUTIA K. Sch.

Plants of small size, spherical, flattened spherical or cylindrical, solitary to offsetting. Ribs straight or spiralling, divided into rounded or hexagonal tubercles. Areoles small, rounded or elongated. Spines straight, acicular to bristly, appressed to erect, often pectinate; distinction between radial and centrals not always possible. Flowers implanted laterally or at the base of the plant, more often funnel-shaped, exceptionally bell-shaped; scales of the tube naked, woolly, or furnished with wool and bristles. Fruits small, globular, the wall becoming papery at maturity. Seeds black or brown; testa papillose, matt or shiny; large basal hilum.

Widespread genus in the North-West of Argentina and the South of Bolivia.

Buining and Donald subdivided the genus in six sections and sub-sections. I will retain only three main categories, as follows:

Rebutia: Plants spherical or flattened, exceptionally cylindrical. Roots fibrous or napiform. Ribs straight to spiralling, little developed. Flowers funnel-shaped; scales of the tube naked or slightly woolly, but always deprived of bristles. Style and filaments free to partially coalescing with the wall of the receptacle. Flowers self-fertile or not.

Aylosteria: Body flattened to cylindrical. Roots fibrous or napiform. Flowers funnel-shaped, receptacle thin and cylindrical; scales of the tube furnished with wool and bristles. Style and filaments coalescing with the wall of the receptacle on all its height. Often self-fertile flowers.

Digitorebutia: Body sub-cylindrical to cylindrical. Napiform root. Ribs straight to spiralling, divided into small rounded tubercles. Spines of variable length, acicular to bristly. Flowers funnel-shaped; scales on the tube always woolly, sometimes with bristles. Style and filaments free or coalescing with the whole or part of the wall of the receptacle. Flowers self-sterile.

The membership of the species to one or the other group will be indicated respectively by the letters R, A, or D, between brackets.

R. (R) aureiflora Backbg.

Body dark glaucous green, sometimes tinted brown, flattened spherical; diameter can reach 50 mm in adult plants, which are proliferating. Ribs spiralling, 8/13 when young, passing later to 13/21, divided into conical rounded tubercles. Areoles yellowish, of 1.5×1 mm. Radial spines fine, white, appressed, 11 to 17; length 5-7 mm. Central spines 2-3, fine, erect, transparent to yellowish, with a light brown tip, reaching 30 mm long.

Flowers lateral, established very low; height and width around 35 mm. Tube light beige, with the scales initially carmine, then brown, furnished with white wool, especially abundant on the ovary. The scales lengthen



Fig. 223: Rebutia aureiflora.

progressively to the external tepals, which are salmon-pink. Internal tepals brilliant orange. The tepals are spatulate mucronate to nearly lanceolate. Throat white. Filaments white; anthers lemon-yellow. Style free, light green; stigma white, with 6 papillose lobes.

Area of distribution: Quebrada del Toro (Salta).

The colour of the flowers is sometimes yellower, sometimes redder, and the aspect of the spines is also extremely variable. From where the description of a certain number of varieties and forms, is more or less justified. However Rausch was wrong when he wanted to bring *R. aureiflora* back to the rank of variety of *R. einsteinii*, with which it grows together in some places.

There is of course an intermediate form, widespread under the name of *Mediolobivia spiralisepala*, but it is probably a hybrid.

R. (D) christinae Rausch

Body glaucous green; height 25-30 mm, diameter 35 mm, offsetting. Apex depressed, spiny. Spiralling ribs, 12 to 16, separated by shallow vertical furrows, and divided into low tubercles merging together. Areoles oval, brown, around 1 × 2 mm. Spines 14-16, appressed to erect, acicular and interlaced, white to brownish-white, reaching up to 7 mm long. No well differentiated central spines.



Fig. 224: *Rebutia christinae*.

Flowers lateral: height 35 mm, diameter 30 mm. Ovary brownish-pink, with olive-green scales and abundant white wool. Tube brownish-pink, with olive-green scales with a darker point, furnished with a little white wool. Scales lengthening at the top of the tube passing progressively to the external sepals. The latter initially olive-green with a pinkish border, then red with an olive-green median band. Internal tepals shiny red. All the tepals spatulate. Throat pale greenish-white. Filaments iridescent; anthers yellow. Style green, coalescent with the tube to the base; stigma yellowish-green, with 7 lobes.

Area of distribution: Area of Nazareno, province of Jujuy.

R. (D) digitiformis (Backbg.): = **R. pygmaea**.

R. (D) einsteinii Fric ex Backbg.

Body dark green strongly tinted with purple, cylindrical; height 55 mm, diameter 22 mm. Ribs 10, spiralling, divided into relatively low rounded tubercles. Areoles oval, brown, not very woolly, of 1-2 mm. Spines white to greyish, appressed, 1-2 mm long, 11. No central spines.

Flowers lateral, reaching 10 mm high and wide and fully opening. Ovary and tube greenish-brown. Ovary with bronzed scales with a shiny black



Fig. 225: *Rebutia einsteinii*: origin Las Cuevas-Cachinal (Salta).

point, and small white wool tufts. Tube with more elongated scales and a shiny black point, and a little white wool. No bristles. External tepals lanceolate, pale green with a brown wide median band. Intermediate tepals spatulate, pale yellow with a brownish-green median band. Internal tepals spatulate with a small mucro, orange yellow with a green stripe on the external face, becoming paler whilst opening more. Throat pale greenish-white. Filaments orange with a white base; anthers cream. Style green; stigma greenish-white, with 7 lobes.

Area of distribution: Quebrada del Toro, province of Salta

R. (R) fabrisii Rausch

Body fresh leaf-green; heads very small, 16-18 mm diameter and 20-30 mm high, strongly offsetting. Apex weakly depressed, more or less spiny, with a little wool. Ribs straight to spiralling, 13 to 17, divided into rounded and conical tubercles. Areoles white, rounded to slightly oval, of less than one millimetre. Radial spines fine, appressed, white, 11 to 15, not exceeding 3 mm long. Central spines 2-4, erect, brown, short: around 2 mm.

Flowers lateral, established at the bottom of the plant; height 20 mm, diameter 28 mm. Tube light green to slightly brownish, glabrous, with the scales of the same colour and a point a little darker. The scales, short and



Fig. 226: Rebutia fabrisii.

green on the ovary, lengthen and become more brownish on the tube. External tepals lanceolate mucronate, pink with a green median stripe. Internal tepals spatulate, sometimes weakly indented, of a brilliant cherry-red. Filaments pink with a white end; anthers yellow. Style yellowish-white; stigma white, with 5-8 lobes.

Area of distribution: Region of Valle Grande - Santa Ana, province of Jujuy.

The plants serving as a basis for present description come from the stock collected by Mats Winberg under his number MN-126. By some of the characteristics (very small heads, short spines...), they seem to be intermediate between the typical form and the variety *nana*.

R. (D) haagei Fric & Schelle: = **R. pygmaea**.

R. (A) jujuyana Rausch

Body leaf-green; height 60 mm, diameter 55 mm, strongly offsetting with age to form compact tufts. Apex spiny. Ribs spiralling, 13/21, divided into rounded relatively low tubercles. Areoles oval, yellowish-white, 3 × 2 mm. Radial spines fine, white, radiating to semi-erect, overlapping, around 25, measuring up to 12 mm long. Central spines 1-3, yellowish-white with a brown point, erect, flexible, reaching 30 mm.



Fig. 227: *Rebutia jujuyana*: origin Termas de Reyes (Jujuy).

Flowers lateral; height and diameter 40 mm. Ovary strongly woolly. Tube greenish-yellow, with green scales furnished with a little white wool and some bristles of the same colour. Tepals spatulate, orange-red, with a more intense median band. Filaments white to rosy; anthers light yellow. Style yellowish-white; white stigma, with 6-8 lobes.

Area of distribution: Quebrada de Humahuaca in the South of Santa Victoria; provinces of Jujuy and Salta.

R. (A) *kieslingii* Rausch

Body green slightly bluish; height 15 mm, diameter 25 mm (reaching 40 mm). Apex depressed umbilicate, non-woolly, covered by the spines of the neighbouring areoles. Ribs spiralling, 8/13, divided into rounded conical tubercles. Areoles brownish white, of less than 1 mm, 4-5 mm apart. Radial spines fine, white, 17-25, around 3-5 mm long. Central spines 1-2, erect, light brown.

Flowers lateral, established at the base of the plant; height 35 mm, diameter 35-40 mm. Tube reddish-brown, with a few greenish-grey to brownish scales, very little white wool, and some bristles. External tepals rounded, denticulate, orange very largely tinted with greenish-grey. Internal tepals denticulate, shiny orange. Throat white. Filaments white to pink; anthers cream. Style yellowish-white; stigma white, with 5-8 papillose lobes.

Area of distribution: Area of Caspala, province of Jujuy.



Fig. 228: Rebutia kieslingii.



Fig. 229: Rebutia marsoneri.

R. (R) marsoneri Werd.

Body dark olive-green; height 20-30 mm, diameter 25-40 mm. Ribs 16, spiralling, divided into rounded tubercles. Areoles oval, white, 1×1.7 mm. Radial spines fine, white, radiating to semi-erect, 13, reaching 3-4 mm long. Central spines 1-2, little differentiated.

Flowers lateral, established very low; height 30 mm, diameter 35 mm. Ovary light red; tube pink, with violet scales, glabrous. External tepals yellow with a red median band. Intermediate and internal tepals golden-yellow; the former a little wider, the internals lanceolate, all mucronate. Filaments light yellow; anthers white. Style yellowish-white; white stigma, with 6 lobes.

Area of distribution: province of Jujuy.

R. (R) minuscula K. Sch.

Body spherical flattened, 35-60 mm in diameter and 20-40 mm in height. Initially solitary, then offsetting. Epidermis light green. Apex depressed, spineless, not very woolly. Ribs spiralling, 13/21, divided into rounded tubercles, separated by sinuous vertical furrows. Areoles white, round, 1-1.5 mm in diameter. Spines fine, bristly, erect, white to pale yellow, 20 to 30, reaching 8 mm long.

Flowers lateral; height 20-30 mm, diameter 30-35 mm. Tube pale pink, with violet scales, glabrous. Tepals lanceolate, shiny scarlet red with a slightly orange border. Throat light yellow. Filaments yellow; anthers creamy-yellow. Style pale pink to yellowish, entirely free; white stigma, with 4-5 lobes.

Area of distribution: Sierra de Medina, province of Tucuman.

R. (D) mudanensis Rausch

Body leaf-green, darker at the top of the tubercles. Subspherical form; diameter 3-4 cm; little offsetting. Apex recessed, covered with interlaced spines. Ribs spiralling, 13-14, divided into polygonal rounded tubercles. Areoles oval, around 1×0.5 mm, furnished with brownish wool. Radial spines white to slightly transparent, 11-13, reaching 5 to 10 mm long. Centrals absent. (Sometimes 1, the lower smaller than 1 cm?)

Flowers lateral; height 30-35 mm, diameter 35 mm. Ovary light brown, with brown scales at the base and a blackish-green point, and rather abundant white wool. Tube salmon-pink, with greenish-orange scales with a blackish green point, and much sparser wool. External tepals lanceolate, salmon-pink with a median stripe of olive-green. Internal tepals spatulate, mucronate, more orange. Throat bright. Filaments white to pink; anthers light yellow. Style green; stigma white to yellowish-green, with 5-6 lobes.



Fig. 230: Rebutia minuscula.



Fig. 231: Rebutia mudanensis.



Fig. 232: *Rebutia pseudodeminuta*.

Area of distribution: Cerro Mudana, Santa Ana, province of Jujuy.

Considered later by Rausch as a variety of *Rebutia pygmaea*.

R. (A) *pseudodeminuta* Backbg.

Body spherical to cylindrical; diameter 25-30 mm, height 20-35 mm (can reach 10 cm), offsetting. Epidermis dark green, tinted with a little purple. Ribs spiralling, 11, divided into rounded tubercles, separated by sinuous furrows. Areoles oval, of 1 × 1.5 mm, yellowish-white. Radial spines white, radiating, 9-10, not measuring more than 5 mm. Central spines 2-3, brown very bright at the base and reddish-brown point.

Flowers lateral, funnel-shaped; height 30 mm, diameter 25 mm. Ovary and tube light brown mixed with a little pink. Ovary furnished with white wool; tube little or not woolly. Scales olive-green to light brown. External tepals carmine. Internal tepals fire-red, with a median stripe of carmine, especially on the external face. All tepals spatulate, with a small mucro. Filaments white to pink; anthers yellow. Style greenish-white; Stigma yellowish-white, with 6 lobes.

Area of distribution: South of the province of Salta (Antilla) to Bolivia.

R. (D) *pygmaea* (Fries) Br. & R.

Heads tiny, of 12 mm in diameter, hardly exceeding the ground by more than a centimetre, (reaching in culture 35 mm in height and 15 mm in



Fig. 233: *Rebutia pygmaea*, Cuesta de Toquero (Jujuy).

diameter), dark green slightly tinted with bluish grey. Napiform root of 8-9 cm long. Plants solitary or in clumps (offsetting). Ribs straight to more or less sinuous, 11, divided into conical rounded tubercles. Areoles oval, brown, very small, around 1×0.5 mm. Spines, short (3-4 mm), tangential, radiating, with a brownish base, 9-11.

Flowers inserted laterally at the base of the body; height 35 mm, diameter 35 mm. Very variable colours. Ovary pale pink to brown. Tube pink to light brown, with elongated scales, pale olive-green with a blackish-green point; a little white wool. External tepals pink with a median stripe of brownish-green. Internal tepals varying from salmon-pink with a brighter median band, to shiny glossy red. (Variability going from pink to scarlet, and even to mauve). Tepals sometimes lanceolate, sometimes spatulate. Throat olive-green, light yellow or pink. Filaments white to pink; anthers light yellow. Style green; stigma light green, with 6 lobes.

Area of distribution: North of the province of Jujuy to the South of Bolivia.

Considering the great variability of the flower colours, a whole series of this species have been described as varieties, whose status does not seem always to be justified.

R. (R) senilis Backbg.

Body light leaf-green, flattened spherical; diameter 38 mm, height 28 mm, reaching 7-8 cm, offsetting. Apex spiny. Ribs spiralling, 15, divided



Fig. 234: *Rebutia senilis*.

into rounded papillose tubercles, relatively low. Areoles rounded to slightly oval, at 2×1.5 mm, furnished with white wool. Spines white, erect, 14-15 and more, measuring up to 10-12 mm long.

Flowers lateral being borne from the base of the plant; height 35 mm, diameter 35 mm. Tube orange red, glabrous, with violet scales, pointed. Tepals shiny red, lanceolate. Filaments orange yellow; anthers cream. Style light yellow; white stigma, with 6 lobes.

Area of distribution: From the Cuesta del Obispo to the area of Cachi, province of Salta.

R. (A) spinosissima Backbg.

Body flattened spherical to spherical, light leaf-green, measuring up to 40 mm in diameter; offsetting. Apex depressed, not very woolly, spiny. Ribs spiralling, 8/13, divided into conical tubercles. Areoles of 1×1.5 mm, furnished with white to light brown wool. Radial spines fine, radiating, white, 20-25, reaching 5 mm long. Central spines 5-7, erect, with a brown point.

Flowers lateral; height 30 mm, diameter 32 mm. Tube pink, with light green scales, with very little white wool. Base of the perianth yellow. External tepals initially greenish, then pink with a green median band, spatulate mucronate. Internal tepals fire-red, spatulate, denticulate and mucronate.



Fig. 235: *Rebutia spinosissima*: origin Campo Alegre (Salta)



Fig. 236: *Rebutia violaciflora*.

Filaments rosy white; anthers light yellow. Style whitish; stigma white, with 5 papillate lobes.

Area of distribution: From the border of Salta and Jujuy provinces up to Bolivia.

R. (R) violaciflora Backbg.

Body light glaucous green, 35-40 mm in diameter and 20-25 mm high; offsetting. Apex depressed, spineless, little or no wool. Ribs spiralling, 20, divided into rhomboidal tubercles. Areoles yellowish-white, oval, of around 1 × 2 mm. Spines fine, bristly, erect, pale-yellow, around 20, measuring 4 mm and more.

Flowers lateral; height 30-35 mm, diameter 25-30 mm. Tube carmine-pink, glabrous, with violet scales. Tepals lilac-pink to mauve, spatulate, more or less indented, with a tiny mucro. Filaments pink; anthers yellow. Style pink, entirely free; white stigma, with 6 lobes.

Area of distribution: South-West of the province of Salta.

R. (R) wessneriana Bew.

Body leaf-green, spherical; height 20 mm, diameter 36 mm. (older plants reach 7 cm and more in diameter). Apex strongly depressed. Ribs spiralling, 16, divided into conical rounded discontinuous tubercles, without furrows.



Fig. 237: *Rebutia wessneriana*: origin road to Tiraxi (Jujuy).

Areoles yellowish-white, oval, around 0.6×1 mm, 4 mm apart. Spines, more or less transparent, partially with a brown point, fine, semi-erect, radiating, from 25 to 30 per areole. Length 5 mm, but reaching 2 cm on the older plants.

Flowers inserted very low; height 30 mm, diameter 35 mm. Tube light red, glabrous, with violet scales. Tepals lanceolate, with a small mucro, fire-red with a more cherry-red point. Stamens in two series, long outside, and shorter in the centre. Filaments red; anthers light yellow. Style pink, free ; white stigma, with 3-4 lobes.

Area of distribution: Province of Jujuy.

R. (R) xanthocarpa Backbg.

Body globular, 40 to 50 mm in diameter and 35 to 45 mm high, leaf-green, offsetting. Root napiform. Spiny, non-woolly apex. Ribs spiralling, 20 to 23, divided into polygonal rounded relatively low tubercles, forming a honeycomb structure. Areoles oval, white, 1×2 mm, 6 mm apart. Radial spines fine, white, hyaline, erect and radiating, 13 to 17, measuring up to 8 mm long. Central spines 1-2, with reddish base.

Flowers lateral, generally inserted very low; height 30 mm, diameter 25 mm. Ovary greenish-yellow. Tube light yellow, narrow, glabrous, with elongated brown scales. Tepals lanceolate, vermilion-red. Throat lighter, passing to greenish at the base. Filaments yellowish-white, sometimes slightly



Fig. 238: *Rebutia xanthocarpa*: origin El Mollar (Salta)

pinky; anthers creamy-yellow. Style white with a green base; stigma white, with 3-4 lobes.

Fruit globular, greenish passing to yellowish.

Area of distribution: Quebrada del Toro and Quebrada de Escoipe, province of Salta.

It is sometimes called "*R. senilis* with small flowers", even if several characteristics make it possible to unambiguously distinguish it from that species.

Culture

Rebutias rightly appear amongst the most popular cacti; they offer all the possible advantages for the amateur. Not posing particular requirements, remaining of modest size (clumps attain a maximum of 15 to 20 cm with age), they flower quickly (as of 2 years of age) and abundantly, offering a superb active palette of white to yellow and red, while passing to the delicate nuances of pink and orange. They appreciate a light ground, humus-bearing but well drained, and placed where there is fair sunshine; watered liberally in summer, one will on the other hand keep them dry in the winter, which will confer on them a good resistance to the cold. Many species are self-fertile, and reproduction by seed is obtained easily. However, one should avoid leaving the seeds too long, which rather quickly lose their germinating capacity.

REICHEOCACTUS Backbg.

See *Lobivia famatimensis*.

RHIPSALIS Gaertner

Plants generally growing as epiphytes, but occasionally also in humus-bearing ground or along rocks, with a generally pendant habit. Presence of aerial roots; always fibrous roots. Segments of variable shape, short or very long, of cylindrical section, angular or flattened. Areoles with tiny scales sometimes glabrous, sometimes furnished with wool and bristles. Flowers generally solitary, small, opening for 1 to 8 days. Tepals very few; stamens in one or two series; stigma with a small number of lobes. Tube reduced or null. Fruit globular, sometimes angular when young, succulent to viscous, white to dark, generally glabrous. Seeds small, brown black, very few.

Genus extremely widespread in the wooded areas more or less humid, of the South of the United States, through Central America and the Antilles, as far as South America, where it reaches its limit in the North of Argentina

and in Uruguay. Also represented in the Old World, in Western and southern Africa and in Ceylon.

R. lorentziana Gris.

Plants with a drooping habit of several metres of overall length, more or less branching. Foliaceous segments, indented, 10 to 30 cm long and 2 to 1 cm wide, light green. Some segments are flat, without ribs, but the majority carry 3 very flattened ribs 10-15 mm in height. Areoles with a little tuft of white wool; no spines or bristles.

Flowers isolated (only one per areole), small, a total height (ovary included) around 15 mm, and a diameter of 7 mm. Ovary light green, with 4 ribs, glabrous, 6 × 4 mm. External tepals with a greenish median stripe and a border tinted with brownish-pink; internal tepals white. All tepals narrowly spatulate. Filaments and anthers white. Style greenish-white, tinted with a little pink at the end; stigma creamy-white, with sometimes a hint of brownish, with 4 thick and papillose lobes.

Fruit globular, with 4-5 ribs, becoming crimson to blackish at maturity. Seeds small, spindle-shaped, around 1 mm long, brown and shiny.

Area of distribution: Provinces of Salta, Tucuman, and Catamarca,

R. lumbricoides (Lem.) Lem.

Species bushy, strongly branching, able to reach more than a metre long, with many aerial roots clinging to the bark of trees or among mossy tufts.



Fig. 239: *Rhipsalis lorentziana*, origin Dique de Escaba (Tucuman).

Segments thin, cylindrical to slightly angular, of a diameter from 4 to 8 mm and 15-30 cm long, yellowish-green to greyish-green finely dappled with paler stains. Areoles very small, 12 mm apart, with a little tuft of yellowish-white wool and a very short white spine, at the top of a little scale.

Flowers lateral, rotate, 14 mm high and 10 mm in diameter. Ovary elliptic, glabrous light greenish-brown, mixed with pink-carmine. External tepals white with a wide carmine pink median stripe; internal tepals pure white. All the tepals lanceolate. Filaments and anthers white. Style yellowish-white to pinkish; stigma pure white, with 4-5 strongly papillose lobes.

Fruit globular, initially green, passing to brownish then to dark purple. Seeds fusiform, light brown.

Area of distribution: From Uruguay to Argentina; provinces of La Plata, Buenos Aires, Entre Rios, Corrientes, Misiones, Chaco, Santiago del Estero, Cordoba, Catamarca, Tucuman, Salta and Jujuy.

Culture

Considering their specialized niche *Rhipsalis* demands a soil rich in humus, definitely a higher moisture level than that of the majority of cacti, and a not too sunny exposure. One should avoid exposing them to temperatures lower than 10° C in winter.

These are plants of fast growth, and one will be better able to appreciate the drooping habit by cultivating them in suspended pots.

The reproduction by seed does not offer any difficulty.



Fig. 240: *Rhipsalis lumbricoides*, origin El Típal (Tucuman).

SETIECHINOPSIS (Backbg.) De Haas

Monotypic genus of dwarf cereoid plants, night flowering. Flowers and tube are long and thin, with scales prolonged by bristles. Stamens in one series. Style short. Plants self-fertile. Fruit claviform to ovoid; seeds blackish brown.

S. mirabilis (Speg.) De Haas

Body dark brown mixed with greenish, lighter at the top of the tubercles; height 60 mm, diameter 22 mm. (able to reach 15 cm in height). Epidermis finely punctuated. Ribs 12, slightly sinuous, rounded, divided into rhomboidal tubercles higher than wide. Areoles white, oval, around 1×2 mm, becoming smaller at the base of the plant, but without becoming completely bald. Radial spines 9, radiating, white, established at the lower half of the areole. Central spine 1, erect, measuring up to 13 mm. Young spines initially black, passing to brown, then white with a brown point.



Fig. 241: Setiechinopsis mirabilis.

Flowers near the apex; height 125 mm, diameter 55 mm. Tube light brown, very thin, with a diameter of 5 mm at the base and 3 mm at the upper part. Scales small, olive-green, furnished with white wool, and ending in a black bristly spine with a white base, 6 mm long. External tepals narrowly lanceolate, olive-green with a long black mucro and a white base. Intermediate tepals lanceolate, white with a green median stripe and extremity tinted with reddish under the mucro. Internal tepals lanceolate, pure white. Stamens in one series. Filaments white; anthers cream. Style white, short, deeply hidden in the tube. Night flowering; Flowers unscented.

Fruit ovoid to spindle-shaped, 35 × 13 mm, shiny dark brown, with remainders of the flower attached to the upper part. Areoles with small yellowish-white scales, white wool and a bristly spine with a flattened base, white with a black point.

Seeds sub-spherical, 15 mm in diameter.

Area of distribution: Discovered originally in the region of Ceres, to the limit of the provinces of Santiago del Estero and Santa Fe, the species seems to have disappeared (or became extremely rare) following the clearing for agriculture. However it was found in several places in the provinces of Catamarca, La Rioja, and even Mendoza.

Spegazzini as well as Britton & Rose describe the flower of this species as odourless, whereas Backeberg maintains that it is strongly scented. Personally, I did not detect any perfume; besides one does not see why an autogamous species would develop any means to attract pollinating agents.

Culture

Plants not posing any problem, flowering abundantly from its second year, and reproducing easily by seed.

SOEHRENSIA Backbg.

See *TRICHOCEREUS*.

STETSONIA Br. & R.

Monotypic genus of plants arborescent cereiform, strongly branched, forming a well differentiated trunk. Large funnel-shaped flowers, with a relatively thin and curved tube, with mucronate scales. Tepals lanceolate, pointed.

Genus spread in low and average altitude in all the North West of Argentina.

S. coryne (S-D) Br. & R.

Arborescent plants reaching 5 to 8 meters in height, with a relatively short and thick trunk, reaching up to 50 cm and more in diameter at the base. Many branches around 3 metres long and 15 cm in diameter. Epidermis glaucous green. Ribs fairly high (1-1.5 cm), rounded, 9. Areoles oval, 10 × 5 mm, white, becoming bald thereafter. Radial spines 5-7-(9), strong, radiating semi-erect, measuring up to 3 cm long. Central spine 1, erect, reaching up to 5 cm long. Young spines brownish-yellow, passing to dirty-white then grey with a black point.

Flowers lateral, borne at the base of the branches as well as near the extremity of the branches; height 12-15 cm. Ovary densely covered with white-edged scales, recalling a covering of tiles. Tube light olive-green, naked, with rounded mucronate scales with a white edge. External tepals



Fig. 242: Stetsonia coryne, road to El Barreal (La Rioja).

white with a wide olive-green to brownish median band. Internal tepals pure white. All the tepals lanceolate, internals narrower. Throat light green. Stamens in one series. Filaments white; anthers creamy-white. Style very pale green; stigma of the same colour, with 16 lobes of 20 mm long.

Fruit globular, 30 × 35 mm, light green to dark green, covered with rounded flattened scales with a white mucro.

Seeds small, black, in the shape of comma or shell of a snail.

Area of distribution: Species very widespread in the low regions of the provinces of Salta, Catamarca and La Rioja, as in the North of Cordoba. Often in partnership with *Cereus forbesii* and *Opuntia quimilo*.

Culture

Considering its great dimensions, it will of course not be possible to bring the species to complete development in an amateur's greenhouse. Young plants, very decorative with their dark green epidermis, their white areoles, and their spines of various colours, can nevertheless be cultivated without difficulty, preferably in the open ground.

TEPHROCACTUS Lem.

Plants with loose branches, formed of superimposed segments, with the articulations often fragile. Segments globular to cylindrical, with a rough epidermis, gray, brown or dark-green. Tubercles circular or wider than high. Areoles inserted in a small cavity at the top of the tubercles, spineless or spiny. Glochids always present. Conical leaves, quickly caducous. Rotate flowers, solitary. Pericarpel in a reversed cone or globular, green or greyish, with areoles regularly implanted. Areoles in a small cavity, with a tuft of reddish glochids; the upper with spines in addition. Style spindle-shaped or as reversed club; Stigma with very few lobes, short and thick, papillose. Tepals white or pink, more rarely yellow or red, with pearly reflection. Stamens sensitive. Fruit dry, dehiscing by irregular fissuration of the pericarpel. Seeds surrounded by a spongy aril with two lateral auricles.

Genus exclusively Argentinean, it is encountered on the plain or hillsides between 500 and 2500 metres, in very dry sandy or stony places. Provinces of Salta, Catamarca, West of Tucuman, La Rioja, Santiago del Estero, Cordoba, San Juan, San Luis and Mendoza.

T. alexanderi (Br. & R.) Backbg.

Loosely branching tufts able to reach 50 cm wide and high, but generally remaining smaller. Segments numerous, globular, of 3 to 5 cm in diameter, tubercled, fragile, coloured light-green or ashy. Areoles at the top of the tubercles, grey, round, around 3-4 mm in diameter. Spines 4 to 14 (20),



Fig. 243: *Tephrocactus alexanderi*, Señor de la Peña (La Rioja).

including 1 to 6 smaller, transparent, appressed, 1-2 cm long; the others stronger, straight to slightly curved, 2-4 cm, white (at the lower areoles) to grey or bluish. Glochids pinkish-yellow, around 2 mm long, many in the centre of the areole.

Flowers large, white to pink, 5-7 cm in diameter at the full opening. Pericarpel leaf-green, of 1.5 cm in diameter and 2 cm in height, in a reversed cone. The areoles of the pericarpel small, only covered with glochids on the lower, and in addition the upper with 6-7 spines with a brown point. External tepals scaly, small, triangular, olive-green with a brown point. Intermediate tepals white with an olive-green median stripe and small brown mucro. Internal tepals widely spatulate, indented, white with a pink median band. Filaments white; anthers golden-yellow. Style white, spindle-shaped, 2 cm long; stigma white slightly greenish tinted, with 5-6 lobes of 2 mm.

Fruit cylindrical, more or less in a reversed cone, 2.5 × 1.5 cm, ash-green, with the lower areoles spineless, and the upper carrying from 2 to 5 small transparent to white spines, 1-2 cm long.

Many seeds, coated with an aril of corky consistency, very light brown, of 5-6 mm in diameter and 3 mm thick.

Area of distribution: Provinces of Catamarca, La Rioja, San Juan and North West of San Luis.

T. aoracanthus (Lem.) Lem.

Branching tufts reaching 30 cm in height. Segments fragile, globular, of



Fig. 244: *Tephrocactus aoracanthus*, San Juan.

5-8 cm in height and slightly less wide, with very apparent tubercles, forming a network of more or less regular rhombuses, the epidermis greyish or pale greyish-green. Areoles established at the top of a small conical protuberance, furnished with white to transparent wool, seldom brown in the centre. Glochids long, around 4-5 mm, yellowish to brown, concentrated in the centre of the areole. Basal areoles spineless, 2-3 mm in diameter; the upper definitely larger, reaching up to 6 mm in diameter, and carrying from 1 to 7 strong spines of 1 to 6 cm long, rigid to slightly flexible, whitish to brown, the base and point often blackish. No secondary spines.

Flowers rotate, white to pink, 5-6 cm in diameter. Pericarpel greyish, in a reversed cone, around 3 cm in height and 2 cm in diameter. Areoles of pericarpel with many glochids, the upper with some dark spines in addition. Tepals widely spatulate, mucronate, white or rosy, with a rigid and brown mucro. Stamens sensitive. Filaments white; anthers yellow. Style claviform, white; stigma whitish, with 8 lobes.

Area of distribution: Provinces of San Juan, La Rioja, West of Cordoba and North of Mendoza.

T. aoracanthus* var. *paediophilus (Cast.) Lambert comb. nov.

Basionym: *Opuntia paediophila* Cast., Lilloa, 23, 7, 1950.

Is distinguished from the type form by the spines less rigid and very sinuous, without a dark point, and much longer.

It is a form which I observed in the area of Chepes (South of La Rioja.)

T. articulatus (Pfeiff.) Backbg.

Plants in the shape of dwarf shrubs, reaching 40 cm in height, forming a "Trunk" from 1 to 3 principal sub-spherical segments of around 40 mm in diameter; segments of the branches globular to ovoid or cylindrical, around 30 mm in diameter. Epidermis matt, greyish-green to brownish, with a network of tubercles quite apparent, in diamonds wider than high. One or the other areole with an occasional spine, short, flattened and appressed, but the great majority of the areoles without spines, furnished with short whitish wool and a crown of reddish-brown glochids.

Flowers rotate, with a diameter of 60 mm and a height of 40 mm. Pericarpel elongated cupuliform, the same colour as the segments, and covered with similar tubercles and areoles. Perianth very widely open. External tepals short, greenish-white with a greyish-green wide median band, extremity tinted with a little red, and a small blackish mucro. Intermediate tepals white with a light green median band; internal tepals pure white. All tepals widely spatulate, the intermediaries and internals indented in their middle. Throat light green. Filaments white; anthers shiny yellow. Style in a reversed club, yellowish-white; stigma white, with 4-6 lobes of 3-4 mm.

Fruit dry, globular or more or less in a reversed cone, becoming pinkish at maturity.

Seeds comma-shaped, brown; aril more or less lenticular, with an auricle on each side.

Area of distribution: Provinces of Catamarca, La Rioja, San Juan and the West of Cordoba, up to those of San Luis and Mendoza.

T. articulatus var. oligacanthus (Speg.) Backbg.

Segments globular to ovoid, never cylindrical; those of the "trunk" around 45 mm in diameter, those of the branches around 35 × 25 mm. Epidermis matt, more or less pruinose, glaucous-green. Tubercles conical, more prominent than with the type form. Lower areoles spineless, only the upper carrying the characteristic spines, papery and elastic, whitish, 1 to 5 per areole. Wide around 4 mm, they sometimes measure 4 to 15 cm long. One observes sometimes, but seldom, spines which are thicker and more rigid, of brown colour. Glochids, brown to blackish, are laid out in a crown around the areoles, whose centre is occupied with whitish wool. Segments of this variety are very fragile and are easily detached.

Other characteristics as with the type form.

Area of distribution: As for the type form, but extending somewhat more to the North, in Valles Calchaquies (Province of Salta).

Form very prized by amateurs, in particular because its spines are very decorative.



Fig. 245: *Tephrocactus articulatus*, Nanogasta (La Rioja).

T. geometricus (Cast.) Backbg.

Clumps 15 cm high and 25 cm in diameter. Segments sub-spherical, ovoid to slightly flattened, reaching up to 50 mm in diameter; colouring varying from olive-green to brownish-red. Tubercles pentagonal to regular hexagonal. Areoles white, small (1-2 mm), the lower only with glochids, upper with 3-7 spines, erect when young, quickly becoming appressed and directed downwards; the odd spine generally longer, able to reach 18 mm. Colouring of the spines generally brown with a dark point, but able to vary from whitish to blackish. (Black spines on the older plants).

Flowers 45-50 mm high and 55-60 mm in diameter. Pericarpel in reversed cone, 15-20 mm high, olive-green to brownish-red, with the areoles furnished with a little white wool and yellowish glochids, and bordered at the top by some scales with a dark point and a crown of white and brown bristles. External tepals white with a wide median stripe of olive-green, darker at the point, and with the upper edge tinted with pink. Internal tepals pearly white with a pink median band. Throat greenish. Stamens sensitive. Filaments white; anthers shiny yellow. Style carmine-pink; stigma white, with 9-10 lobes strongly papillose.

One also finds white flowers, the pericarpel dark green, with only a hint of a pink median stripe on the tepals, and a white style very slightly rosy at the top.

Lastly, there exists in this species a spineless form, with the body a lighter green.

Fruit in a truncated sphere, around 20 × 22 mm, brownish-green. Upper



Fig. 246: *Tephrocactus articulatus*
var. *oligacanthus*.
Costa de Reyes (Catamarca).

edge with a crown of 10 to 12 mm bristles, white with a brown point. The upper face like a flat-bottomed crater, with a small umbilical protuberance in the centre.

Seeds comma-shaped, around 3.2 mm long; aril spongy, around 6×3.5 mm, irregular, of yellowish-brown colour.

Area of distribution: Valley of Rio Guanchin, province of Catamarca.

T. molinensis (Speg.) Backbg.

Little tufts caespitose to arborescent, 15-25 cm in diameter and up to 35 cm high. Segments of $25-45 \times 20-30$ mm, greyish-green. Tubercles conical rhomboidal, very prominent. Areoles at the top of the tubercles, with a diameter of 3.5-4 mm, deprived of spines, but with a tuft of orange to light brown glochids, surrounded by yellowish-white wool mixed with red.

Flowers around 30 mm in diameter. Pericarpel truncated ovoid, of 2×1.5 cm, with spineless areoles, and sometimes some little spines on the upper



Fig. 247: *Tephrocactus geometricus*, Rio Guanchin (Catamarca).

edge. Tepals spatulate or lanceolate, lustrous white with a pink to brownish median band. Filaments green; anthers yellow. Style greenish-white; stigma white, exceeding the stamens.

Area of distribution: Valles Calchaquies, province of Salta.

T. weberi (Speg.) Backbg.

Caespitose plants, in tufts of 20-50 cm in diameter and 10-20 cm high. Segments cylindrical, of 2.5 to 7 cm long and 1.5 to 2 cm in diameter, densely covered with spines, yellowish-green to leaf-green, divided into rhomboidal tubercles. Areoles at the top of the tubercles, the lower part vertical, narrow, and the higher circular, around $1 \times 2-3$ mm, furnished with whitish wool. Young areoles with a very small green leaf, quickly falling away. Lower spines 3-5, appressed, transparent, short (3-10 mm), the odd one directed downwards. Upper spines 2-5, erect, flexible, reaching 3 to 5 cm long, with a colouring varying from white to yellow, and reddish, the latter colour being prevalent.

Flowers apical, rotate, 25 mm in diameter and 20 mm high. Pericarpel ovoid, around 1-1.5 cm in height and wide, tubercled, with the areoles abundantly furnished with wool and carrying from 2 to 5 small spines of 2-5 mm long. Tepals spatulate, yellow to orange or red. Filaments yellow or pink; anthers yellow. Style as a reversed club, white, of around 1.5 cm long; greenish stigma, with 6 lobes.



Fig. 248: *Tephrocactus molinensis*, Palo Pintado (Salta).



Fig. 249: *Tephrocactus weberi*, San Martin (Salta).

Fruit globular, from around 1 cm in diameter, with the areoles covered with reddish glochids.

Seeds comma-shaped, 2.5×1.2 mm; aril irregularly winged, $5-6 \times 3-4$ mm, coloured yellowish-brown.

Area of distribution: Provinces of Salta, Catamarca, La Rioja, San Juan and West of Tucuman.

T. weberi var. deminutus Rausch

Is distinguished from the type form by the smaller tufts and the fewer and shorter spines.

Originating in the area of Amblayo, province of Salta.

Culture

Tephrocactus are cultivated without difficulty, either in sufficiently spacious pots, or in the open ground. A substrate finely granulous, well drained, is the most appropriate to them, and one should give them a quite sunny site if one wants to see them thriving normally. Water reasonably in summer, and keep them dry in the winter.

The growth is slow, and flowering is not always easy at our latitudes. However, certain species, like *T. geometricus* for example, flower abundantly and regularly from the age of 5 to 6 years.

TRICHOCEREUS (Berg.) Ricc.

Plants crawling to erect, low to arborescent, from 30 cm to more than 15 metres high, and from 5 to 50 cm in diameter. Body generally cylindrical, sometimes globular, with many low ribs. Roots fibrous, strongly branching, colonizing an appreciable area. Apex generally symmetrical. Areoles strongly woolly when young. Centrals and radial spines differentiated or not, generally many, flexible or rigid, with bulbous base, their length varying from a few millimetres to 15 centimetres.

Flowers lateral or apical, bell-shaped. Tube fleshy, green to greenish, with triangular thick scales, furnished with wool and sometimes with bristles to the axils. External tepals narrow, sepaloid, often bent towards the outside, of greenish or pinkish colour. Internal tepals spatulate, the upper edge sometimes rounded, sometimes denticulate and mucronate. Stamens generally in two series. Fruit globular, woolly, of yellowish, orange, or pinkish colour. Seeds blackish-brown, smooth or warty, elliptic to kidney-shaped, with a more or less oblique hilum.

Widespread genus from South of Ecuador, via Peru, Chile and Bolivia, to the North of Argentina; provinces of Jujuy, Salta, Tucuman, Catamarca, La Rioja, Cordoba, Santiago del Estero, San Juan, Mendoza, the North of Neuquen, La Pampa and the South-West of Buenos Aires.

Some have proposed the creation of a sub-genus *Soehrensia*, for the species from the high mountains with a more globular body and shorter apical flowers.

However, the quoted characteristics could hardly be regarded as determining taxonomic criteria, and even if they were, it would be extremely difficult to trace a clear boundary line, considering the existence of intermediate forms, like *T. smrsonianus* for example. Moreover, the old *Soehrensia* genus, sensu Backeberg, comprised not only globular species from altitude, but also forms belonging obviously to *Trichocereus* s.s., such as *T. formosus*...

This is why I agree here with Ritter's view, who concluded that separation into a distinct sub-genus was not justified.

Let me state finally, that according to Friedrich and Glaetzle, all the Argentinean *Trichocereus*, including the arborescent forms, are different from the Northern species by a different type of seed, which they call Group II. ("Austro-trichocereus").

T. andalgalensis (Web.) Hoss.

Caespitose plants, branching from the base. Stems cylindrical, erect attaining 80 cm long and 5 cm in diameter, with a light green epidermis. Ribs straight, flattened, 8-10 mm wide and 5-6 mm high, 14-16. Areoles oval, whitish, of 2-3 × 3-4 mm, 8-10 mm apart. Radial spines 8-12, yellowish-white, acicular and flexible. Central spines 1 to 4, brown with reddish base.

Flowers close to the end of the stems; height 10 cm, diameter 9.5 cm; fully opening. Tube green, with fleshy triangular scales, with light point, of 2 × 3 mm, abundantly furnished with yellowish wool and some brown



Fig. 250: *Trichocereus andalgalensis*, Cuesta de la Chilca (Catamarca).

bristles. External tepals lanceolate, red. Internal tepals narrowly spatulate, bright-red. Stamens in two series. Primary filaments implanted in a spiral in the tube, with the anthers in compact tufts around the style; secondary filaments in a ring at the upper part of the perianth. All filaments red; anthers yellow to cream. Style pink with a green base; stigma whitish, with 14 papillose lobes.

Globular fruit, yellow-orange, 35 mm in diameter.

Seeds black, 1×0.7 mm, with a longitudinal keel, the sub-hexagonal cells separated by a small furrow, and ends with small pores at angles.

Area of distribution: Western slope of the Sierra de Ambato (Cuesta de Chilca, Cuesta de Cebila...), Sierra de Graciana and Sierra de Ancasti, province of Catamarca. Sierra de Famatina, province of La Rioja.

T. bruchii (Br. & R.) Ritter

Body sub-spherical, with a diameter of 35 cm and a height of 30 cm (able to reach 50 cm in diameter), offsetting, forming compact clumps of one meter and more wide. Epidermis light green. Apex depressed, woolly, spineless. Ribs acute, with very marked chins, 35-50 and more. Areoles salt-white to grey, $10 \times 8-9$ mm. Spines strong, erect, yellow with a brown point. Radials 9-15; centrals of 1 to 3, reaching 35 mm long.

Flowers on the apex; height 6-8 cm, diameter 5 cm. Tube short, woolly. Tepals dark scarlet-red to lighter red. Filaments red; anthers light yellow,



Fig. 251: *Trichocereus bruchii*, Parque de los Menhires (Tucuman).

very elongated. Style green; stigma the same colour, with 10 lobes.

Area of distribution: Region of Tafi del Valle, province of Tucuman.

T. candicans (Gillies) Br. & R.

Plants caespitose, in clumps of 1 to 3 metres in diameter. Stems cylindrical, erect, light green, reaching 60 cm in height and 13-16 cm in diameter. Apex furnished with white wool. Ribs 8-12, of 1.5 to 2.5 cm in height near the apex, but thin at the base of the plant. Areoles oval to round, 10 × 12-15 mm, abundantly furnished with white wool. Spines strong, straight, acicular, erect; young spines light brown with a reddish-brown base, passing to straw-yellow with a reddish base. Radials 9-12, measuring 2 to 6 cm; centrals 3-4, reaching 3 to 11 cm long.

Flowers bell-shaped; 18-23 cm long, 11-19 cm in diameter. Ovary and tube pinkish-green. Scales of the tube greenish to yellowish, in an elongated triangle, with long yellowish to pinkish-brown wool in the axils. External tepals narrowly lanceolate, fleshy, sepaloid, pink, sometimes slightly yel-

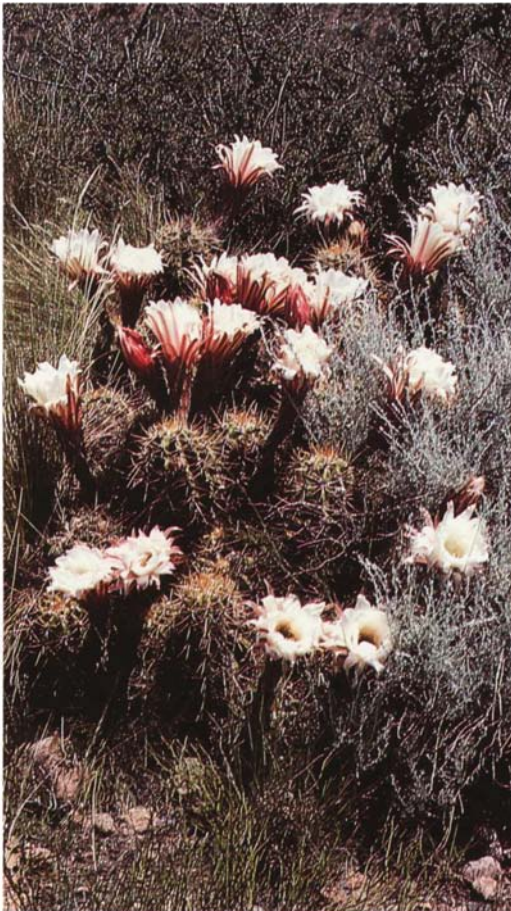


Fig. 252: *Trichocereus candicans*,
La Jarilla (Mendoza).

lowish. Internal tepals spatulate, mucronate, snow-white. Stamens in two series. Primary filaments white with a greenish base, secondary filaments white; anthers yellow. Style white with a greenish-yellow base; stigma white, with 17-20 lobes.

Fruit globular, around 5 cm in diameter, golden-yellow to pinkish.

Seeds black, 1.5×1 mm; cells of testa hexagonal, warty, separated by transverse striations, with small pores on the angles.

Area of distribution: Provinces of Mendoza, San Juan. La Rioja, Córdoba, San Luis, Buenos Aires and La Pampa.

T. huascha (Web.) Br. & R.

Stems simple cylindrical, offsetting from the base, erect, reaching 1 metre in height and 5-10 cm in diameter; young growths light green, passing to glaucous green. Ribs low and round, 12 to 18. Areoles white passing to greyish and becoming bald thereafter. Radial spines 9-11, acicular, fine, reaching 15 mm long. Centrals 1 to 3, thicker, 2 to 7 cm. All the spines dirty-yellow to reddish or brownish; old spines becoming greyish, with darker point.

Flowers lateral, bell-shaped, established on the upper areoles; height 115 mm, diameter 80 mm. Tube light green, covered with olive-green scales and a blackish-brown mucro, with brownish wool on the axils. External tepals reddish. Intermediate tepals yellow with a reddish mucro. Internal tepals pure yellow. All the tepals lanceolate but the internals wider and more or less indented. Throat greenish. Stamens in two series, primaries grouped



Fig. 253: *Trichocereus huascha*, Costa de Reyes (Catamarca).

around the pistil, secondaries in a crown at the top of the perianth. Primary filaments almost entirely green, secondary filaments light yellow with a greenish base; anthers pale-yellow. Style light yellow, 75 mm; stigma of the same colour, with 16-19 lobes of 15 mm.

Fruit globular to ovoid, around 3 cm in diameter, lemon-yellow tinted pinkish at maturity, with brown wool.

Seeds black, shiny, of 1.4×1 mm, kidney-shaped, with a longitudinal keel; hilum oblique.

Area of distribution: Province of Catamarca; regions of Tinogasta, Belen and Andalgalá.

There are populations (varieties?) with white flowers tinted with pink, in particularly in Cuesta de Belen and Cuesta de Cebila, and perhaps also in the Sierra de Famatina.

T. huascha var. pecheretianus (Backbg.) Kiesling

Form growing at a higher altitude, with yellower spines and red flowers.

Origin: Cuesta de Zapata, province of Catamarca.

T. ingens (Br. & R.) Ritter

Body flattened spherical, 25 to 30 cm in diameter. Ribs 50 and more.



Fig. 254: *Trichocereus ingens*, Cuesta de Capillitas (Catamarca).

Areoles whitish to greyish. Spines fine, acicular, long and flexible. Young spines light brown, passing to yellow.

Flowers apical, short bell-shaped; height 70 mm, diameter 85 mm. Tube light greenish-yellow, 40 mm long. Scales greenish, with reddish points at the top of the tube; brown wool on the axils. External tepals lanceolate, yellow with a red wide median band. Internal tepals spatulate, yellow with a more or less orange border. Stamens in two series. Primary filaments yellow with a green base, secondaries white with a yellowish end; anthers white. Style white, more or less curved, 45 mm long; stigma yellowish-white, with 16 lobes of 13 mm.

Fruit globular to ovoid, 3-4 cm in diameter, scaly, dark olive-green to brownish.

Seeds small, black and shiny.

Area of distribution: Cuesta de Capillitas and Cuesta de Chilca, province of Catamarca.

T. korethroides (Werd.) Ritter

Body globular 30 cm in diameter, offsetting, forming compact groups of 50 cm and more wide. Epidermis matt light green to glaucous green. Apex depressed, young plants covered with yellowish to blackish-brown spines, becoming spineless and slightly woolly thereafter. Ribs 25-35, acute and tortuous. Areoles oval, 7 × 5 mm, whitish to dirty yellow. Radial spines 12 to 20, acicular, appressed, yellowish with a brown point, measuring up to 3



Fig. 255: *Trichocereus korethroides*, Abra de Potrerillo (Jujuy).

cm. Central spines 4-5, strong, erect, flexible, reddish-brown, reaching up to 5 cm long.

Flowers apical; height 60-70 mm, diameter 45 mm. Tube dark green, with elongated scales furnished with greyish-brown wool. External tepals lanceolate, red tinted with a little purple. Internal tepals spatulate, strong cherry-red. Details of stamens and the pistil not noted.

Area of distribution: Provinces of Salta and Jujuy, at altitude.

T. lamprochlorus (Lem.) Br. & R.

Cylindrical stems, 0.5 to 1 metre long and 6-9 cm in diameter, branching from the base; epidermis light green darkening more or less in the older parts of the plant. Ribs round, 12-15, with two small furrows in a reversed "V" above the young areoles. These latter rounded to triangular, 3 × 5 mm, furnished with white wool passing to greyish-brown. Radial spines 11-19,



Fig. 256: *Tephrocactus lamprochlorus*, Los Patayes (Cordoba).

radiating, fine and short, not exceeding 7 mm. Central spines 4, stronger, erect, the longest reaching 10 to 20 mm, reddish. Young spines with a darker base; this colouring persists with the central spines and with part of the radials, the others passing to straw-yellow.

Flowers lateral, on the upper areoles; height 215 mm, diameter 140 mm when fully open. Ovary covered with fleshy scales, olive-green to dark green, masked by abundant mauvish to greyish wool. Tube pinkish, with elongated scales olive-green, furnished with the same type of wool as above. Scales passing gradually to the sepaloid external sepals, which are narrowly lanceolate, carmine-red with a green end. Internal tepals lanceolate, mucronate, white. Stamens in two series. Primary filaments white with a greenish-yellow base, secondary filaments white; anthers yellow. Style light green with a greenish-white base; stigma yellow, with 19 papillose lobes.

Fruit globular, around 4 cm in diameter, yellow orange, strongly woolled.

The characteristic colouring of the wool covering the tube was responsible for the synonymous name of "*T. purpureopilosus*".



Fig. 257: *Trichocereus pasacana*, Quebrada del Toro (Salta).

Area of distribution: The North-West of Cordoba, and areas bordering on La Rioja and Catamarca.

T. pasacana (Web.) Br. & R.

Arborescent plants, reaching 15 meters in height, with a central trunk and parallel branches, conferring an aspect of candelabrum to them. The trunk can reach a diameter of 50 cm, and count around 10 ribs. Lateral stems being borne between 1 and 3 metres high, often branching in their turn, with a diameter of 20-25 cm, and carrying from 20 to 30 rounded ribs of 2 cm high. Areoles large, round, reaching up to 2 cm in diameter, furnished with brownish-yellow wool, passing then to greyish. Spines strong, straight, yellowish-brown. When young, one can distinguish 13 radial spines, fine, flexible, yellow, of 1.5 to 4 cm long, and some 8 rigid central spines, of which the longest can reach 15 cm. On the old trunks, the areoles are caducous, and the spines become more numerous, without clear distinction between radials and centrals.

Flowers infundibuliform, being borne on the upper third of the trunk and on the branches; length 15-17 cm, diameter 10-13 cm when fully open. Ovary and tube light green, completely furnished with light brown to greyish-brown wool, of 1-2 cm long, established in the axils of triangular scales, whose uppers lengthen to pass gradually to the external tepals. The latter are lanceolate, white with a green wide median stripe and brownish extremity. Internal tepals white to yellowish, spatulate and mucronate. Stamens in two series. Filaments white to greenish; anthers cream. Style white with a pale green base, reaching 11 cm long; stigma greenish-white, with 20-25 lobes of 2 cm.

Fruits green, globular, around 5 cm in diameter, furnished with whitish wool.

Seeds of 1.4×1 mm, black, shiny, urn-shaped.

Area of distribution: From South of Bolivia to the North of Argentina; provinces of Jujuy, Salta, Catamarca and Tucuman, between 2500 and 3500 m altitude.

T. pseudocandicans (Backbg.) Kiesling

Clumps of 1 metre high and up to 3 metres in diameter. Stems erect, branching only from the base or from the crawling part, cylindrical, leaf-green, reaching 1 metre long (generally less) and 8-13 cm in diameter. Ribs wide and round, 11-13. Areoles oval to rounded, 10×8 mm, furnished with whitish to greyish wool. Spines strong, acicular, erect. Radials 12-13, measuring 2 cm long; centrals 3-4-(6), reaching 4 to 6 cm long. Young spines straw-yellow to light brown, becoming brown.

Flowers funnel-shaped, subapical; length 15 cm, diameter 11 cm when fully open. Ovary green; tube pinkish-green, with the fleshy scales furnished with white to light brown wool. External tepals triangular, salmon-pink to reddish; intermediate and internal tepals lanceolate, of varied colour; white to yellow or red, with all the intermediate combinations, including differ-



Fig. 258: *Trichocereus pseudocandicans*, road to Famatina (La Rioja).

ences between the border and the central stripe of the tepals, or between internal and intermediate tepals. Stamens in two series. Filaments greenish-yellow; anthers cream. Style light green with a cream extremity; stigma yellow, with 15 papillose lobes.

Fruit globular, dehiscent laterally, with a diameter of 5-6 cm, yellowish-green to pinkish.

Seeds black, shiny, finely punctured, 1.3×1 mm.

Area of distribution: Province of La Rioja, the North of Famatina to Cuesta de Miranda.

This species is very like that of *T. candicans*, from which it was perhaps created by hybridization with *T. vatteri*. In any event it seems to be of recent origin, and is apparently not yet completely stabilized from the genetic point of view.

T. smrzianus (Backbg.) Backbg.

Plants in clumps of 0.5 metres high and up to 1.5 metres in diameter. Stems cylindrical around 14-15 cm in diameter, dark green. Ribs high and acute, 11-14. Areoles of $7-8 \times 5$ mm, white passing to blackish. Spines strong, erect, yellow; radials 9-11, reaching 10-25 mm long; centrals 1 to 4, reaching 4 cm long.

Flowers apical, funnel-shaped, 16-17 cm long. Ovary and tube light

green. Scales with a darker green tip and brownish base, furnished with white and black wool, the latter becoming dominant at the top of the tube. Scales passing gradually to the external tepals, which are lanceolate, initially green with a brownish-pink border, then lilac-pink. Internal tepals spatulate, white. Stamens in two series. Primary filaments green, secondary filaments creamy-yellow; anthers ochre-yellow. Style green, 11 to 13 cm; yellowish-green stigma, with 15-16 lobes of 15 mm.

Fruit globular, yellowish-green, 25-40 mm in diameter, dehiscing laterally.

Seeds dark brown to black, of $1.3-1.5 \times 1$ mm, with shiny testa.

Area of distribution: Cuesta del Obispo, province of Salta.



Fig. 259: *Trichocereus smrzianus*, Cuesta del Obispo (Salta).

T. spachianus (Lem.) Ricc.

Stems erect, initially single, then branching from the base, with a height of 60 cm to 1 metre (exceptionally up to 2 metres) and with a diameter of 5-10 cm, leaf-green, having tendency to lignify at the base as the plant ages. Ribs



Fig. 260: *Trichocereus spachianus*, Icaño (Santiago del Estero).

10-15, obtuse and rounded. Areoles oval to round, 4-4.5 mm in diameter, yellowish passing to greyish-white. Radial spines straight, acicular, radiating, 7-10, measuring up to 6-10 mm. Single central spine, of around 15 mm. Young spines blackish, passing to yellowish, initially with a brownish base, and then greyish white.

Lateral flowers, funnel-shaped; length 20 cm, diameter 15 cm and more. Tube light green, with the many scales furnished with black wool to the axils. External tepals narrowly lanceolate, initially green tinted with brownish-pink, especially towards the end, then white with a median stripe of light green. Internal tepals spatulate, pure white. Stamens in two series. Primary filaments green, secondary filaments green with a white end; anthers ochre-yellow. Style white; greenish-white stigma, with 14 lobes.

Area of distribution: Surroundings of Icaño, province of Santiago del Estero.

Several authors wrongly believed *Cereus santiaguensis* to be synonymous with this species. According to what I could see, the description of *C. san-*

tiaguensis by Spegazzini (of which there is neither type, nor photo...) rests on confusion between several forms. Quoted dimensions, of 4 to 7 metres to the very top, are indeed never reached with *T. spachianus*, but easily by the sympatric species *Cereus forbesii* and *Stetsonia coryne*...

T. strigosus (S-D) Br. & R.

Caespitose plants, in clumps 60 cm high and up to 1 metre diameter. Simple stems, only branching from the crawling part, erect, 5-6 cm in diameter, light shiny green to dark green. Apex spiny, densely covered with young spines orange with a dark brown tip. Ribs straight, flattened, 15-19. Areoles initially round, becoming oval (5 × 3 mm), abundantly furnished with white wool, but becoming bald thereafter. Spines straight, acicular, erect, of variable colour; yellowish, pinkish-white with a brown point, or completely reddish. Radials 9-15, reaching 1 to 5 cm long. Centrals 3-4, measuring up to 7 cm. The two types of spines are not always easily differentiated.

Flowers lateral, on the upper part of the stems; height 19-20 cm, diameter



Fig. 261: Trichocereus strigosus:
origin Termas de Talacasto
(San Juan).

13.5-15 cm when fully open. Ovary of 20 × 25 mm, abundantly furnished with blackish-brown wool. Tube light green, covered with lighter elongated scales, with brown bristles and white to yellowish tufts of wool on the axils. External tepals lanceolate, pink to white, with a light green median band. Internal tepals narrowly spatulate, pure white with a green throat. Stamens in two series. Primary filaments pale green, secondary filaments white; anthers cream. Style white with a slightly greenish base, 12-13 cm long; stigma yellowish white, with 17 lobes of 17 mm.

Fruit fleshy, 4-6.5 cm in diameter, yellow to orange at maturity, dehiscing laterally.

Seeds black, shiny, finely punctured, 1.5 × 1 mm; hilum slightly oblique.

Area of distribution: Provinces of La Rioja, Catamarca, San Juan and Mendoza; hot and dry places, between 500 and 800 metres altitude.

T. tarijensis (Vpl.) Werd.

Plants columnar to slightly branching in the form of a candelabra, 1 to 5 metres in height. Central stem with a diameter of 40 cm; branches, when present, 20-35 cm only. Ribs around 25, high and wide. Areoles oval round, 10 mm in diameter, furnished with grey wool, confluent on the apex, then around 7 mm apart. Spines 50 and more, not differentiated into radials and centrals, acicular, flexible, light brown to yellowish or even whitish, measuring 1 to 8 cm long.



Fig. 262: *Trichocereus tarijensis*, botanical garden of Tilcara (Jujuy).

Flowers bell-shaped, in a crown around the apex; height 14 cm, diameter 8 cm. Ovary green. Tube old-pink, the scales with a brownish-green point, furnished with greyish white to brownish wool. External tepals narrowly lanceolate, carmine with a greenish median stripe and slightly brownish point. Internal tepals shiny red to carmine-pink, very widely lanceolate. Stamens in two series. Filaments with a green base and yellowish-white end, then pink; anthers cream. Style with a green base and pink end, 65-70 mm long; slightly greenish-yellow stigma, with 18-19 lobes of 15-16 mm.

Fruit ovoid, around 35 × 23 mm; green, furnished with white to brown wool.

Seeds sub-kidney-shaped, black, finely punctured, 1.3 to 1.5 mm long.

Area of distribution: South of Bolivia and province of Jujuy, from the Bolivian border to Tilcara, between 3200 and 4200 metres altitude.

T. terscheckii (Parm.) Br. & R.

Plants columnar arborescent, with many branches borne on the lower



Fig. 263: Trichocereus terscheckii,
Cuesta de Miranda (La Rioja).

third of the trunk. The principal stem reaching up to 15 metres in height and 45 cm in diameter. Ribs 8-18, obtuse, 2-4 cm high. Areoles large, 10-15 mm in diameter, abundantly furnished with brown wool. Spines yellow, 8-15 on the young areoles, measuring 3-12 cm. Their number increases to around 36 on the older areoles, whilst the colour passes from yellow to greyish-brown.

Flowers lateral, bell-shaped, 15-23 cm long and 13-18 cm in diameter. Ovary 25 mm. Tube light green, the scales with a yellow point and black mucro, covered with white and brown bristles. Scales progressively pass to the external tepals, which are narrowly lanceolate, initially brown with a green median band, then pink with a brown median band, and finally white with a pink median band. Internal tepals spatulate, sometimes more or less indented, with a small pure white mucro. Throat light green. Stamens in two series. Filaments light green; anthers cream. Style greenish-white, 15-18 cm long; stigma with 20-23 lobes of 18-25 mm.

Fruit globular fruit, 3 to 5 cm in diameter, green, scaly, furnished with white wool.

Seeds dark brown to blackish, urn-shaped; 1.2-1.5 × 1-1.1 mm; the face slightly rough, with pores at the angles of the cells, which are sub hexagonal.

Area of distribution: South-East of Jujuy, North and East of Salta, Tucuman Catamarca, La Rioja and North-East of San Juan, between 800 and 1400 metres altitude.

T. thelegonus (Web.) Br. & R.

Stems cylindrical crawling, only the apical part is erect; the length totaling 2 metres and more, and a diameter of 6-8 cm. Young parts light green, passing to dark green. Ribs 10-13, wide, low and obtuse, forming sub-hexagonal tubercles of 8-12 mm long, aligned longitudinally and separated by transverse furrows. Areoles at the top of the tubercles, round, 4-8 mm in diameter, furnished with whitish wool, passing to grey and then becoming bald. Spines acicular, rigid, light brown to black, passing to greyish-white. Radials 7-9, up to 1 to 2 cm long; single central spine, reaching 2-4-(8) cm long.

Flowers funnel-shaped, established at the top of the stems; length 20 cm, diameter 15 cm. Ovary and tube pinkish-green, with small green scales furnished with white wool and pink bristles. External tepals narrowly lanceolate, greenish, more or less bent towards the outside. Internal tepals spatulate, mucronate, white. Stamens in two series. Primary filaments white with a greenish base, secondary filaments cream; anthers yellow. Style cream with a greenish base; stigma yellow, with 12 lobes of 15 mm.

Fruit globular to ovoid, 5 cm long, scaly, furnished with white wool, laterally dehiscing; initially green, passing to yellowish tinted with red at maturity.

Seeds black, shiny, around 1.5 mm in diameter, finely spotted near the hilum.



Fig. 264: *Trichocereus thelegonus*, road to Valle Grande (Jujuy).

Area of distribution: Provinces of Jujuy, Salta, Tucuman and Catamarca.

T. vatteri Kiesling

Plants caespitose, in clumps counting up to 20 stems, of 1 to 2 metres in diameter and 50 cm high. Stems cylindrical, erect, light green, with a diameter of 5.5-8 cm. Ribs 14-16, obtuse. Areoles rounded, 4 mm in diameter, furnished with whitish to brown wool. Spines yellowish, sometimes more or less reddish, acicular, flexible. Radials 10 and more, measuring 1.5 to 2 cm long. Centrals 1 to 4, reaching 3.5 to 5 cm long.

Flowers funnel-shaped; length 10-14 cm, diameter 10 cm. Ovary globular or in a reversed pear, furnished with pale yellow wool. Tube green, covered with elongated triangular scales, which are covered with yellowish bristles around 1.5 cm long. External tepals narrowly lanceolate, with a green median band. Internal tepals spatulate mucronate, of variable colour: from red to yellow whilst passing orange (seldom white?). Stamens in two



Fig. 265: Trichocereus vatteri,
road to Famatina (La Rioja).

series. Filaments the same colour as the tepals, but with a green base; anthers yellow. Style lighter; stigma yellow, with 14-16 lobes.

Area of distribution: Cuesta de Miranda in the South-East of the Sierra de Famatina, province of La Rioja.

T. walteri (Kiesl.) Lambert comb. nov.

Basionym: *Lobivia walteri* Kiesling, *Hickenia*, 35, 1976.

Body spherical, more or less lengthening thereafter, attaining a diameter of 16 cm, offsetting. Epidermis light green. Ribs 10-11, straight and acute. Areoles large, in a rounded triangle, of 10 × 6 mm, yellowish-white passing to grey. Radial spines 11 and more, finely acicular, flexible. Central spines 1 to 3, strong, erect, measuring up to 40 mm long. Young spines light brown with a greenish-yellow base, passing to horn-yellow.

Flowers apical; length 7-9 cm, diameter 9 cm when fully open. Tube green, with fleshy elongated scales, furnished with dark grey wool. Exter-



Fig. 266: Trichocereus walteri:
photo G. Charles.

nal tepals narrowly lanceolate, pink with a greenish wide median band. Intermediate tepals lanceolate, orange. Internal tepals spatulate mucronate, shiny yellow. Stamens in two series. Primary filaments greenish with a yellow end, secondary filaments yellow; anthers light yellow. Style yellowish white with a greenish base; stigma creamy-white, with 14-16 lobes.

Fruit globular, around 2-2.5 cm in diameter, slightly scaled, yellowish-green, with a little light-grey wool.

Black seeds, finely spotted, with an indistinct keel and oblique hilum.

Area of distribution: Quebrada de Escoipe and road to Amblayo, province of Salta

Culture

It is obvious that the arborescent species of *Trichocereus* hardly lend themselves to be grown under glass by an amateur. However, whoever can lay out a strip of sufficiently roomy open ground could try to acclimatize *T. tarijensis*,

which starts to flower from a little more than one metre high.

On the other hand, species with less thick stems, not exceeding 60 cm and 1 metre long, can be raised in the same way as the globular form of “Soehrensia”, without particular problems. One will need to keep account of the fact that with time, the majority of these plants vigorously offset, and it will thus be necessary to envisage a sufficient “vital space”. The too unrestrained growth will eventually need to be trimmed, but it is then likely to impede flowering. This is obtained only with the help of much patience (10 to 15 years on average!). If I have been lucky enough to observe a flower of *T. strigosus* as of the fourth year in culture, I have on the other hand heard of a case of flowering of *T. candicans* that occurred for the first time after... 30 years!

WEINGARTIA Werd.

Plants sub-spherical, generally solitary, with a napiform root generally separated from the body by a more or less constricted collar. Flowers relatively small, short, scaly although glabrous. One observes in some cases several flowers on the same areole. Small fruits, glabrous, with very few seeds. The envelope of the ripe fruits desiccates itself in a thin film; the dehiscence is basal.

Genus widespread at altitude in the South of Bolivia and in the North of Argentina.

W. neumanniana (Backbg.) Werd.

Body short cylindrical, 7 cm high and 5 cm in diameter, glaucous-green sometimes tinted purplish-brown. Root napiform, separated from the body by a constricted collar. Ribs wide and low, 14, divided into rounded hexagonal tubercles. Areoles rounded to oval, of around 1 mm in diameter, established at the top of the tubercle, furnished with white wool. Radial spines 5-7, rigid, acicular and radiating. Single central spine, measuring up to 22 mm long. All spines dark brown to blackish-red.

Flowers near the apex, around 25 mm high and wide. Ovary spherical. Tube short, glabrous, with wide green scales and a white border. Tepals lanceolate yellow to orange. Filaments yellow; anthers creamy-yellow. Style and stigma yellow.



Fig. 267: *Weingartia neumanniana*: photo M. Nilsson.

Fruit small, green, covered with scales, and thinly enveloped, opening by basal dehiscence.

Seeds cap-shaped, black, finely spotted; hilum rounded to oval, basal.

Area of distribution: North of Humahuaca, province of Jujuy.

Culture

Plants without particular requirements, very floriferous and easily multiplied from seed.

APPENDIX I: SOME CHARACTERISTIC BIOTOPES



Fig. 268: The Chaco at Pozo del Tigre. Dense thickets, sandy to clayey ground, climate very hot; alternating heavy rain and dry periods.



Fig. 269: Wooded hills of low and average altitude, province of Tucuman. Wetter biotope, with some more specialized cactus, or located on escarpments



Fig. 270: High-plateau of the pre-Cordillera, province of San Juan. Flat ground made of sand and stones; vegetation low, able to resist the violent winds that sweep the area.



Fig. 271: Quebrada de Cafayate; strongly eroded red sandstone. Plants grow not only in sand resulting from the degradation of the rock, but also on the flanks of the same friable material.

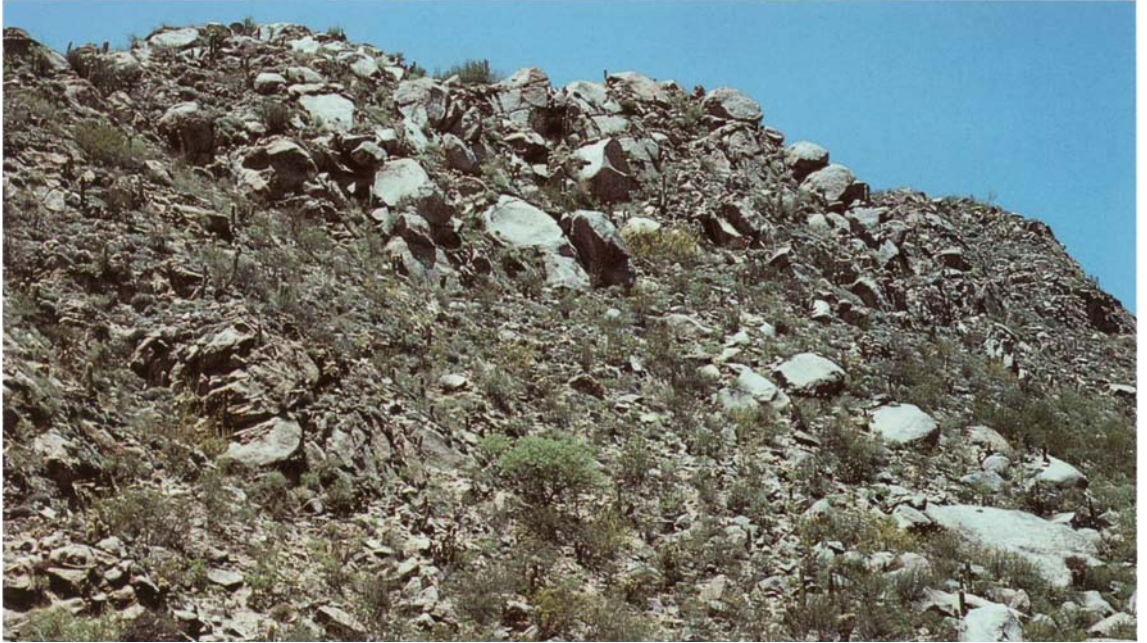


Fig. 272: Agua Blanca, Sierra de Velasco; blocks of quartziferous granite. Plants anchored in fractures, preferably where a little organic matter accumulates.



Fig. 273: Angastaco, Valles Calchaquies; wind-eroded schistose formation. Muddy ground with mixed up stones, however remaining very dry considering scarcity of rain.



Fig. 274: The puna of Santa Calabria: schistose sub-soil with glacial moraine remainders (white stones) on the surface.



Fig. 275: Quebrada del Toro: sinuous gorge set to benefit by the rail and the road to reach to San Antonio de los Cobres.



Fig. 276: The Cuesta del Obispo: access road from Salta towards the Cachipampa.



Fig. 277: Quebrada de Tilcara: mountains of many colours according to the nature of the minerals present.

APPENDIX II. COLLECTION NUMBERS OF J. LAMBERT

la	<i>Gymnocalycium multiflorum</i> Low altitude form with white flowers and very few spines	Tanti	880 m.
lb.	<i>Gymnocalycium multiflorum</i> Average altitude form with pink flowers and more abundant spines.	Dos Rios	2050 m.
2.	<i>Gymnocalycium calochlorum</i>	Tanti	880 m.
3.	<i>Gymnocalycium quehlianum</i>	Tanti	880 m.
4.	<i>Gymnocalycium castellanosii</i> var. <i>armillatum</i>	Ulapes	600 m.
5.	<i>Gymnocalycium schickendantzii</i>	Ulapes	600 m.
6.	<i>Gymnocalycium schickendantzii</i>	Chepes Viejo	900 m.
7.	<i>Gymnocalycium saglionis</i>	Cuesta de Miranda	1850 m.
8.	<i>Gymnocalycium riojense</i>	Sanogasta	1150 m.
9.	<i>Gymnocalycium</i> sp.	Sanogasta	1150 m.
10.	<i>Gymnocalycium hossei</i>	Chilecito	1400 m.
11.	<i>Gymnocalycium saglionis</i>	El Jumeal	1400 m.
12.	<i>Gymnocalycium hossei</i>	Alto Carrizal	1850 m.
13.	<i>Gymnocalycium riojense</i>	Los Molinos	1350 m.
14.	<i>Gymnocalycium schickendantzii</i>	Los Molinos	1350 m.
15.	<i>Gymnocalycium nidulans</i>	Señor de la Peña	1050 m.
16.	<i>Gymnocalycium hossei</i>	Carrizal	1100 m.
17.	<i>Pyrrhocactus catamarcensis</i>	Santa Teresita	950 m.
18.	<i>Gymnocalycium glaucum</i>	Copacabana	1700 m.
19.	<i>Gymnocalycium riojense</i>	Sierra de Vinquis	1150 m.
20.	<i>Gymnocalycium catamarcense</i> (reddish flowers)	Quebrada de Belen	1400 m.
21-22.	<i>Gymnocalycium catamarcense</i>	Quebrada de Belen	1400 m.
23.	<i>Gymnocalycium spgazzinii</i>	El Hombre Muerto	1800 m.
24.	<i>Gymnocalycium saglionis</i>	Colalao	1800 m.
25.	<i>Gymnocalycium quehlianum</i> fa	Tanti	880 m.
26.	<i>Gymnocalycium spgazzinii</i>	Cachi	2500 m.
27.	<i>Gymnocalycium schickendantzii</i> var. <i>delaetii</i>	Osma	1300 m.
28.	<i>Gymnocalycium saglionis</i>	Osma	1300 m.
29.	<i>Gymnocalycium pflanzii</i>	Rio Juramento	850 m.
30.	<i>Gymnocalycium schickendantzii</i> var. <i>delaetii</i>	Lumbreras	850 m.
31.	<i>Gymnocalycium schickendantzii</i> var. <i>delaetii</i>	Trancas	780 m.
32.	<i>Gymnocalycium marsoneri</i>	Vipos	850 m.
33.	<i>Gymnocalycium nigriareolatum</i>	Monte Potrero	850 m.

34-35.	<i>Gymnocalycium nigriareolatum</i>	El Portezuelo	600 m.
36.	<i>Gymnocalycium baldianum</i>	Anquincila	1150 m.
37.	<i>Gymnocalycium leptanthum</i>	Balbuena	600 m.
38.	<i>Gymnocalycium</i> aff. <i>odoratum</i>	San Miguel	625 m.
39.	<i>Gymnocalycium calochlorum</i>	Sauce Punco	1050 m.
40.	<i>Gymnocalycium erinaceum</i>	Sauce Punco	1050 m.
41.	<i>Gymnocalycium valnicekianum</i>	Capilla del Monte	900 m.
42.	<i>Gymnocalycium capillaense</i>	Capilla del Monte	1000 m.
43.	<i>Notocactus submammulosus</i>	Los Gigantes	1200 m.
44.	<i>Gymnocalycium quehlianum</i>	Cuesta del Aguila	700 m.
45.	<i>Gymnocalycium mostii</i>	Bialet Masse	650 m.
46.	<i>Parodia malyana</i>	Anquincila	1150 m.
47.	<i>Gymnocalycium mostii</i>	Km 12/Villa Allende	625 m.
48.	<i>Trichocereus candicans</i>	Road to San Rafael	1150 m.
49.	<i>Notocactus submammulosus</i>	Capilla del Monte	1100 m.
50.	<i>Opuntia salmiana</i>	Entre Cruz del Eje and Villa de Soto	600 m.
51.	<i>Tephrocactus articulatus</i> var. <i>articulatus</i>	Serrezuela	350 m.
52.	<i>Gymnocalycium schickendantzii</i>	Serrezuela	350 m.
53.	<i>Gymnocalycium</i> sp.	Sierra de Ambato	500 m.
54.	<i>Echinopsis fallax</i>	Carrizal	850 m.
55.	<i>Trichocereus pseudocandicans</i>	Carrizal	850 m.
56.	<i>Gymnocalycium</i> sp.	Los Molinos	1300 m.
57.	<i>Tephrocactus articulatus</i> var. <i>oligacanthus</i>	Los Molinos	1300 m.
58.	<i>Gymnocalycium kieslingii</i> fa. <i>castaneum</i>	Anjullon	1350 m.
59.	<i>Echinopsis fallax</i>	Pinchas	1400 m.
60.	<i>Gymnocalycium piltziorum</i>	Agua Blanca	1650 m.
61.	<i>Gymnocalycium riojense</i>	Los Colorados	700 m.
62.	<i>Cleistocactus baumannii</i>	El Mollar	560 m.
63.	<i>Gymnocalycium castellanosii</i>	Cortaderas	550 m.
64.	<i>Echinopsis fallax</i>	Km 18/Olpas	500 m.
65.	<i>Gymnocalycium castellanosii</i>	Anzulon	700 m.
66.	<i>Parodia mesembrina</i>	Anzulon	700 m.
67.	<i>Gymnocalycium saglionis</i>	Solca	900 m.
68.	<i>Gymnocalycium castellanosii</i>	Sierra de Malanzan	1050 m.
69.	<i>Gymnocalycium acorrugatum</i>	San Agustin de Valle Fertil	850 m.
70.	<i>Gymnocalycium saglionis</i>	San Agustin de Valle Fertil	850 m.
71.	<i>Gymnocalycium riojense</i>	Astica	700 m.
72-73.	<i>Pyrrhocactus marayesensis</i>	Marayes	700 m.
74.	<i>Tephrocactus aoracanthus</i>	San Juan	700 m.
75.	<i>Trichocereus strigosus</i>	Termas de Talacasto	1300 m.
76.	<i>Denmoza rhodacantha</i>	Termas de Talacasto	1300 m.
77.	<i>Pyrrhocactus</i> sp.	Termas de Talacasto	1300 m.

78.	<i>Opuntia microdisca</i>	Pampa de Hualilan	1800 m.
79-80.	<i>Denmoza rhodacantha</i>	Pampa de Hualilan	1800 m.
81.	<i>Pterocactus kuntzei</i>	Llanos de Chita	2300 m.
82.	<i>Pterocactus gonjianii</i>	Llanos de Chita	2300 m.
83.	<i>Pterocactus reticulatus</i>	Llanos de Chita	2300 m.
84.	<i>Echinopsis leucantha</i>	Villa Nueva	1650 m.
85.	<i>Maihueniopsis glomerata</i>	Pampa Yalguaraz	2150 m.
86.	<i>Pyrrhocactus strausianus</i>	Road to Tupungato	1150 m.
87.	<i>Cereus aethiops</i>	Road to Tupungato	1150 m.
88.	<i>Pyrrhocactus strausianus</i>	Road to Tupungato	1200 m.
89.	<i>Pyrrhocactus strausianus</i>	Manzano Historico	1400 m.
90.	<i>Notocactus submammulosus</i>	Manzano Historico	1400 m.
91.	<i>Maihuenia patagonica</i>	El Sosneado	1800 m.
92.	<i>Pyrrhocactus strausianus</i>	Road to San Rafael	1150 m.
93.	<i>Denmoza rhodacantha</i>	Cuesta de los Terneros	950 m.
94.	<i>Pyrrhocactus strausianus</i>	Cuesta de los Terneros	950 m.
95.	<i>Maihueniopsis ovata</i>	Rio Malargue	1400 m.
96.	<i>Pyrrhocactus strausianus</i>	Rio Malargue	1400 m.
97.	<i>Pterocactus fischeri</i>	Rio Malargue	1400 m.
98.	<i>Maihueniopsis darwinii</i>	Puntilla de los Huincanes	1550 m.
99.	<i>Pterocactus fischeri</i>	Vaca Muerta	750 m.
100.	<i>Maihuenia patagonica</i> fa.	Vaca Muerta	750 m.
101.	<i>Pterocactus</i> sp.	Bajada del Agrio	700 m.
102.	<i>Maihuenia valentinii</i>	Road Zapala-Neuquen	750 m.
103.	<i>Pterocactus valentinii</i>	Sierra de Portezuelo	900 m.
104.	<i>Pyrrhocactus strausianus</i>	Barrancas de los Loros	350 m.
105.	<i>Gymnocalycium sutterianum</i>	Loma El Plateado	950 m.
106.	<i>Gymnocalycium achirasense</i>	Juan Llerena	900 m.
107.	<i>Gymnocalycium achirasense</i>	Cerros Largos	1400 m.
108.	<i>Echinopsis aurea</i>	Cerros Largos	1400 m.
109.	<i>Gymnocalycium calochlorum</i>	San Sebastian	900 m.
110.	<i>Echinopsis aurea</i>	Copina	1350 m.
111.	<i>Echinopsis aurea</i>	Tanti	880 m.
112.	<i>Cereus roseiflorus</i>	Sierra de Misiones	375 m.
113.	<i>Monvillea cavendishii</i>	Peñon de la Reina Victoria	180 m.
119.	<i>Opuntia retrorsa</i>	Pozo del Tigre	100 m.
120.	<i>Stetsonia coryne</i>	Pozo del Tigre	100 m.
121.	<i>Gymnocalycium mihanovichii</i>	Pozo del Tigre	100 m.
122.	<i>Monvillea cavendishii</i>	Pozo del Tigre	100 m.
123.	<i>Eriocereus guelichii</i>	Las Lomitas	150 m.
124.	<i>Opuntia kiska-loro</i>	Las Lomitas	150 m.
125.	<i>Monvillea spegazzinii</i>	Igr. Faure	150 m.
126.	<i>Quiabentia pflanzii</i>	Los Blancos	
127.	<i>Monvillea cavendishii</i>	San Pedro de Jujuy	600 m.
128.	<i>Echinopsis ancistrophora</i> var. <i>hamatacantha</i>	Abra de Sta. Laura	1300 m.

129.	<i>Echinopsis ancistrophora</i>	Leon	1600 m.
130.	<i>Opuntia corrugata</i>	Volcan	2000 m.
131.	<i>Cleistocactus hyalacanthus</i>	Volcan	2000 m.
132.	<i>Trichocereus volcanensis</i>	Quebrada de Tumbaya	2150 m.
133.	<i>Parodia tilcarensis</i>	Crossing towards Purma- marca	2150 m.
134.	<i>Blossfeldia liliputana</i>	Crossing towards Purma- marca	2150 m.
135-136.	<i>Maihue niopsis boliviana</i>	Road to Abra de Pives	3220 m.
137.	<i>Lobivia ferox</i>	Road to Abra de Pives	3220 m.
138.	<i>Lobivia jajoiana</i> var. <i>elegans</i>	Road to Abra de Pives	3220 m.
139.	<i>Maihue niopsis boliviana</i>	Road to Abra de Pives	3750 m.
140.	<i>Parodia maassii</i>	Road to Huma- huaca	3300 m.
141.	<i>Lobivia marsoneri</i>	Quebrada de Huma- huaca	3300 m.
142.	<i>Austrocylindropuntia shaferi</i>	Quebrada de Humahuaca	3300 m.
143.	<i>Lobivia ferox</i>	Iturbe	3400 m.
144.	<i>Oreocereus trollii</i>	Cuesta de Azul Pampa	3550 m.
145.	<i>Rebutia xanthocarpa</i>	El Mollar	1625 m.
146.	<i>Trichocereus schickendantzii</i>	El Mollar	1625 m.
147.	<i>Echinopsis ancistrophora</i> var. <i>polyancistra</i>	El Alisal	1700 m.
148.	<i>Cleistocactus hyalacanthus</i>	Chorrillos	1950 m.
149.	<i>Lobivia</i> sp.	Quebrada del Toro	2000 m.
150.	<i>Gymnocalycium spagazzinii</i>	Quebrada del Toro	2000 m.
151.	<i>Parodia stuemeri</i>	Igr. Maury	2250 m.
152.	<i>Parodia nivosa</i>	Igr. Maury	2250 m.
153.	<i>Opuntia microdisca</i> var.	Igr. Maury	2250 m.
154.	<i>Pyrrhocactus umadeave</i>	Puerta Tastil	2600 m.
155.	<i>Parodia tuberculosi-costata</i>	Alemania	1300 m.
156.	<i>Echinopsis silvestrii</i>	Alemania	1300 m.
157.	<i>Pfeiffera ianthothele</i>	Alemania	1300 m.
158.	<i>Trichocereus angelesii</i>	El Sapo	1600 m.
159.	<i>Echinopsis leucantha</i>	Colalao	1675 m.
160.	<i>Cereus aethiops</i>	Colalao	1675 m.
161.	<i>Gymnocalycium</i> aff. <i>catamarcense</i>	Hualfin	1850 m.
162.	<i>Acanthocalycium glaucum</i>	Los Nacimientos	2150 m.
163.	<i>Pterocactus kuntzei</i>	Hualfin	1850 m.
164.	<i>Parodia belenensis</i>	Quebrada de Belen	1375 m.
165.	<i>Tephrocactus geometricus</i>	Rio Guanchin	2100 m.
166.	<i>Trichocereus huascha</i>	Costa de Reyes	1350 m.
167.	<i>Trichocereus vatteri</i>	Campanas	1600 m.
168.	<i>Parodia sanagasta</i>	Agua Blanca	1650 m.
169a.	<i>Gymnocalycium kieslingii</i>	Cuesta de Huaco	1250 m.
169b.	<i>Gymnocalycium kieslingii</i>	Agua Blanca	1650 m.
170.	<i>Cleistocactus baumannii</i> (fa. <i>flavispina</i>)	Puerto del Valle	500 m.

171.	<i>Gymnocalycium moserianum</i>	Los Patayes	700 m.
172.	<i>Gymnocalycium bicolor</i>	Agua Colorada	825 m.
173.	<i>Echinopsis fallax</i> var. <i>cylindrica</i>	La Canada	900 m.
174.	<i>Gymnocalycium stellatum</i>	La Falda	1025 m.
175.	<i>Gymnocalycium capillaense</i>	Cosquin	850 m.
176.	<i>Gymnocalycium stellatum</i>	Cosquin	850 m.
177.	<i>Gymnocalycium</i> sp.	La Higuera	1000 m.
178.	<i>Gymnocalycium nigriareolatum</i>	Quebrada de Cebila	700 m.
179.	<i>Parodia catamarcensis</i> var. <i>riojensis</i>	Quebrada de Cebila	1000 m.
180.	<i>Gymnocalycium ambatoense</i>	Quebrada de Cebila	1000 m.
181.	<i>Trichocereus andalgalensis</i>	Quebrada de Cebila	1150 m.
182.	<i>Parodia spegazziniana</i>	Cuesta de Capillitas	2250 m.
183.	<i>Trichocereus ingens</i>	Cuesta de Capillitas	3000 m.
184.	<i>Acanthocalycium thionanthum</i>	San Carlos	1700 m.
185.	<i>Tephrocactus molinensis</i>	Palo Pintado	1850 m.
186.	<i>Tephrocactus weberi</i>	San Martin	1975 m.
187.	<i>Tephrocactus molinensis</i>	Angostura	2000 m.
188.	<i>Parodia aureicentra</i> var. <i>muhrii</i>	South of Molinos	2000 m.
189.	<i>Tephrocactus molinensis</i>	Molinos	2150 m.
190.	<i>Parodia aureicentra</i> var. <i>rauschii</i>	Cachi Adentro	2600 m.
191.	<i>Acanthocalycium chionanthum</i>	Buena Vista	2500 m.
192.	<i>Acanthocalycium chionanthum</i>	El Cajon	2750 m.
193.	<i>Opuntia</i> sp.	Chorrillos	1950 m.
194.	<i>Frailea schilinzkyana</i>	Cerro Azul	
195.	<i>Cereus argentinensis</i>	Cerro Azul	
196.	<i>Frailea schilinzkyana</i>	Santa Ana	150 m.
197.	<i>Notocactus linkii</i>	Santa Ana	150 m.
198.	<i>Notocactus linkii</i>	Cerro Volcan	200 m.
199.	<i>Notocactus ottonis</i>	Tres Cerros	120 m.
200.	<i>Frailea pumila</i>	Tres Cerros	120 m.
201.	<i>Eriocereus martinii</i>	Rio Corrientes	
202.	<i>Opuntia kiska-loro</i>	Rio Corrientes	
203.	<i>Echinopsis minuana</i>	Rio Corrientes	
204.	<i>Opuntia salmiana</i>	Avia Terai	80 m.
205.	<i>Parodia albo-fuscata</i>	La Punta	350 m.
206.	<i>Eriocereus pomanensis</i>	La Punta	350 m.
207.	<i>Parodia catamarcensis</i>	El Portezuelo	550 m.
208.	<i>Echinopsis fallax</i> var. <i>catamarcensis</i>	El Portezuelo	550 m.
209.	<i>Parodia catamarcensis</i>	Cuesta de Los Angeles	650 m.
210-211.	<i>Gymnocalycium nigriareolatum</i>	Cuesta de Los Angeles	650 m.
212.	<i>Pyrrhocactus catamarcensis</i>	Quebrada de Mazan	700 m.
213-214.	<i>Lobivia grandiflora</i>	El Rodeo	1750 m.
215.	<i>Parodia lembckeii</i>	Condor Huasi	2100 m.
216.	<i>Lobivia grandiflora</i> var. <i>lobivoides</i>	Condor Huasi	2100 m.

217.	<i>Trichocereus bruchii</i>	El Mollar	1950 m.
218-219	<i>Echinopsis schreiteri</i>	El Mollar	1950 m.
220.	<i>Austrocylindropuntia verschaffeltii</i>	Las Carreras	2250 m.
221.	<i>Austrocylindropuntia verschaffeltii</i>	Abra del Infernillo	3000 m.
222.	<i>Echinopsis stilowiana</i>	Abra del Infernillo	3000 m.
223.	<i>Acanthocalycium variiflorum</i>	Los Corpitos	2850 m.
224.	<i>Parodia tolobana</i>	Ruinas de Quilmes	1860 m.
225.	<i>Parodia horrida</i>	San Lucas	2000 m.
226.	<i>Acanthocalycium chionanthum</i>	San Lucas	2000 m.
227.	<i>Parodia heteracantha</i>	Road Molinos-Seclantas	2100 m.
228.	<i>Parodia aureicentra var. albifusca</i>	Road to Brealito	2375 m.
229.	<i>Parodia cachiana</i>	El Vallecito	2400 m.
230.	<i>Parodia aureicentra var. rauschii</i>	Rumihuasi	2600 m.
231.	<i>Acanthocalycium chionanthum</i>	Rumihuasi	2600 m.
232.	<i>Parodia lohaniana</i>	Road to Potrero	2600 m.
233.	<i>Parodia aureicentra var. variicolor</i>	Road to Potrero	2600 m.
234.	<i>Parodia aureicentra var. aureicentra</i>	Cachipampa	3100 m.
235.	<i>Trichocereus walteri</i>	Escoipe	2030 m.
236.	<i>Echinopsis silvestrii</i>	Sumalao	1100 m.
237-238	<i>Rebutia wessneriana</i>	Road to Tiraxi	1650 m.
239.	<i>Parodia schuetziana</i>	Huajra	2050 m.
240.	<i>Parodia schuetziana</i>	Tumbaya	2100 m.
241.	<i>Lobivia ferox</i>	Pucara de Tilcara	2550 m.
242.	<i>Parodia maassii</i>	Huacalera	2650 m.
243.	<i>Maihueniopsis nigripina</i>	Quebrada de Sapagua	3400 m.
244.	<i>Lobivia ferox</i>	Cuesta de Azul Pampa	3560 m.
245.	<i>Maihueniopsis minuta</i>	Cuesta de Azul Pampa	3560 m.
246.	<i>Trichocereus thelegonus</i>	Road to Valle Grande	1150 m.
247.	<i>Opuntia spegazzinii</i>	Road to Valle Grande	1150 m.
248.	<i>Parodia setifera</i>	Lumbreras	750 m.
249.	<i>Parodia microsperma var. macrancistra</i>	El Tala	875 m.
250.	<i>Gymnocalycium bayrianum</i>	El Tala/El Brete	875 m.
251.	<i>Parodia microsperma var. weberiana</i>	Rio Grande de Sauce	1000 m.
252.	<i>Parodia microsperma</i>	Las Tacanas	1200 m.
253.	<i>Echinopsis ancistrophora</i>	Las Tacanas	1200 m.
254a.	<i>Parodia microsperma</i>	Rio Rearte	1300 m.
254b.	<i>Parodia microsperma</i>	La Higuera	1250 m.
254c.	<i>Parodia microsperma</i>	Rio Choromoro	1275 m.
255.	<i>Echinopsis albispinosa</i>	Vipos	800 m.
256.	<i>Pfeiffera ianthothele</i>	Dique El Cadillal	650 m.

257.	<i>Rhipsalis lumbricoides</i>	El Típal	950 m.
258.	<i>Echinopsis ancistrophora</i>	Sierra Medina	1050 m.
259.	<i>Echinopsis ancistrophora</i>	Rio Nio	950 m.
260.	<i>Eriocereus tortuosus</i>	Colonia Alpina (Ceres)	90 m.
261.	<i>Cleistocactus baumannii</i>	Colonia Alpina (Ceres)	90 m.
262.	<i>Opuntia sulphurea</i>	Pinto	85 m.
263.	<i>Echinopsis baldiana</i>	Sierra de Sumampa	500 m.
264.	<i>Opuntia utkilio</i>	Sierra de Sumampa	500 m.
265.	<i>Acanthocalycium klimpelianum</i>	Road to Villa Maria	450 m.
266.	<i>Eriocereus pomanensis</i>	Road to Villa Maria	450 m.
267.	<i>Echinopsis fallax</i> var. <i>cylindrica</i>	Sauce Punco	850 m.
268.	<i>Gymnocalycium moserianum</i>	Salsacate	950 m.
269.	<i>Pyrrhocactus marayesensis</i>	Marayes	700 m.
270.	<i>Trichocereus strigosus</i>	Pachaco	1300 m.
271.	<i>Echinopsis leucantha</i>	Pachaco	1300 m.
272.	<i>Trichocereus vatteri</i>	Road Chilecito-Famatina	1350 m.
273.	<i>Trichocereus pseudocandicans</i>	Road Chilecito-Famatina	1350 m.
274-275	<i>Trichocereus huascha</i> var. <i>pecheretianus</i>	Cuesta de Zapata	1550 m.
276.	<i>Parodia belenensis</i>	Barrancas	1425 m.
277.	<i>Acanthocalycium glaucum</i>	Barrancas	1425 m.
278.	<i>Acanthocalycium griseum</i>	Punta de Balasto	2100 m.
279.	<i>Acanthocalycium thionanthum</i>	South of Cafayate	1650 m.
280.	<i>Parodia "cabracorralensis"</i>	Cabra Corral	1100 m.
281.	<i>Parodia chrysacanthion</i>	Volcan	2050 m.
282.	<i>Parodia tilcarensis</i>	Garganta del Diablo (Tilcara)	2800 m.
283.	<i>Opuntia soehrensii</i>	Garganta del Diablo	2800 m.
284.	<i>Lobivia multicosata</i>	Road to Abra de Pives	3400 m.
285.	<i>Parodia tilcarensis</i>	Road to Abra de Pives	3400 m.
286.	<i>Parodia maassii</i>	Tafna	3500 m.
287.	<i>Lobivia ferox</i> var. <i>longispina</i>	Tafna	3500 m.
288.	<i>Rebutia pygmaea</i>	Cuesta de Toquero	3550 m.
289.	<i>Lobivia ferox</i> var. <i>longispina</i>	Cuesta de Toquero	3550 m.
290.	<i>Puna subterranea</i>	East of Yavi	3500 m.
291.	<i>Lobivia pugionacantha</i>	East of Yavi	3500 m.
292.	<i>Maihue niopsis pentlandii</i>	East of Yavi	3500 m.
293.	<i>Maihue niopsis nigrispina</i>	Aroyo Ugchara (Abra Pampa)	3550 m.
294.	<i>Trichocereus tarijensis</i>	Quebrada de Humahuaca	3300 m.
295.	<i>Parodia cebilarensis</i>	Cuesta El Lajar	1700 m.
296.	<i>Opuntia schickendantzii</i>	Cuesta El Lajar	1700 m.
297.	<i>Parodia microsperma</i> var. <i>weberiana</i>	Los Sauces	1550 m.
298.	<i>Cleistocactus smaragdiflorus</i>	Dique El Cadillal	625 m.
299.	<i>Gymnocalycium quehlianum</i> var. <i>zantnerianum</i>	Sauce Punco	1050 m.

300.	<i>Echinopsis albispinosa</i>	Cabra Corral	1100 m.
301.	<i>Parodia nivosa</i>	Chorrillos	2000 m.
302.	<i>Parodia stuemeri</i>	Chorrillos	2000 m.
303.	<i>Opuntia microdisca</i> var.	El Antigal	2450 m.
304.	<i>Pyrrhocactus umadeave</i>	Puerta Tastil	2650 m.
305.	<i>Trichocereus smrzianus</i>	El Sunchal (Cuesta del Obispo)	3050 m.
306.	<i>Austrocylandropuntia verschaffeltii</i>	El Sunchal	3050 m.
307.	<i>Trichocereus korethroides</i>	Piedra del Molino	3600 m.
308.	<i>Echinopsis saltensis</i> var. <i>pseudocachensis</i>	Cachipampa	3000 m.
309.	<i>Trichocereus walteri</i>	Road to Amblayo	2450 m.
310.	<i>Echinopsis densispina</i> var. <i>amblayensis</i>	Amblayo	2350 m.
311.	<i>Cleistocactus smaragdiflorus</i> fa. <i>rojoi</i>	Aguas Blancas	450 m.
312.	<i>Parodia cardenasii</i>	Road to Itiyuro	500 m.
313.	<i>Cleistocactus smaragdiflorus</i> fa. <i>rojoi</i>	Road to Itiyuro	500 m.
314.	<i>Eriocereus tortuosus</i>	La Estrella	500 m.
315.	<i>Opuntia brunnescens</i>	Martinez del Tineo	500 m.
316.	<i>Eriocereus tortuosus</i>	South of Antilla	450 m.
317.	<i>Opuntia cedergreniana</i>	Rio Urueña	400 m.
318.	<i>Cleistocactus</i> sp.	Rio Urueña	400 m.
319.	<i>Parodia rigidispina</i>	Quebrada de Escaba	600 m.
320.	<i>Opuntia discolor</i>	Quebrada de Escaba	600 m.
321.	<i>Rhipsalis lorentziana</i>	Dique de Escaba	650 m.
322.	<i>Lepismium tucumanense</i>	Dique de Escaba	650 m.
323.	<i>Parodia catamarcensis</i>	Cuesta de Portezuelo	1100 m.
324.	<i>Parodia sanguiniflora</i>	Cuesta de Portezuelo	1300 m.
325.	<i>Tephrocactus alexanderi</i>	Quebrada de Cebila	850 m.
326.	<i>Trichocereus huascha</i> var.	Quebrada de Cebila	1100 m.
327.	<i>Parodia wagneriana</i>	East of Andalgala	800 m.
328.	<i>Gymnocalycium ambatoense</i>	East of Andalgala	800 m.
329.	<i>Parodia sanguiniflora</i>	Cuesta de la Chilca	1600 m.
330.	<i>Echinopsis fallax</i> var. <i>shaferi</i>	Cuesta de la Chilca	1700 m.
331.	<i>Trichocereus pseudocandicans</i>	Pinchas	1400 m.
332.	<i>Chamaecereus silvestrii</i>	Anillaco: cultivated.	
333.	<i>Parodia sanagasta</i>	Cuesta de Huaco	1450 m.
334.	<i>Trichocereus strigosus</i>	Los Colorados	600 m.
335.	<i>Pyrrhocactus bulbocalyx</i>	Los Colorados	600 m.
336.	<i>Trichocereus lamprochlorus</i>	San Salvador	800 m.
337.	<i>Echinopsis aurea</i>	La Falda	800 m.
338.	<i>Echinopsis aurea</i> var. <i>sierragrandsensis</i>	Road to Los Gigantes	1200 m.
339.	<i>Echinopsis aurea</i>	Santa Monica (Calamuchita)	600 m.

340.	<i>Gymnocalycium stellatum</i>	Santa Monica	600 m.
341.	<i>Gymnocalycium sutterianum</i>	Road to Yacanto	750 m.
342.	<i>Gymnocalycium bruchii</i>	Road to Yacanto	900 m.
343.	<i>Gymnocalycium bruchii</i>	Road to Athos Pampa	1000 m.
344.	<i>Notocactus submammulosus</i>	Road to Athos Pampa	1000 m.
345.	<i>Parodia</i> cf. <i>tumbayana</i>	Road to Abra de Pives	2850 m.
346.	<i>Opuntia armata</i>	Road to Abra de Pives	2850 m.
347.	<i>Echinopsis densispina</i>	Road to Abra de Pives	3000 m.
348.	<i>Lobivia ferox</i>	Road to Abra de Pives	3000 m.
349.	<i>Parodia schuetziana</i>	Road to Abra de Pives	3000 m.
350.	<i>Lobivia jajoiana</i> var. <i>elegans</i>	Road to Abra de Pives	3250 m.
351.	<i>Austrocylindropuntia vestita</i>	Volcan	2100 m.
352.	<i>Rebutia wessneriana</i>	Volcan	2150 m.
353.	<i>Opuntia</i> sp. (aff. <i>delaetiana</i>)	Leon	1700 m.
354.	<i>Rhipsalis lumbricoides</i>	Los Cedros	1200 m.
355.	<i>Echinopsis ancistrophora</i> var. <i>hamatacantha</i>	Campo Alegre	1425 m.
356.	<i>Opuntia salmiana</i>	El Bordo	600 m.
357.	<i>Echinopsis</i> sp.	Road to San Vicente	700 m.
358.	<i>Echinopsis albispinosa</i>	Road to San Vicente	700 m.
359.	<i>Gymnocalycium schickendantzii</i> var. <i>delaetii</i>	Road to San Vicente	700 m.
360.	<i>Parodia microsperma</i>	Rio Sali / San Vicente	550 m.
361.	<i>Pfeiffera ianthothele</i> fa	Cuesta del Totoral	800 m.
362.	<i>Opuntia paraguayensis</i>	Cuesta del Totoral	950 m.
363.	<i>Cereus forbesii</i>	Cuesta del Totoral	950 m.
364.	<i>Parodia sanguiniflora</i>	Cuesta del Totoral	1100 m.
365.	<i>Gymnocalycium baldianum</i>	Cumbre del Portezuelo	1750 m.
366.	<i>Lobivia grandiflora</i>	Cumbre del Portezuelo	1750 m.
367.	<i>Trichocereus andalgalensis</i>	Cumbre del Portezuelo	1750 m.
368.	<i>Echinopsis dobeana</i>	Road to El Vallecito	1650 m.
369.	<i>Lobivia grandiflora</i>	Las Juntas	1500 m.
370.	<i>Opuntia</i> sp.	Cuesta de Miranda	1900 m.
371.	<i>Tephrocactus alexanderi</i>	San Jose de Jachal	1300 m.
372.	<i>Pyrrhocactus strausianus</i> var. <i>sanjuanensis</i>	Llanos de Chita	2100 m.
373.	<i>Pyrrhocactus villicumensis</i>	North of Albardon	800 m.
374.	<i>Gymnocalycium catamarcense</i> fa. <i>montanum</i>	Villavil	2050 m.
375.	<i>Gymnocalycium catamarcense</i> fa. <i>montanum</i>	El Bolson	2200 m.
376.	<i>Echinopsis haematantha</i> var. <i>jasimanensis</i>	Barranca Larga	2750 m.
377.	<i>Acanthocalycium glaucum</i>	Hualfin	1850 m.
378.	<i>Acanthocalycium variiflorum</i>	Zurita	2100 m.
379.	<i>Acanthocalycium thionanthum</i>	Pichao	2000 m.
380.	<i>Parodia aureispina</i>	Rio Mojotoro	1250 m.
381.	<i>Trichocereus terscheckii</i>	Cuesta de Quesera	1450 m.

382.	<i>Gymnocalycium andreae</i>	El Condor	2300 m.
383.	<i>Gymnocalycium vatteri</i>	Las Rabonas	950 m.
384.	<i>Gymnocalycium ochoterenae</i>	Road to Talita	500 m.
385.	<i>Gymnocalycium ochoterenae</i>	Baños del Zapallar	550 m.
386.	<i>Gymnocalycium castellanosii</i> var. <i>bozsingianum</i>	Chepes Viejo	950 m.
387.	<i>Pyrrhocactus megliolii</i>	Marayes	700 m.
388.	<i>Tephrocactus</i> aff. <i>weberi</i>	Marayes	700 m.
389.	<i>Trichocereus formosus</i>	Road to Uspallata	2050 m.
390.	<i>Maihue niopsis</i> sp.	Road to Uspallata	2875 m.
391.	<i>Pyrrhocactus vertongenii</i>	Baños La Laja	700 m.
392.	<i>Pterocactus megliolii</i>	Baños La Laja	700 m.
393.	<i>Pyrrhocactus pachacoensis</i>	Pachaco	1200 m.
394.	<i>Trichocereus formosus</i> var.	Road to Arrequintin	3000 m.
395.	<i>Gymnocalycium hossei</i>	Road to Guanchin	1350 m.
396.	<i>Tephrocactus</i> aff. <i>weberi</i>	Chañarmuyo	1450 m.
397.	<i>Tephrocactus geometricus</i>	Loro Huasi	2100 m.
398.	<i>Gymnocalycium bodenbenderianum</i>	Carrizal	850 m.
399.	<i>Parodia cachiana</i>	Sari Jose de Escalchi	2200 m.
400.	<i>Austrocylindropuntia verschaffeltii</i>	Cachipampa	3500 m.
401.	<i>Parodia</i> sp.	Las Ventanas	1550 m.
402.	<i>Maihue niopsis</i> sp.	Amaicha-Los Corpitos	2600 m.
403.	<i>Parodia spanisa</i>	Amaicha-Los Corpitos	2800 m.
404.	<i>Gymnocalycium baldianum</i> var. <i>albiflorum</i>	Road Alijilana-El Alto	1000 m.
405.	<i>Lobivia grandiflora</i> var. <i>pumila</i>	Road Alijilana-El Alto	1125 m.
406.	<i>Gymnocalycium oenanthemum</i>	Above de Los Angeles	1700 m.
407.	<i>Opuntia</i> sp. (aff. <i>picardoi</i> ?)	Above de Los Angeles	1700 m.
408.	<i>Parodia</i> sp.	Pinchas-Agua Blanca	1500 m.
409.	<i>Gymnocalycium piltziorum</i>	Agua Blanca	1550 m.
410.	<i>Gymnocalycium bicolor</i>	Los Patayes	650 m.

Remarks.

- 1) Numbers 114 to 118 are not reproduced on the present list, because they are collections carried out in Paraguay, of species not represented in Argentina.
- 2) It can happen that a locality appears several times in the list at different altitudes. This means simply that collections took place at various places on the perimeter of the aforementioned locality, which is obviously not always perfectly level.

GLOSSARY

- Acicular:** needle-shaped.
Actinomorph: radially symmetric
Acuminate: sharp-pointed; tapering to a long point.
Anthesis: opening of the flower.
Auricule: ear-shaped
Caducous: early-dropping.
Campanulate: bell-shaped.
Chasmogamous: Flower that opens “as usual”; cross fertilization possible.
Claviform: club-shaped.
Cleistogamous: Flower that does not open; self-fertilization only possible.
Confluent: running together, merging, converging.
Crateriform: bowl-shaped
Cupuliform: cup-shaped
Escutcheon: type of graft made of a piece of bark with a bud.
Infundibuliform: funnel-shaped.
Isabelle: light golden yellow colour; palomino.
Mucro: a sharp-pointed end.
Mucronate: sharp-pointed.
Piriform: pear-shaped.
Pruinose: with a powdery layer.
Recurved: folded backwards.
Rotate: wheel-shaped.
Strophiole: aril outgrowth of the hilum
Subulate: awl-shaped.
Umbilicate: depressed in centre.
Vestita: covered.

