

PLANT USES IN A BRAZILIAN COASTAL FISHING COMMUNITY (BUZIOS ISLAND)

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ABSTRACT.-Búzios Island (southeast Brazil) is a fishing community in which agriculture played an important role in the past. Despite the increased importance of market-oriented fishing, decline of agriculture, and shift from traditional herbal toward modern medicine, wild and cultivated plants still play a major role in the economics of the community. This study gives a general description of vegetation, cultivated, or collected plants used for food, construction, handicrafts, and medicinal purposes. Local and scientific names are provided for 61 plants used for food, 53 plants **used** in medicine, and 32 species used for house and canoe construction and handicrafts. On **Búzios**, older adults showed a better knowledge of medicinal plants than younger ones. Many medicinal plants are **used** for the treatment of worms, which are common among children. The medicinal plants used on **Búzios** Island are widespread plants commonly **used** in other parts of Brazil. We found a high diversity of plants **used** on **Búzios** even compared to Amazonian communities.

RESUMO.-A comunidade pesqueira da Ilha dos **Búzios** (sudeste do Brasil), teve no passado a agricultura como atividade predominante. Apesar do desenvolvimento das atividades de **pesca**, do **decréscimo** da agricultura e de certa **mudança** da medicina **caseira** para uma mais moderna, as plantas coletadas e cultivadas ainda têm um papel importante na economia da comunidade. Este estudo apresenta uma **descrição** geral da **vegetação** da **área**, das plantas cultivadas ou coletadas para **alimentação**, **construções**, artesanato e para usos medicinais. Nomes locais e científicos **são** listados para 61 plantas usadas como alimento, 53 usadas na medicina caseira e 32 usadas em **construções** de casas e canoas, e para artesanato. Em **Búzios**, os indivíduos mais velhos demonstraram um conhecimento maior sobre plantas medicinais. Muitas **dessas** plantas **são** usadas no tratamento de verminoses, muito comuns entre as **crianças**. As plantas medicinais usadas em **Búzios são também** usadas em outras partes do Brasil. Encontramos em **Búzios**

uma alta diversidade de plantas usadas, mesmo comparacla à de comunidades da **Amazônia**.

RÉSUMÉ.—La communauté de pêcheurs de l'Id de **Búzios** (située au sud-est du **Brésil**) pratiquait, dans le temps, l'agriculture comme une des **activités prédominantes**. Malgré le développement de la **pêche**, la **diminution** de l'agriculture, et un **certain** changement de la **médecine ménagère** envers une plus moderne, les **plantes cultivées et récoltées** jouent encore un **rôle** important dans l'**économie** de la communauté. Cette **étude présente** une description **générale** de la **végétation** de l'endroit, des plantes **cultivées** ou **récoltées** en vue de leur utilisation dans l'alimentation, la construction, l'artisanat, et l'usage **médicinal**. Ont **été catalogués** les noms locaux et les noms scientifiques de 61 plantes **utilisées** dans l'alimentation, 53 **utilisées** en **médecine ménagère**, et 32 pour la construction des maisons et des **canôes**, ainsi que l'**artisanat**. A **Búzios**, les personnes plus **agées** ont **démontré** une connaissance plus profonde des plantes **médicinales**. Un grand nombre de res plantes s'emploie à soigner la vermineuse, **très fréquente** parmi les enfants. Les plantes **médicinales utilisées à Búzios** sont aussi **employées** dans **d'autres régions** du **Brésil**. On trouve à **Búzios** une grande diversité de plantes **utilisées** localement; cela, **même comparé** aux **communautés** de la **région** Amazonique.

INTRODUCTION

Ethnobotanical studies have shown that humans have discovered and improved plants for a variety of purposes, including food, shelter, and medicine. Even in the case of medicine, where modern inventions appear to dominate, we owe a great debt to folk medicine for a knowledge of the healing properties of plants (Schultes 1978). Many aboriginal cultures in Africa, Asia, and South America are disappearing; there is a danger that much of potentially useful knowledge of the curative properties and other uses of plants will vanish with these cultures. Even in industrialized countries, 45% of commercial drug production comes from natural products (Elisabetsky 1986). There is less comment in the literature on the effects of modernization on nonmedicinal **plant** uses. Similarly, the continued use of land for cultivation and plant communities for collected resources by modernizing communities is an important issue in conservation biology. Several aspects of the Buzios Island economy and society have changed significantly since the careful field study conducted by Willems in 1947 (Willems 1952). This offers us an unusual opportunity to document changes and continuities in plant use as a function of modernization.

This study is part of a larger research project in human ecology carried out at Buzios Island (Begossi 1989) that included an analysis of all economic and subsistence activities. Fish and terrestrial plants play a dominant role in islanders' subsistence and commercial production. We describe here the plants used by families from Buzios, and present an analysis of the current relationship between agriculture and fishing.

In spite of an economic shift at **Búzios** from farming to fishing during the course of the twentieth century (Begossi 1989), plants are still very important to islanders' livelihoods. Plants are cultivated and collected on Buzios for a variety of purposes, such as medicine, house construction, handicrafts, and food. The economic shift on Buzios is similar to events along the whole northern coast of

São Paulo State. According to Diegues (1983), the shift from agriculture to fishing that occurred mainly since the 1950s is due to low prices for agricultural products relative to fish, and to accumulating soil and pest problems in the agricultural sector.

One of the first studies of Brazilian plant utilization (including medical practices and Portuguese and Indian influences) was that of Piso in 1648 (Piso 1957). As pointed out by Levi-Strauss (1986), few peoples have so complex a knowledge of the physical and chemical properties of plants as do the South American Indians. Prance et al. (1987) studied the plant utilization of four South American Indian groups and showed that 49-79% of the tree species on one hectare sample forest plots were useful to each group. They suggest that such a high usage has important implications for conservation policies.

Búzios Island is in the heavily disturbed Atlantic Forest Phytogeographic Province. It would be interesting to know to what extent studies from other parts of Brazil, especially from Amazonia, can be applied to this region. Southeast coastal populations, called *caçaras*, are influenced by Portuguese and Indian culture; Indian influences are still conspicuous in manioc flour processing, for example.

THE STUDY SITE

Búzios Island is located in southeastern Brazil (23° 47' S, 45° 10' W), off the coast of **São Paulo State** (Fig. 1). The population of the island consists of about 220 individuals (44 families) distributed among 8 hamlets situated on small harbors with canoe shelters. Porto do Meio is the largest harbor, with 23 families. Bairro de **São Francisco** (**São Sebastião City**) and Ilhabela (**São Sebastião Island**) are the main urban localities visited by islanders.

Leitão-Filho (1982, 1987) and Silva and Leitão-Filho (1982) give descriptions of the Atlantic Forest of **São Paulo State**. Ecologically important families and genera are: Myrtaceae (*Eugenia*, *Myrcia*, *Marlierea*), Sapotaceae (*Pouteria*, *Chrysophyllum*), Lauraceae (*Ocotea*, *Nectandra*, *Aniba*), Euphorbiaceae (*Hyeronima*, *Croton*, *Alchornea*, *Pera*), Elaeocarpaceae (*Sloanea*), Mimosaceae (*Inga*, *Pithecellobium*, *Piptadenia*), Fabaceae (*Centrolobium*, *Andira*, *Hymenolobium*), and Caesalpiniaceae (*Sclerolobium*, *Tachigalia*). In areas deforested (either by fire or by cutting), the predominant plants are shrubs and colonizing plants from the genera *Tibouchina*, *Piper*, *Costus*, *Rapanea*, *Leandra*, *Trema*, *Cecropia*, and *Solanum*, typical of early successional stages of the Atlantic Forest.

Forests on Búzios Island are found on top of the main hill of the island and on the uninhabited side (Figs. 1 and 2). Fruit trees, such as mango (*manga*) (*Mangifera indica* L.) and jack fruit (*jaca*) (*Artocarpus integrifolia* L.) are planted next to houses, especially at the harbors of Guanxuma and Pitangueira. Porto do Meio, the most populous harbor, has proportionately fewer trees and more grassland.

METHODS

One of us (AB) carried out field work on Búzios Island from September 1986 to December 1987. Observations and photographs of plant utilization by community members for agriculture, construction, and medicinal purposes were obtained.

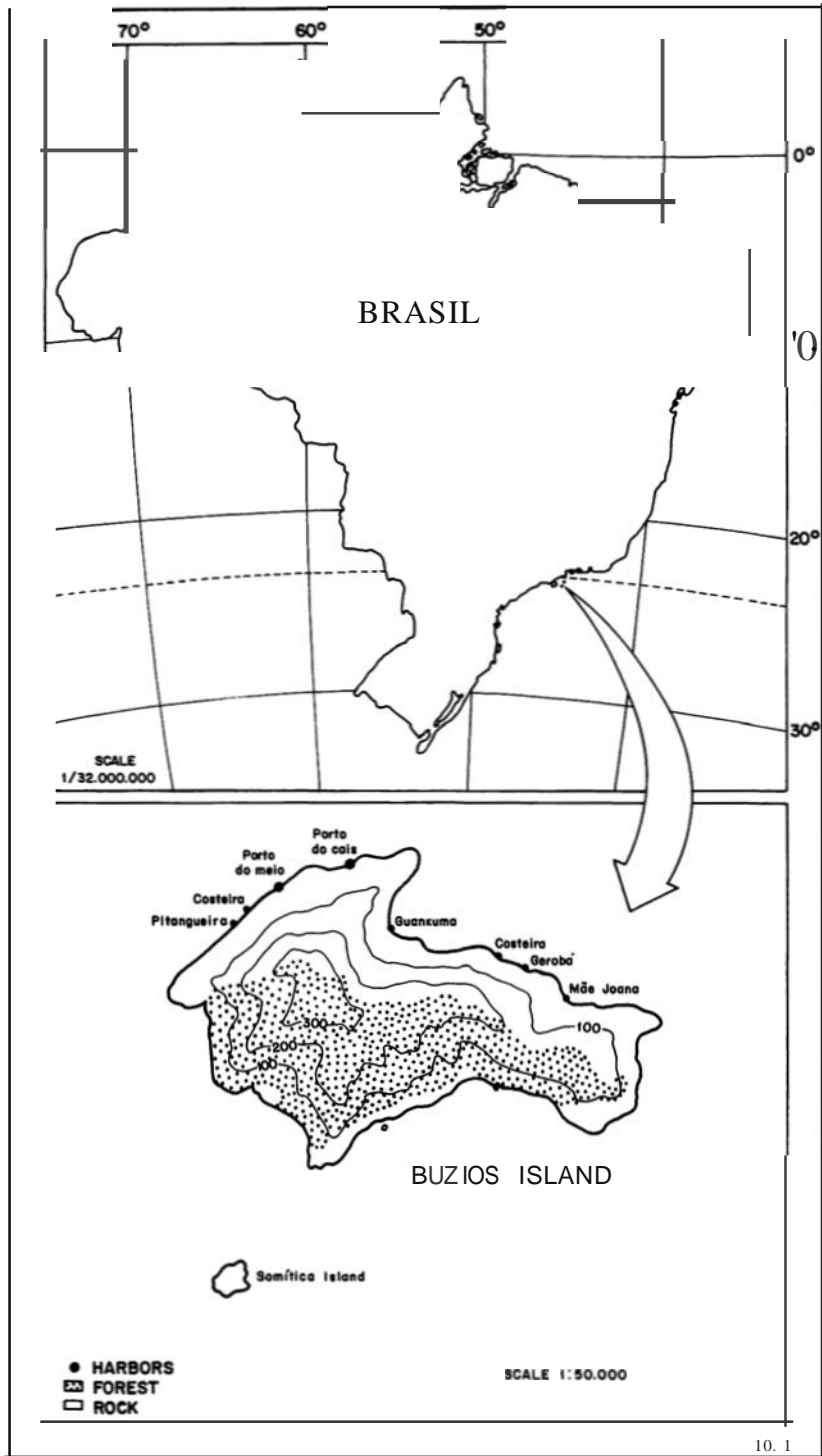


FIG. 1.-Location of **Búzios** Island in Brazil and the distribution of harbors.

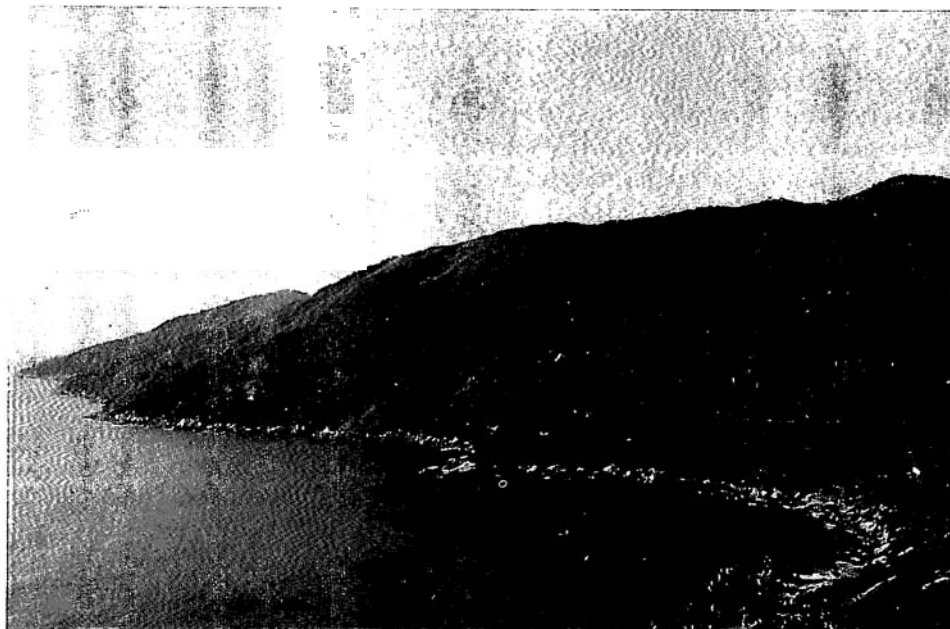


FIG. 2.-General view of **Búzios** Island.

mainly at Porto do Meio Harbor. Plant collections and interviews were made at all harbors except **Mãe Joana**, **Costeira**, and **Geroba**, where seven families lived (Fig. 1). These harbors were difficult to reach as the island topography is quite dissected and weather and rough seas often prevent canoe travel. **Twenty-eight** families (adults) were interviewed concerning utilization of medicinal plants in February 1987. In general, both husband and wife participated in interviews. The names of plants collected for identification were checked with informants from Porto do Meio. Plants were identified at the Herbarium of the Universidade Estadual de Campinas (UEC) at Campinas, **São Paulo**, Brazil. Small birds were identified by L.Q.M. Machado, J. Vielliard, and O.c. de Oliveira of the Departamento de Zoologia, Universidade Estadual de Campinas, **São Paulo**, Brazil.

SHIFT FROM AGRICULTURE TO FISHING

França (1954) reviewed the general history of agriculture for the northern coast of **São Paulo**, and his generalizations provide the context in which the Buzios economy developed. Before 1800 the coast of **São Paulo**, in particular **São Sebastião** Island, was economically dominated by sugarcane plantations where sugar and sugarcane rum (*aguardente* or *pinga*), a typical Brazilian beverage, were produced. Around 1800 coffee plantations began to replace sugarcane. Coffee plantings peaked in the midnineteenth century and the industry collapsed in the decade after 1870. During the first half of this century, cultivation of sugarcane (this time restricted to the production of *aguardente*) was again the main economic activity, but declined gradually toward midcentury. Manioc had been always a staple crop, despite these introductions.

On **Búzios** today, agricultural activities are still carried out mainly for subsistence. Cash income is obtained almost exclusively from fish sales (Begossi 1989). But agriculture centered around the cultivation of manioc was formerly more important in the local economy. Willems (1952) reported that during his stay at **Búzios**, 33 men worked at farming as their major activity while only two depended primarily on fishing. According to older informants, at the beginning of this century Buzios islanders cultivated rice, beans, maize, manioc, cotton, coffee, and oranges, and even exported some of these crops. These crops, along with sweet potatoes, yams, *altas*, pumpkins, sugarcane, coconuts, bananas, and tobacco were mentioned by Willems (1952). As is the case with contemporary **Búzios**, manioc, sweet potatoes, and sugarcane were important crops in the past, but Buzios was never a self-sufficient community. In spite of a stable subsistence based on manioc and fish, major changes **occurred** in commercial production on the island; starting with **coffee** in the last century, the island's economy moved from trade of salted fish and black beans, to cultivation of manioc and beans and algae collecting (Willems 1952), and finally back to trade of fish. Agriculture has thus been replaced on Buzios by fishing as the principal economic activity. Fishing is especially emphasized by younger people. Older islanders still maintain manioc and bean fields, and are usually part-time rather than full-time fishermen.

Buzios is similar to other relatively small and isolated settlements in which social relations are based on kinship ties (Begossi 1989). Products are exchanged along family lines, and there is an informal division of labor in that younger fishermen exchange fish for plant foods grown and collected by their older relatives.

CONTEMPORARY AGRICULTURAL PRODUCTION

Beans and potatoes are important in contemporary diets, but are now largely purchased on the coast. Manioc continues to be a basic staple crop on **Búzios** Island but it is commercialized by a few families, especially when fishing is not possible.

Roças (swiddens) are small plots located five to ten minutes, by foot, from the houses; *hortas* are small gardens next to the houses where green vegetables are grown (Fig. 3). About 17 species of fruit trees are planted by islanders and along with other crops they represent a greater diversity of products than described by Willems (1952) (Tables 1 and 2).

Roças are prepared for planting by clearing the plot with axes, machetes, and hoes, and burning the resulting debris. Plots are prepared and planted in the dry season, from July to October. The bean harvest occurs three or four months later, whereas manioc is harvested throughout the year. After two or **three** years the plot can be burned again or left fallow. Informants told us that they may use the same plot for five or six years. The decision either to continue cultivating or to leave a given plot fallow is based on expected *roça* productivity. Fields that are still producing a reasonable crop of large manioc tubers are burned again.

Production of manioc flour occurs in a separate building next to the house that is called the *casa de farinha* (flour house). The technique and instruments used to process manioc are indigenous and the same as Willems (1952) described. The time spent on each step in the processing of manioc and the production of flour was recorded by Begossi (1989:62). Two persons need about one day to produce

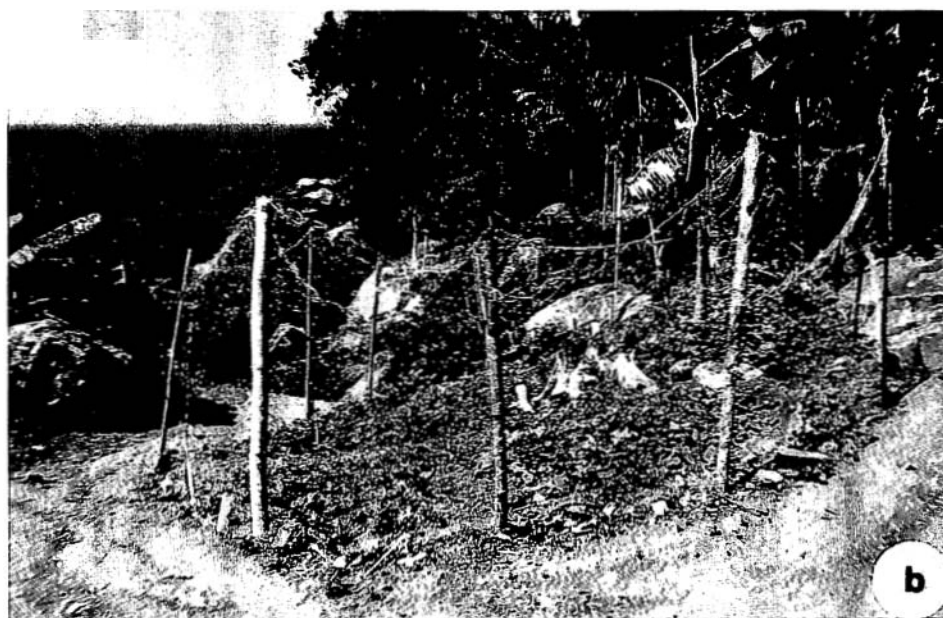
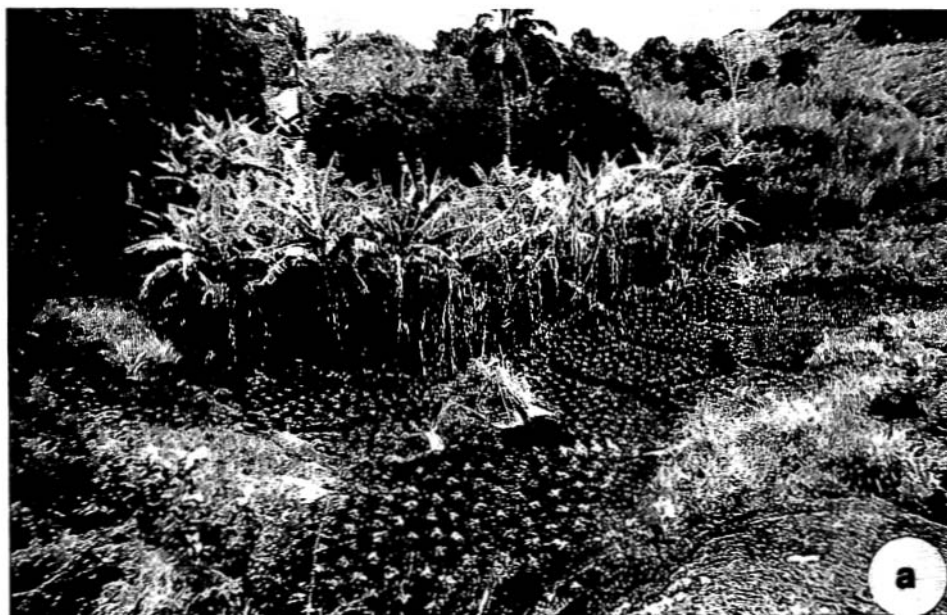


FIG. 3.- (a) a typical *roça* with beans and bananas; (b) a garden (*harta*) protected by pieces of fishing nets.

TABLE 1.-Field (**roças**) and garden *Chartas*) food crops cultivated at Buzios Island. Fields are small plots located in walking distance (5-10 minutes) from residences while the gardens are located next to houses. Portuguese names are the ones used at **Búzios**. Plants from Brazil are considered as native (n) while plants from other areas (including South America) are considered as exotic (e).

Plant Names Common Name	Scientific Name	Family
In Open Fields (roça)		
e batata potato	<i>Solanum tuberosum</i> L.	Solanaceae
e balata doce sweet potato	<i>Ipomoea batatas</i> Poir.	Convolvulaceae
e cana de açúcar¹ sugarcane	<i>Saccharum officinarum</i> L.	Gramineae
e cará (inhume) yam	<i>Dioscorea alata</i> L.	Dioscoreaceae
e café² coffee	<i>Coffea arabica</i> L.	Rubiaceae
e feijão³ beans	<i>Phaseolus vulgaris</i> L.	Fabaceae
e feijão guando red gram	<i>Cajanus cajan</i> (L.) Mill.	Fabaceae
e feijão fava	<i>Phaseolus lunatus</i> L.	Fabaceae
n mandioca⁴ (ramo) manioc	<i>Manihot esculenta</i> Crantz.	Euphorbiaceae
n mandioca landr-preto manioc	<i>Manihot</i> sp.1	
n mandioc^Q vermelhinha manioc	<i>Manihot</i> sp.2	
n mandioca landí-miúdo manioc	no longer used	
n mandioca macaé manioc	no longer used	
n mandioc^Q maria francisca manioc	no longer used	
n mandioca saracura manioc	no longer used	
e milho maize	<i>Zea mays</i> L.	Gramineae
e soja soybean	<i>Glycine max</i> (L.) Merr.	Fabaceae
In House Garden (horta)		
e abóbora squash	<i>Cucurbita pepo</i> L.	Cucurbitaceae
e abobrinha summer squash	<i>Cucurbita pepo</i> L.	Cucurbitaceae
e alface lettuce	<i>Lactuca sativa</i> L.	Compositae

Plant Names Common Name	Scientific Name	Family
e <i>almeirão</i> blue sailors	<i>Cichorium endivia</i> L.	Compositae
e <i>cebolinha</i> welsh onion	<i>Allium fistulosum</i> L.	Liliaceae
e <i>chicória</i> chicory	<i>Cichorium intybus</i> L.	Compositae
e <i>chuchu</i> chocho	<i>Sechium edule</i> Sw.	Cucurbitaceae
e <i>couPe</i> cole	<i>Brassica oleracea</i> L.	Cruciferae
e <i>pepino</i> cucumber	<i>Cucumis sativus</i> L.	Cucurbitaceae
e <i>pimentão</i> green pepper	<i>Capsicum annuum</i> L.	Solanaceae
n <i>pimenta vermelha</i> hot pepper	<i>Capsicum frutescens</i> L.	Solanaceae
e <i>quiabo</i> okra	<i>Hibiscus esculentum</i> L.	Malvaceae
e <i>repolho</i> cabbage	<i>Brassica oleracea</i> L.	Cruciferae
e <i>salsinha</i> parsley	<i>Petroselinum sativum</i> L.	UmbeUiferae
e <i>tomate</i> tomato	<i>Lycopersicon esculentum</i> Mill	Solanaceae

leaten by **children**; they also **make** *garapa* (**fresh** sugar cane juice) to drink and **as** a substitute for **refined** sugar.

²one family

³varieties of *Phaseolus vulgaris* are: *bico de euro*, *carioca*, or *lis/radinhe do roça* and *roxinho*.

⁴varieties of *Manihot esculenta* are: *branca*, *doee*, *nertisla*, *vassourinha*, and *roxinha da areia*.

one *alqueire* (standard. weight measure used at the island, equal to 22 kg) of manioc flour, using the steps shown in Fig. 4. On average, one person-hour of labor yields about 1 kg of manioc flour. Manioc prices are low compared to the price of fish in the markets of Ilhabela or Baireo de São Francisco. For example, the price of manioc flour was 10 cruzados/kg (US\$ 0.23) in June, 198Z Fishing was much more rewarding per unit of effort. In the same month, a very inexpensive fish such as yellow chub [*Kyphosus incisor* (Cuvier)] was sold by islanders for 10 cruzados/kg while an expensive fish such as grouper (Serranidae) brought 25 cruzados/kg. Typical fish catches yielded approximately 3 kg per trip and trips lasted around two hours. Thus fishing was minimally 1.5 times as productive per unit of labor as manioc processing, without including the labor of growing manioc (for more information on the **economics** of fishing see Begossi 1989 and Begossi and Richerson 1991).

TABLE 2.-Fruits cultivated and collected (.) for food at Buzios Island. Portuguese names are the ones used at **Búzios**. Native (n) and exotic (e) species.

Plant Names Common Name	Scientific	Family	Voucher Number (AD, UEC)
e abacate avocado	<i>Persea americana</i> Mill.	Lauraceae	
n abricó mameyapple	<i>Mammea americana</i> L.	Guttiferae	10812
e <i>amora</i> " raspberry	<i>Rubus rosaefolius</i> Sm.	Rosaceae	23906
n azedinha*	<i>Oxalis hedisarifolia</i> Raddi	Oxalidaceae	49815
n araçá	<i>Psidium cattleyanum</i> Sabine	Myrtaceae	12227
n bacupari*	<i>Rheedia gardneriana</i> Planch. et Triana	Clusiaceae	5524
e banana banana	<i>Musa acuminata</i> Colla	Musaceae	
e chapu de sol* tropical almond	<i>Terminalia catappa</i> L.	Combretaceae	1435
e coco coconut	<i>Cocos nudlera</i> L	Palmae	
n <i>coquinho</i> "	<i>Syagrus</i> sp.	Palmae	
e <i>Feijão guando</i> ¹ red gram	<i>Cajou</i> <i>Cajon</i> (L.) Mill.	Fabaceae	
e <i>fruta do conde</i> sugar apple	<i>Annona squamosa</i> L.	Annonaceae	
n goiaba branca guava	<i>Psidium guajava</i> L	Myrtaceae	
n guapeba*	<i>Pouteria</i> sp.	Sapotaceae	
n ingá* inga	<i>Inga sessilis</i> (Veil.) Mart.	Mimosaceae	49737
e jaca jack fruit	<i>Artocarpus integrifolia</i> L	Moraceae	
e jambolão jambolan	<i>Eugenia cumini</i> (L.) Druce	Myrtaceae	
e jambro ² star apple	<i>Syzygium jambos</i> (L.) Alston	Myrtaceae	47000
e <i>laranja</i> ³ orange	<i>Citrus sinensis</i> (L.) Osbeck	Rutaceae	
e limão lemon	<i>Citrus aurantifolia</i> Swing.	Rutaceae	
e mamão papaya	<i>Carica papaya</i> L	Caricaceae	
e <i>melão de São Caetano*</i>	<i>Momordica charantia</i> L.	Cucurbitaceae	33276
e mexerica*	<i>Clidemia hirta</i> D. Don.	Melastomataceae	10342
e manga mango	<i>Mangifera indica</i> L	Anacardiaceae	

Plant Names Common Name	Scientific	Family	Voucher Number (AB, VEC)
n marocujd (imbucuiá) passion fruit	<i>Passiflora edulis</i> Sims.	Passifloraceae	12714
n paino- silk cotton tree	<i>Pseudobombax gmnidiflorum</i> (Cav.) A. Robyns	Bombacaceae	949
n pitanga- Brazilian cherry	<i>Eugenia uniflora</i> L.	Myrtaceae	11745
e romil pomegranate	<i>Punica granatum</i> L.	Punicaceae	
e ,va grape	<i>Vitis vinifera</i> L.	Vitaceae	

1children eat the green seeds

2children eat the flowers, too.

3variety called serra d"gua

PLANTS USED FOR FOOD, CONSTRUCTION, AND MEDICINE

Plants consumed at Buzios are listed in Tables 1 and 2. Fruits are often collected by children; these include mangos, *Momordica charantia* L. (*melao de São Caetano*), tropical almond (*chapéu de sol*) (*Terminalia catappa* L.), inga (*Inga sessiflora* [Veil.] Mart.), *Pouteria* sp. (*guapeba*), *Syagrus* sp. (*coquinho*), and *Oxalis hedysarifolia* Raddi (*azedinha*). Other plants are used to spice foods; these include two Labiatae, basil (*fabaca*) (*Ocimum gratissimum* L.), used on shark, and *Coleus* sp. (*hortea de galinha*), used on chicken. Arrowroot (*caiquê*) (*Maranta* sp., Marantaceae) is used to cover *pamonha*, a kind of cake made with corn paste. Two wild plants, palm (*pa/mito*) (*Euterpe edulis* Mart., Palmae, AB 40913, VEC) and primrose malanga (*taíoba*) (*Xanthosoma violaceum* Schott, Araceae, AD 23604, VEC), are appreciated as food.

Fruits of Brazilian peppertree (*aroeira*) (*Schinus terebinthifolius* Raddi, AB 37703, VEC) are put in traps made of yellow bamboo (*taquaruçú*) (*Bambusa* sp.) to catch saddle tanager (*tie-sanglle*) (*Rhamphocelus bresilius* Sclater) and thrushes (*sabia*) (*Platicychna flavipes* Vieillot, *Turdus* sppJ, usually eaten with beans. At Pitangueira Harbor, where 5 families live, islanders told us they caught about 130 birds in May and June, 198Z Birds are a dietary supplement when fishing is either impossible or has low returns, such as in the windy days of winter.

The bark of meadow beauty (*jacarterio*) (*Miconia* spJ is used in net staining. Lenko (1965) also reported the use of Brazilian peppertree and meadow beauty for this purpose. Handicrafts, such as model canoes and wooden spoons, are made with silk-cotton tree (*paina*) (*Pseudobombax grandiflorum* (Cav.) A. Robyns) and *Malauetia arhareana* Miers (*guaranda*), among other species. Woody Hanas (*imberanda*) (*Philodendrum guttiferum* Kunth), bamboo (*taqltara*) (*Merosfachys* sp.), and



FIG. 4.-Main steps in the production of manioc flour: (a) **peeling** manioc, (b) grinding manioc using **an** arm-wheel (*roda de braço*), (c) **pressing** manioc using the *arataca*; on left are baskets called *tipitf*, (d) manioc being toasted in a wood-burning copper furnace.

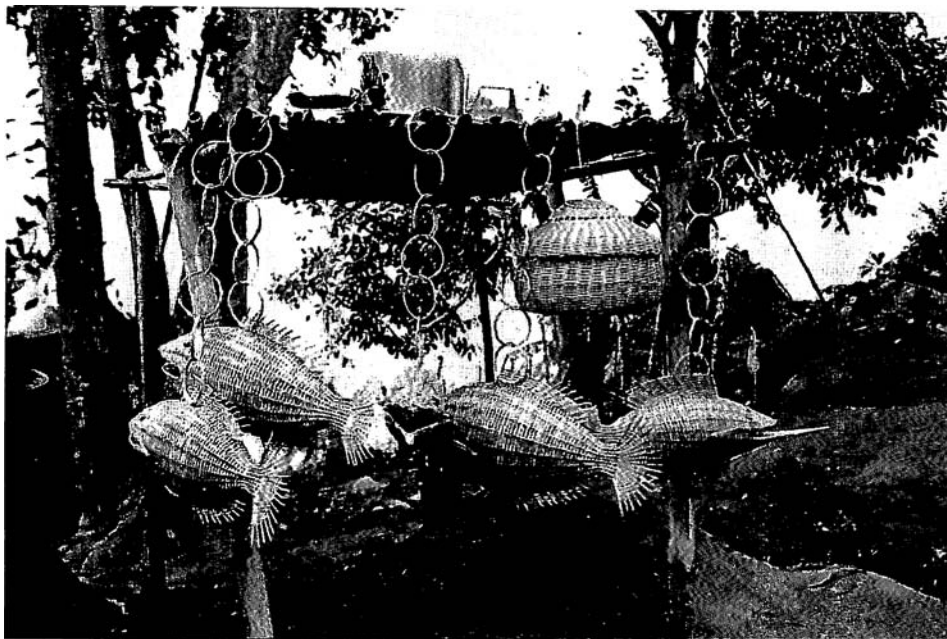


FIG. 5.-Handicrafts made by islanders.

yellow bamboo (*taquaruçú*) (*Bambusa* spJ) are used to make baskets, hats, and fish models that islanders sell at Ilhabela <Table 3 and Fig. 5).

Necklaces and curtains are made with seeds of Job's tears (*capM*) (*Coix lacrym-jobi* L., Gramineae, AB 16865, VEC). Cattail (*taboa*) (*Typha angustifolia* L., Typhaceae, AB 17457, VEC) is used to make mats (*esteiras*) and the flowers of *Achyrocline satureioides* DC. (Compositae, AB 49444, VEC) (*macela*) are used to stuff pillows. *Baccharis dracunculifolia* DC. (Compositae) (AB 25968, VEC), *Malvastrum coromandelianum* (L.) Gurcke (AB 40296, VEC) and *Sida spinosa* L. CAB 10186, VEC) (Malvaceae), locally called *vassourinha*, are bundled to make brooms. *Vriesia* sp. (*caraguatd*), a Bromeliaceae, is used as a lure for bluefish [(*Pomatomus saUator* (L.)], bluerunner [*Caranx crysos* (Mitchill)j, and species of Scombridae.

About ten plants used in house construction and for handicrafts, among other uses, were listed by Willems (952). Some are still used at **Búzios**, such as woody Hanas, grass for roofs, cattail for mats, and a Bromeliaceae for bait. There were about thirteen plants (names not listed in Willems 1952) used for dugout canoes, but we found only seven species used for this purpose (Table 3). Islanders from Porto do Meio complained that good trees for canoes are hard to find close **by**, and that the forest was **becoming "far away from home,"** suggesting a relatively intensive use of resources through the years.

Dugout canoes are built in the forest from a single trunk of a large tree. There were some 22 finished, paddled canoes at Porto do Meio; during September 1987, three canoes were built from *aracurana* (*Alchornea iricurana* Casar) logs. Two were built by three fishermen who spent 18 working days on the task 00 in the forest and 8 at home). We observed the heavy work involved in the transportation of

TABLE 3.- Plants used at **Búzios** Island for canoe, house, and dock construction and for handicrafts. A = handicrafts such as baskets and *tipiti*; C = canoes; O = wood for docks or foot bridges on which canoes roll; H = **framing** for houses; P = paddles; R = roofs; W = wooden handicrafts such as small canoes and wooden spoons; and N = uses not **specified**. Native (O) and exotic (e) species.

Plant Names Common	Scientific	Family	Uses	Voucher Number (AB, DEC)
? <i>aia</i>	?	?	N	
n <i>angelim</i> anjelywood	<i>Jacaranda</i> sp.	Bignoniaceae	COP	
n <i>araçá</i>	<i>Psidium cattleyanum</i> Sabine	Myrtaceae	O	32875
n <i>aracurana</i> ¹ (urucurana)	<i>Alchornea iricurana</i> Eásar	Euphorbiaceae	C	4567
n <i>bucuíba</i> (<i>mucuíba</i>)	<i>Viro// oleifera</i> (Schott) A.C. Smith	Myristicaceae	C	11549
n <i>cafeiro</i> do mato	<i>Cordia</i> sp.1	Boraginaceae	O	
n <i>caixeta</i> trumpet tree	<i>Tabebuia cassinoides</i> O.C.	Bignoniaceae	P	37862
n <i>canela</i> cinnamon	<i>Ocotea</i> sp.	Lauraceae	O	
n <i>capororoca</i>	<i>Rapanea lancifolia</i> Mez	Myrsinaceae	OP	11587
n <i>capororoca-uçú</i>	<i>Rapanea umbellata</i> Mez	Myrsinaceae	O	40335
n <i>cedro</i> tropical cedar	<i>Cedrela fissilis</i> Veil.	Meliaceae	CW	40282
e <i>chapéu de sol</i> tropical almond	<i>Terminalia catappa</i> L.	Combretaceae	O	1435
n <i>cubatã</i>	<i>Cupania racemosa</i> (Vell.)Radlk.	Sapindaceae	OH	14320
n <i>figueira</i> ligtree	<i>Ficus</i> sp.	Moraceae	C	
n <i>guaranda</i>	<i>Malouetia arborea</i> Miers	Apocynaceae	OW	20898
n <i>guatambú</i>	<i>Guettarda</i> sp.	Rubiaceae	N	
n <i>guatiguaba</i>	<i>Trichilia</i> sp.	Meliaceae	N	
n <i>imberanda</i>	<i>Phi/odendrum</i> <i>guttiferum</i> Kunth	Araceae	A	7818
n <i>ingá</i> inga	<i>Inga sessilis</i> (Ven.) Mart.	Mimosaceae	C	49737
n <i>ipê roxo</i>	<i>Tabebuia avellaneda</i> Lorentz ex Griseb	Bignoniaceae	C	2229
n <i>jacarterão</i> meadow beauty	<i>Miconia</i> sp.	Melastomataceae	O	
n <i>laranjeira do mato</i>	<i>Zollernia illicifolia</i> Vag.	Caesalpinaceae	N	6761

Plant Names Common	Scientific	Family	Uses	Voucher Number (AB, VEC)
n <i>paina</i> silk cotton tree	<i>Pseudobombax grandiflorum</i> (Cav.) A. Robyns	Bombacaceae	CW	37847
n <i>pequeá</i> <i>guatambu</i> white quebracho	<i>Aspidosperma tomentosum</i> Mart.	Apocynaceae	0	31791
n <i>pequeá rosa</i> white quebracho	<i>Aspidosperma tomentosum</i> Mart.	Apocynaceae	DH	32874
n <i>sape</i> grass	<i>Imperata brasiliensis</i> Trin.	Gramineae	R	16906
n <i>tabucúba</i>	<i>Pera obovata</i> BaHI.	Euphorbiaceae	DH	40364
n <i>tambatarú</i> prickly ash	<i>Zanthoxylum rhoifolium</i> Lam.	Rutaceae	PW	14250
n <i>taquara</i> bamboo	<i>Merostachys</i> sp.	Gramineae	A	
e <i>taquaruçú</i> yellow bamboo	<i>Bambusa</i> sp.	Gramineae	A	

'most canoes are built with this **tree**.

one canoe. It took nine men about **six** hours to move the canoe from the forest to the harbor due to the island's steep topography (Fig. 6).

Medicinal plants are used at Buzios along with medicines prescribed by the clinic (*Posta de Saúde*) at Ilhabela. However, the relative importance of medicinal plants may also be drawn from the mention made to them during interviews (Fig. 7). The most frequently mentioned plants were wormseed (*canema*) (*Chenopodium ambrosioides* L.), lemon verbena (*cidreira*) (*Lippia citriodora* H.B.K.), fennel (*erva dace*) (*Foeniculum vulgare* Gaertn.), spearmint (*hortefa-preta*) (*Mentha spicala* L.), and wormwood (*losna*) (*Artemisia absinthium* L.), plants used for the treatment of worms, cough, and influenza (Table 4). Worms are a common childhood ailment; intestinal problems often occur among adult islanders as well.

During interviews we noted that some less commonly reported plants (Fig. 7) were mentioned by older people. Older people were commonly cited by younger interviewees as being knowledgeable about medicinal plants. It is likely that much of the older generation's knowledge about medicinal plants is not being passed on to the younger generations, since the young tend to be more faithful visitors of the clinic than are the older people. This substitution or loss of knowledge concerning local medicinal plants is similar to Anderson's (1986b) observations for the Lahu in Northern Thailand. Despite the difficulty of obtaining modern medical care and some complaints about its effectiveness, **Búzios** islanders use both modern and traditional treatments. About half of the plants used in medicine on Buzios are introduced (Table 4). These plants illustrate the significant influence of the Portuguese on the southeast coast of Brazil.



FIG. 6.-Unfinished canoe made of *Alchornea iricurana*, Euphorbiaceae, transported by fishermen from the forest to Porto do Meio harbor.

Willems (1952) reported four plants used in islanders' "curative magic" and one, common fue (*arruda*) (*Rutn graveo/ens* L.), described. as used against the "evil eye," is still used at Buzios to "dispel bad spirits" <Table 4).

In general, plants play a fundamental part in the life of islanders. However, some rare plants, such as trees of the genera *Oeotea* (cinnamon) (*canefa*), *Tabebuia* (*ipê*), *Zollernia* (*laranjeira do malo*), and *Aspidosperma* (white quebracho) (*pequeá*), may likely be lost due to their rare occurrence and the fact that islanders are obligated to take the tree trunk for constructing docks, houses, or canoes. On the other hand, some medicinal plants are easy to collect and, as readily available means to treat common illnesses and an alternative to modern medical care, are more likely to be maintained in the islanders' culture.

COMPARISON WITH MEDICINAL USES OF PLANTS IN OTHER BRAZILIAN REGIONS

Wormseed. is used against worms in the Amazon (Van den Berg 1978) and in most Brazilian states (Cruz 1979). Lentz (1986) reported this plant as used against stomachaches among the Jicaque Indians (Honduras). According to Bye (1986), the antihelmenthic properties of wormseed have been long recognized in **tradi-**tional American cultures; its oil contains the active principle.

Other plants listed in Table 4 are also used in most areas of Brazil for medicinal purposes. These include wormwood (Junqueira 1980), guava, and tropical ageratum (*menrasto*) (*Ageratum conyzoides* L.) (Cruz 1979). Use of this last was also reported for Thailand by Anderson (1986a). *Pothomorphe umbellata* (L.) Miq.

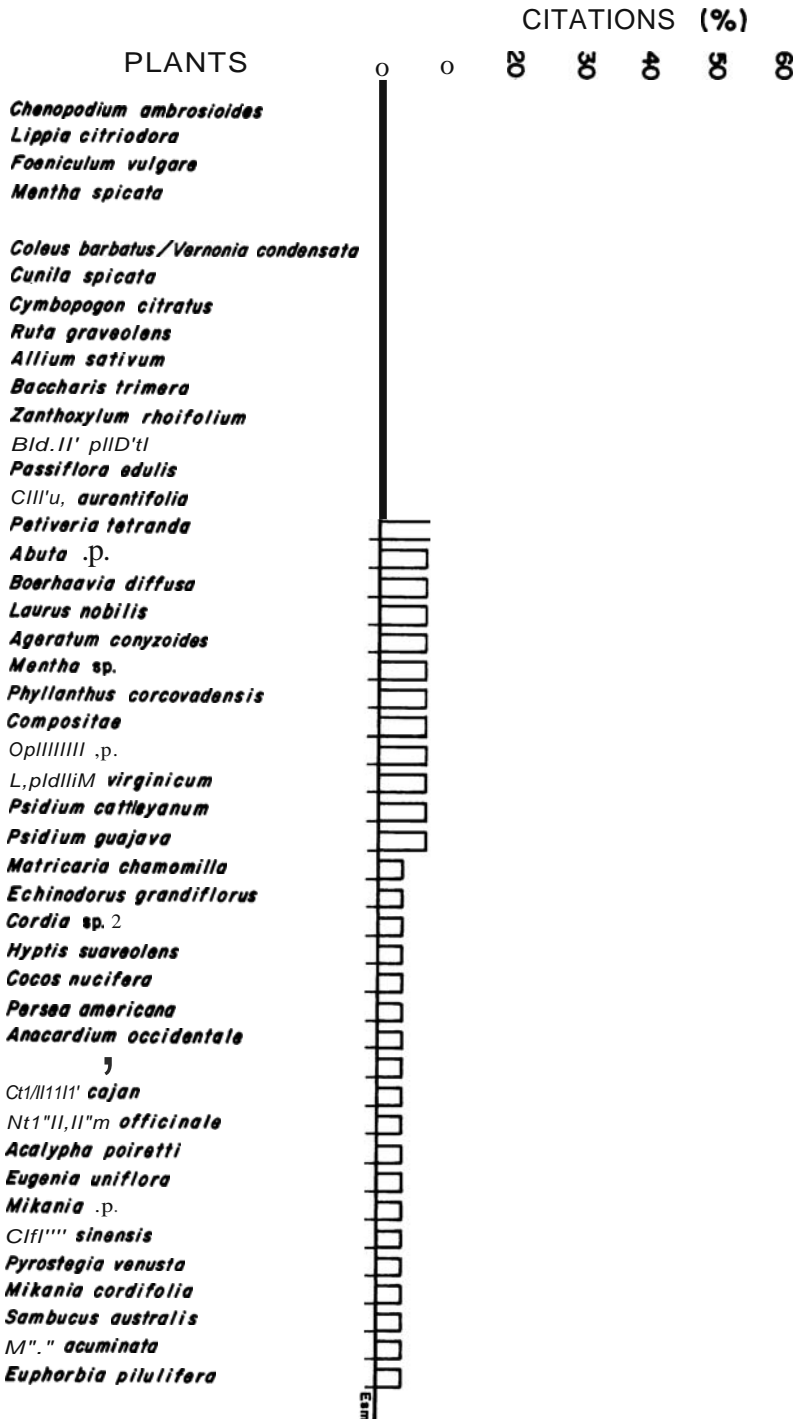


FIG. Z-Medicinal plants mentioned in interviews (n = 28) at Búzios Island; citations were based on popular names; ? = popular name: *cipó de palmera*.

TABLE 4.-Medicinal plants used. at **Búzios** Island. Native (n) and exotic (e) species. Some teas made with medicinal plants may be mixed with *pinga*, a Brazilian beverage made of sugarcane. Two plants used to ward off bad luck or spirits are included. Refer to Begossi (1989) for more detail on these plants.

Common Names	Scientific Name Family Voucher Number	Uses (part)
e <i>abacate</i> avocado	<i>Persea americana</i> Mill. Lauraceae	painful urination , with <i>erva tostão</i> , liver problems, with <i>pariôba</i> (leaves: tea) and <i>jerbão</i>
e <i>agrião</i> watercress	<i>Nasturtium officinale</i> R. Br. Cruciferae	influenza (leaves: syrup)
n <i>aguiné</i>	<i>Petiveria tetrandra</i> Gomez Phytolaccaceae AD 8881, UEE	bad luck and spirits (leaves: bath)
e <i>alha</i> garlic	<i>Allium sativum</i> L. Liliaceae	snake-bites (bulbs: pounded)
n <i>ambula</i>	<i>Abu/a</i> sp. Menispermaceae	anemia, after childbirth, abortifacient (bark: tea)
n <i>anica</i>	<i>Indigofera suffruticosa</i> Mill. Fabaceae AB8499, UEC	any illness (leaves: bath, tea)
n <i>araçá</i> guava	<i>Psidium cattleianum</i> Sabine Myrtaceae AD 32875, UEC	diarrhea (fruit peel : tea)
e <i>arruda</i> common rue	<i>Rula graveolens</i> L. Rutaceae	abortifacient, to expell bad spirits or bad luck (leaves: tea, bath)
n <i>baleeira</i>	<i>Cordia</i> sp.2 Boraginaceae	rheumatism (leaves: pounded)
e <i>banana</i> bananas	<i>MusQ acumilata</i> Colla Musaceae	boils, thorns (leaves)
e <i>holdo</i>	<i>Coleus barbatus</i> Benlh. Labiatae	liver, stomach, diarrhea (leaves: raw, pounded, lea)
n <i>bel/do</i>	<i>Venronia coltensata</i> Baker Compositae AB 41024, UEC	diarrhea (leaves: pounded with water)
n <i>mju</i> cashew	<i>Atlacardium occidentale</i> L. Anacardiaceae AB 30087, VEC	diarrhea (fruits)
e <i>camomila</i> camomila	<i>Matricaria chamomilla</i> L. Compositae	diarrhea (tea)
e <i>canema</i> wormseed	<i>Chenopodium ambrosioides</i> L. Chenopodiaceae AS 1337, VEC	diarrhea, worms (leaves: pounded, with sugar/ milk, tea) plaster for injuries (leaves: pounded with salt)
n <i>capoquinha</i>	<i>Hyptis suaveolens</i> Poit. Labiatae AS 21001, VEC	injuries (leaves: pounded with <i>pinga</i>)
n <i>carqueja</i>	<i>Baccharis trimera</i> (DC.) Less. Compositae AB 43709, VEC	diarrhea, stomach, liver, high blood pressure (leaves: tea)

Common Names	Scientific Name Family Voucher Number	Uses (part)
? <i>carrapicho de ferrao, carrapicho prefo.</i>	? Compositae	painful urination (tea)
n <i>chapéu de de couro</i>	<i>Echinodorus grandiflorus</i> Mich. Alismataceae AB 19875, UEC	rheumatism (leaves: tea)
n? <i>cidrão lemon grass</i>	<i>Cymbopogon citratus</i> (DC.) Stapf Gramineae	stomach, high blood pressure, sedative, cough, influenza (leaves: tea, syrup) sleeplessness (branches: under pillow)
e <i>eidreira lemon verbena</i>	<i>Lippia citriodora</i> H.B.K. Verbenaceae AB 21008, VEC	cough, influenza, menstrual cramps, high blood pressure, sedative, stomach (leaves: juice with milk, tea, syrup)
n <i>cipó de cobra</i>	<i>Mikania cordifolia</i> (LfJ Willd.) Compositae AB 48639, UEC	snake-bites (tourniquets)
? <i>cipó de palmera</i>	?	snake-bites (tourniquets)
n <i>cipó de são joão</i>	<i>Pyrostegia venusta</i> (Ker-Gawl.) Miers Bignoniaceae ABB08, VEC	snake-bites (tourniquets)
e <i>coco</i> coconut	<i>Cocos nucifera</i> L Palmae	abortifacient (water: with <i>pinga</i>)
n <i>euvinha</i>	<i>Porophyllum ruderale</i> (Jacq.) Cass Compositae AB 40328, VEC	diarrhea (leaves: bath, tea)
e <i>erva doce</i> fennel	<i>Foeniculum vulgare</i> Gaertn. Umbelliferae	influenza, worms, diarrhea, child colics, asthma, headaches (leaves: tea, pounded for plaster and poultice)
n <i>erva tostão</i>	<i>Boerhaavia diffusa</i> L Nyctaginaceae AD 40298, UEC	hepatitis (roots: tea)
e <i>eucalipto</i> eucalyptus	<i>Eucalyptus</i> spp. Myrtaceae	injuries, rheumatism (leaves: pounded with <i>alcool</i> for plaster)
n <i>goiaba branea</i> guava	<i>Psidium guajava</i> L. Myrtaceae AD 12227, VEC	diarrhea (buds: tea)
e <i>quando</i> red gram	<i>Cajanus cajan</i> (L.) Mill. Fabaceae AD 24606, VEC	toothaches (leaves: tea)

TABLE 4.-Medicinal plants used at **Búzios** Island. Native (0) and exotic (e) species. Some teas made **with** medicinal plants may be mixed with *pil1ga*, a Brazilian beverage made of sugarcane. Two plants used. to ward off bad luck or spirits are included. Refer to Begossi (1989) for more detail on these plants. <continued>

Common Names	Scientific Name Family Voucher Number	Uses (part)
e <i>hortelã</i> mint	<i>Mentha</i> sp. Labiatae	diarrhea, worms (leaves: tea)
e <i>hortea</i> <i>preta</i> spearmint	<i>Mentha</i> <i>spicata</i> L. Labiatae	diarrhea, worms, cough, bronchitis (leaves: tea, syrup)
n <i>jerbão</i>	<i>Stachytarpheta</i> <i>polyura</i> Schauer Verbenaceae AB 46180, UEE	liver (leaves: tea with <i>pariôba</i>)
e <i>laranja</i> orange	<i>Citrus sinensis</i> (L.) Osbeck Rutaceae	influenza (leaves: tea)
e <i>limão</i> lemon	<i>Citrus aurantifolia</i> Swing. Rutaceae	toothaches, influenza (leaves, fruit peel: tea, syrup)
e <i>Iosna</i> wormwood	<i>Artemisia</i> <i>absinthium</i> L. Compositae	stomach, diarrhea, worms, abortifacient (leaves: tea)
e <i>loura</i>	<i>Laurus nobilis</i> L. Lauraceae AB 31842, VEC	sour-stomach (leaves: tea)
n <i>mllracujd</i> passion- flower	<i>Passiflora edulis</i> Sims. Passifloraceae AB 12714, VEC	high blood pressure, heart, toothaches (leaves, buds: tea)
e <i>menttasto</i> tropical ageratum	<i>Ageratum conyzoides</i> L. Compositae AB 35030, VEC	poultice for sprains (leaves: pounded with salt or vinegar). Formerly the leaf juice was drunk after childbirth
e <i>mentrus</i> cress	<i>Lepidium virginicum</i> L. Cruciferae AB 3955, VEC	injuries, pneumonia (leaves: tea)
n <i>paliatéia</i>	<i>Acalypha</i> <i>poiretti</i> Spreng. Euphorbiaceae AB 49736, VEC	diarrhea (leaves: tea)
n <i>palma de</i> <i>mandacaru</i>	<i>Opuntia</i> sp. Cactaceae	snake-bites, boils, (cladode: eaten, juice with corn starch for boils).
n <i>pariôba</i>	<i>Pothomorphe umbel/ata</i> (L.) Miq. Piperaceae AB 12819, VEC	liver, kidney (leaves: tea)
e <i>picão</i> railway beggarticks	<i>Bidens</i> <i>pilosa</i> L. Compositae AB 38864, VEC	injuries, itching, hepatitis (mixed with <i>tambatarú</i> in tea) (leaves: baths, tea)
n <i>pitmga</i> Brazilian cherry	<i>Eugenia</i> <i>uniiflora</i> L. Myrtaceae AB 11745, VEC	painful urination (leaves: tea with <i>goiaba</i> and <i>erva fostilo</i>)

Common Names	Scientific Name Family Voucher Number	
n <i>prumera</i>	Mikania sp. Compositae	snake-bites (leaves: juice)
e <i>puejo</i> pennyroyal	<i>Cunila spicata</i> L. Labiatae	influenza, cough, diarrhea, worms (with <i>hortelil preta</i>) (leaves: tea, syrup)
n <i>quebra-pedra</i> fly-roost leafflower	<i>Phylanthus corcovadensis</i> Muell. Arg. Euphorbiaceae AS 40860, UEC	painful urination (leaves: tea)
e <i>sabugueiro</i> elderberry	Sambucus australis Cham. & Schlecht Caprifoliaceae AS 1267, VEC	measles (tea)
n <i>santa luzia</i>	<i>Euphorbia pilulifera</i> L. Euphorbiaceae AS 40253, UEC	stomach (leaves: tea)
n <i>sapé</i> grass	<i>Imperata brasiliensis</i> Trin. Gramineae AB 16906, VEC	abortifacient (seeds with salt, aspirin, and coca-cola)
n <i>tambatarú</i> prickly ash	Zanthoxylum rhoifolium Lam. Rutaceae AS 23043, VEC	hepatitis (bark: tea)

(*pariíba*) and *Petiveria tetrandra* Gomez (*aguine*) are used. in Amazonia (Van den Berg 1978). *Baccharis trimera* (DC.) Less. (*carqueja*), *Hyptis suaveolens* Poit. (*capo-quinha*), and prickly ash (*tambataru*) (*Zanthoxylum rhoifolium* Lam.) have medicinal uses in west-central Brazil, where savanna (*cerrado*) vegetation dominates (Siqueira 1988). Use of *Hyptis suaveolens* was also reported in northeast Brazil (Parafba State) by Agra (1980). Of the major medicinal plants used on Buzios, wormseed, fennel, wormwood, lemon grass (*Cymbopogon citratus* (DC.) Stapf), common rue (*Baccharis trimera*), camomila (*Matricaria chamomilla* L.), and watercress (*agriiio*) (*Nasturtium officinale* R. Br.) are described by Santos et al. (1988) as being in general use for similar purposes elsewhere in Brazil.

Lemon grass tea (Table 4) is used in most Brazilian regions as a sedative, but treatments presumably depend on a placebo effect as no pharmacologically active compound has been found in this plant (Carlini 1985). Pharmacological activity has been found in passion fruit (*Passiflora edulis* Sims) (Valle and Leite 1978), and antiseptic properties are attributed to *Eucalyptus* (Thomson 1978). As stressed by Schultes (1978), the overwhelming **number** of modern medicines deriving from traditional pharmacopoeias should convince medical scientists about the value of ethnopharmacological investigation.

THE DIVERSITY OF PLANTS USED

The diversity of plants used at Buzios, compared to other communities, **is** high. Johnson (1983) collected data **on 80** plants used by the Machiguenga Indians (Upper Amazon, Peru) as food, fish poison, and medicine, among other uses. Data collected in the Amazon forest (Rondonia State) by Coimbra (1985) from 300 Surui Indians indicate that 58 species from 25 families were used for a variety of purposes. Posey (1983) estimated that the fruits of 250 plants are used by the Kayapó Indians. At Buzios, we found 128 species **belonging** to 56 families used for food, housing, canoe construction, handicrafts, and medicine. These are plants found in forested (Atlantic Forest) and deforested areas of the island.

CONCLUSIONS

The results of this study show that even in a community that has switched from a dependence on agriculture to **an** economic emphasis on fishing, for both cash and subsistence, people remain highly dependent on local plant resources for a variety of uses. However, **knowledge** of traditional herbal medicine is declining. A few plants have been dropped from cultivation and are now purchased, but subsistence production of most historic crops remains important. Use of collected plant resources for construction, fuel, handicrafts, and food remains essential to the economy of the community.

These observations are important for management purposes. The remaining Atlantic Forest vegetation is **considered** a top priority for conservation and is included in the Biosphere Reserve Program (MAB/UNESCO) (Lino 1992). Small and relatively isolated communities like Buzios are often located in conservation areas. **Búzios** Island is part of the State Park of Ilhabela (*Parque Estadual de Ilhabela*), which is an archipelago including **São Sebastião** Island and other small islands (SEMA 1991). The continuing, **rather** intensive use of land for gardens and forest for gathered resources by these communities should be **recognized** in any conservation or management **proposal**.

NOTES

Plants without voucher numbers are either common cultivated plants or were identified by comparing material without diagnostic parts (and thus could not be deposited in the Herbarium); for this material, only generic names are given. Many plant classifications were based on Ioly and **Leitão-Filho** (1978). English plant names were based on Alzugaray and Alzugaray (1984), Junqueira (1980), Taylor (1985), and Thomson (1978).

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