

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

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ABSTRACT.-Buzios 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 comparada à de comunidades da Amazônia.

RÉSUMÉ.—La communauté de pêcheurs de l'Île 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 canoës, ainsi que l'artisanat. A Búzios, les personnes plus âgées ont démontré une connaissance plus profonde des plantes médicinales. Un grand nombre de personnes 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.

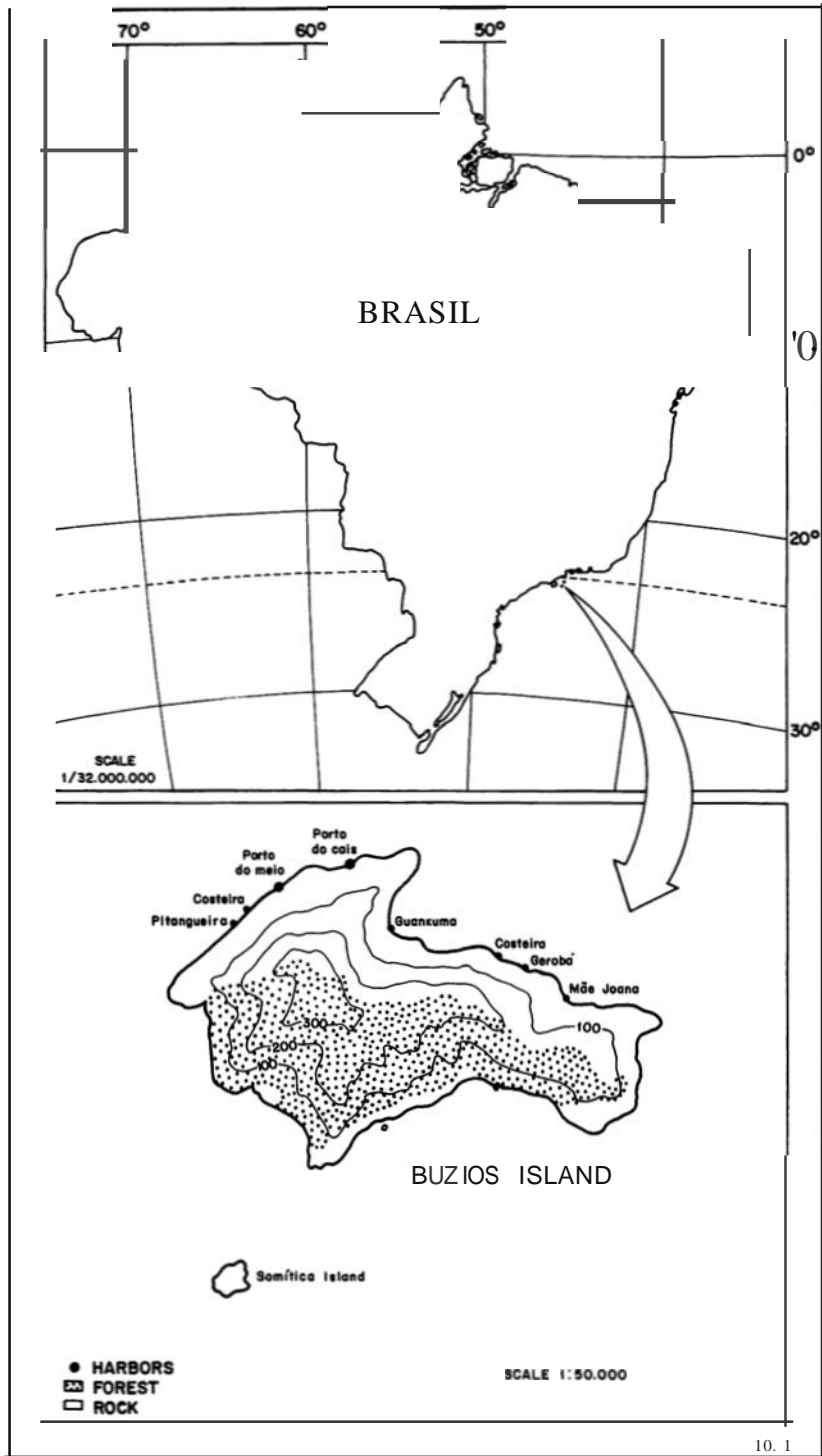


FIG. 1.-Location of **Búzios** Island in Brazil and the distribution of harbors.

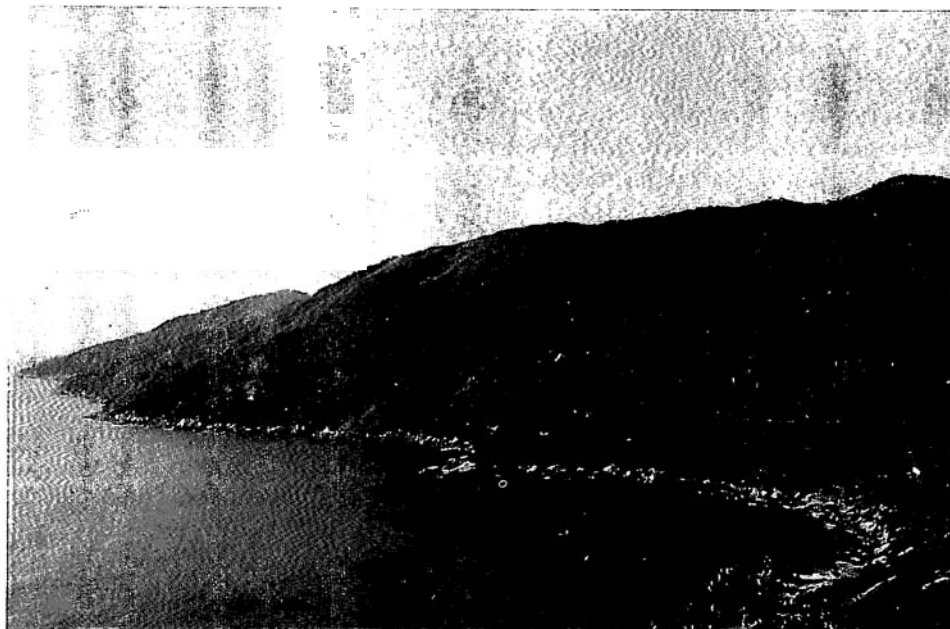


FIG. 2.-General view of **Búzios** Island.

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

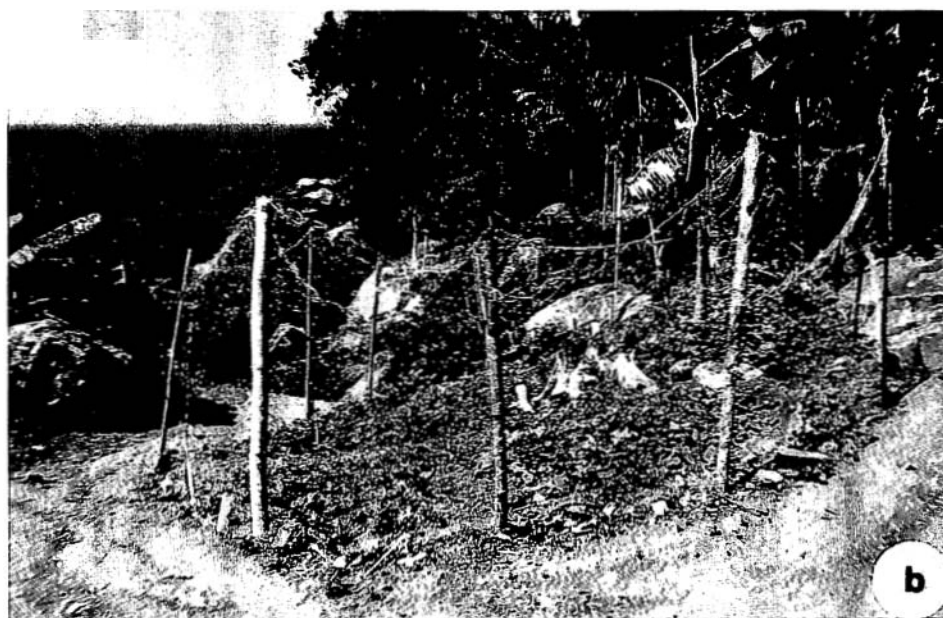
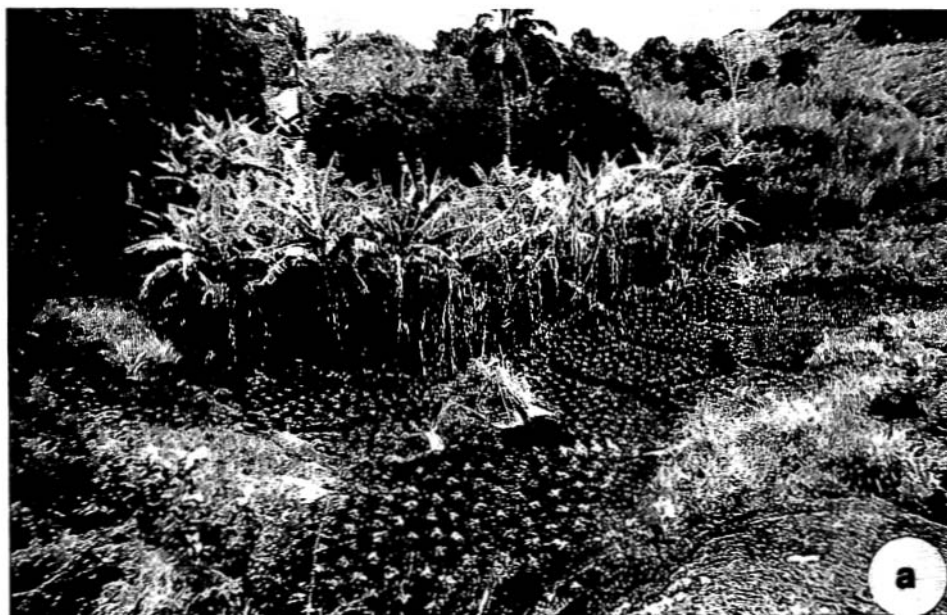


FIG. 3.- (a) a typical *roça* with beans and bananas; (b) a garden (*harta*) protected by pieces of fishing nets.

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 <i>abacate</i> avocado | <i>Persea americana</i> Mill. | Lauraceae | |
| n <i>abricó</i> mameyapple | <i>Mammea americana</i> L. | Guttiferae | 10812 |
| e <i>amora</i> " raspberry | <i>Rubus rosaefolius</i> Sm. | Rosaceae | 23906 |
| n <i>azedinha</i> * | <i>Oxalis hedisarifolia</i> Raddi | Oxalidaceae | 49815 |
| n <i>araçá</i> | <i>Psidium cattleyanum</i> Sabine | Myrtaceae | 12227 |
| n <i>bacupari</i> * | <i>Rheedia gardneriana</i> Planch. et Triana | Clusiaceae | 5524 |
| e <i>banana</i> banana | <i>Musa acuminata</i> Colla | Musaceae | |
| e <i>chaplú de sol</i> * tropical almond | <i>Terminalia catappa</i> L. | Combretaceae | 1435 |
| e <i>coco</i> coconut | <i>Cocos nudlora</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>lúrn do conde</i> sugar apple | <i>Annona squamosa</i> L. | Annonaceae | |
| n <i>goiaba branca</i> guava | <i>Psidium guajava</i> L | Myrtaceae | |
| n <i>guapeba</i> * | <i>Pouteria</i> sp. | Sapotaceae | |
| n <i>ingá</i> * | <i>Inga sessilis</i> (Veil.) Mart. | Mimosaceae | 49737 |
| e <i>jaca</i> jack fruit | <i>Artocarpus integrifolia</i> L | Moraceae | |
| e <i>jambolão</i> jambolan | <i>Eugenia cumini</i> (L.) Druce | Myrtaceae | |
| e <i>jambro</i> 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 <i>limão</i> lemon | <i>Citrus aurantifolia</i> Swing. | Rutaceae | |
| e <i>mamão</i> papaya | <i>Carica papaya</i> L | Caricaceae | |
| e <i>melão de São Caetano</i> * | <i>Momordica charantia</i> L. | Cucurbitaceae | 33276 |
| e <i>mexerica</i> * | <i>Clidemia hirta</i> D. Don. | Melastomataceae | 10342 |
| e <i>manga</i> mango | <i>Mangifera indica</i> L | Anacardiaceae | |

| Plant Names Common Name | Scientific | Family | Voucher Number (AB, VEC) |
|---|---|----------------|--------------------------------|
| n <i>marocujá</i> (<i>imbucuiá</i>) passion fruit | <i>Passiflora edulis</i> Sims. | Passifloraceae | 12714 |
| n <i>paino</i> silk cotton tree | <i>Pseudobombax gmoindiflorum</i> (Cav.) A. Robyns | Bombacaceae | 949 |
| n <i>pitanga</i> Brazilian cherry | <i>Eugenia uniflora</i> L. | Myrtaceae | 11745 |
| e <i>romil</i> pomegranate | <i>Punica granatum</i> L. | Punicaceae | |
| e <i>uva</i> 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 (0) 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>cafeeiro</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 avellanadae</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 | |

¹most 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.

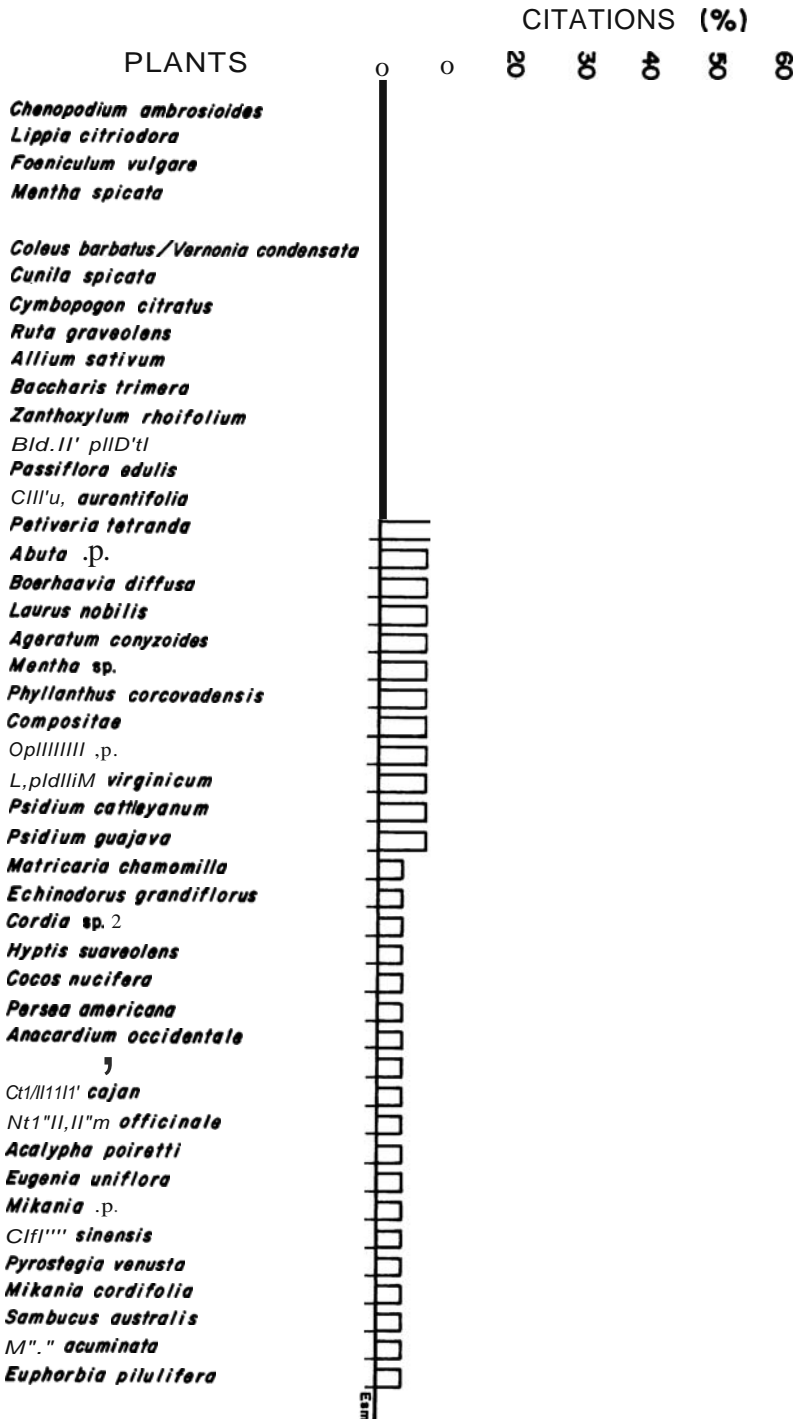


FIG. Z-Medicinal plants mentioned in interviews (n = 28) at Búzios Island; citations were based on popular names; ? = popular name: *cipó de palmera*.

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 coltdensata</i> Baker Compositae AB 41024, UEC | diarrhea (leaves: pounded with water) |
| n <i>mju</i> cashew | <i>Atlacardium occidetltale</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 coconut</i> | <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 fennel</i> | <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 eucalyptus</i> | <i>Eucalyptus</i> spp. Myrtaceae | injuries, rheumatism (leaves: pounded with <i>alcool</i> for plaster) |
| n <i>goiaba branea guava</i> | <i>Psidium guajava</i> L. Myrtaceae AD 12227, VEC | diarrhea (buds: tea) |
| e <i>quando red gram</i> | <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 *pitanga*, 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>hortelã</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</i> <i>sinensis</i> (L.) Osbeck Rutaceae | influenza (leaves: tea) |
| e <i>limão</i> lemon | <i>Citrus</i> <i>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</i> <i>nobilis</i> L. Lauraceae AB 31842, VEC | sour-stomach (leaves: tea) |
| n <i>mlracujd</i> passion- flower | <i>Passiflora</i> <i>edulis</i> Sims. Passifloraceae AB 12714, VEC | high blood pressure, heart, toothaches (leaves, buds: tea) |
| e <i>menttasto</i> tropical ageratum | <i>Ageratum</i> <i>conyzoides</i> L. Compositae AB 35030, VEC | poultice for sprains (leaves: pounded with salt or vinegar). Formerly the leaf juice was drunk after childbirth injuries, pneumonia (leaves: tea) |
| e <i>mentrus</i> cress | <i>Lepidium</i> <i>virginicum</i> L. Cruciferae AB 3955, VEC | |
| n <i>paliatêia</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</i> <i>umbellata</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</i> <i>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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