

PLURALISTIC MEDICAL SETTINGS AND MEDICINAL PLANT USE IN RURAL COMMUNITIES, MATO GROSSO, BRAZIL

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ABSTRACT.—The use of medicinal plants and other traditional forms of treating illness in rural communities of Mato Grosso State, Brazil, that nowadays also depend on modern health care facilities is assessed. Forty-four households were surveyed about disease events and the use of modern health care facilities, medicinal plants, and consultation with practitioners of traditional medicine during the six months prior to research. All manufactured medicines, medicinal plants, and other therapeutic products present in the household at the time of the interview were recorded. Ninety-three percent of households reported the use of at least one of the modern medical services available as well as the use of medicinal plants during the previous six months. About 120 plant species were recorded. The associated use of modern and traditional medical services and the importance of medicinal plants in a context of social and economic change are discussed.

Key words: rural communities, medicinal plants, medical pluralism, Brazilian savannah.

RESUMO.—O objetivo deste trabalho foi avaliar o emprego de plantas medicinais e outras formas tradicionais de tratar doenças, em comunidades rurais de Mato Grosso, Brasil, que atualmente contam também com serviços médicos modernos. Foi feito um levantamento em uma amostra de 44 domicílios, sobre episódios de doença e recurso às diversas opções terapêuticas disponíveis, modernas e tradicionais, durante os seis meses anteriores à pesquisa; registraram-se todos os medicamentos industrializados, plantas medicinais e outros produtos de uso terapêutico presentes no domicílio no momento da entrevista. 93% dos domicílios relataram uso de pelo menos um dos serviços médicos oficiais e de plantas medicinais nos seis meses anteriores. Cerca de 120 espécies de plantas foram registradas. Discute-se o uso conjunto de facilidades médicas modernas e recursos terapêuticos tradicionais, como plantas, bem como sua importância num contexto de mudança social e econômica.

RÉSUMÉ.—L'objectif de cette recherche était d'évaluer l'utilisation des plantes médicinales ainsi que d'autres approches traditionnelles dans le traitement des maladies parmi les habitants des communautés rurales du Mato Grosso, au Brésil. Aujourd'hui, ces communautés ont également recours à des centres de médecine moderne. Une enquête s'est déroulée auprès de 44 foyers. Elle portait sur les maladies survenues dans les foyers, la fréquentation des centres de médecine moderne, l'utilisation de plantes médicinales et la consultation de guérisseurs traditionnels, au cours des six mois précédent l'étude. Lors des interviews, on prenait note de tous les médicaments commercialisés, plantes médicinales et au-

tres produits ayant des propriétés thérapeutiques qui se trouvaient présentes dans les différents domiciles. Pendant ces six mois, 93% des foyers ont utilisé au moins l'un des centres de médecine moderne mis à leur disposition tout en faisant appel aux plantes médicinales. Environ 120 espèces de plantes ont été identifiées. De plus, dans cet article, l'utilisation parallèle des centres de médecine moderne et des ressources thérapeutiques traditionnelles, ainsi que l'importance des plantes médicinales sont discutées dans un contexte de changements socio-économiques.

INTRODUCTION

Therapeutic pluralism is common throughout the world and can be understood as the coexistence, within the same society or group, of a number of health care alternatives with diverse origins and treatment foci, representing different systems of medical practice and ideology (Janzen 1971; McGrath 1999; Stoner 1986). Some researchers have found that patients and their relatives, when confronted with illness, may make use of the multiple treatment options available, even when there are clearly established limits and functions ascribed to the different coexisting medical systems. From the viewpoint of users, then, they would be rather complementary than contradictory (Brunelli 1987; Colson 1971; Hamnett and Connell 1981; McGrath 1999). People take a pragmatic view of treatment and are willing to try whatever may be effective.

Some scholars stress the importance of the role played by social and political factors in legitimizing different medical systems within the same society and allowing them to coexist (Janzen 1971; McGrath 1999). In this view, medical pluralism provides patients and their families with an array of disease concepts and treatment alternatives that may be employed not only to obtain resources like prestige, power and material resources, but also to negotiate social relations and define cultural identity (Crandon-Malamud 1991). Likewise, the persistence of folk medicine in cosmopolitan settings where modern health care system is well established is sometimes explained as a means of the subordinate classes to resist impositions of the dominant medical ideology (Loyola 1991). Both pragmatic and sociopolitical views contribute to explain medical pluralism in different settings.

In Brazil, different therapeutic traditions have contributed to the formation of folk medicine. From the sixteenth century on, contact between Iberian and indigenous peoples of various ethnic groups created a complex combination of elements from European and autochthonous medicines; it is often difficult to identify the origin of specific aspects of the folk practices as indigenous, European, or the result of contact (Holanda 1994). African slaves taken to Brazil to work in agriculture and mining further contributed to shape folk medicine. A feature shared by these different therapeutic traditions is the use of plants, at least to some extent, to treat illnesses.

At present, folk or traditional medicine in rural areas of Brazil still retains many aspects of the medicine practised in colonial times. For example, some practices related to humoral theory, especially those aimed at "purifying" the blood and at maintaining health through hot and cold balance, are still very common; the therapeutic use of excreta (like urine and feces) is also found among rural people (Amorozo and Gély 1988; Fleming-Morán 1975; Queiroz 1984). The relative

isolation of these populations has contributed to the maintenance of these ideas and to their continuing reliance on local specialists: curers, midwives, and *benzedores*—who heal by praying on (blessing) the ill person—among others. Moreover, these populations exploit their environments very efficiently in search of therapeutic elements; in general they have a solid and long-standing knowledge about procurement and use of medicinal plants.

In the past two or three decades, modern facilities have been brought to countryside; in some areas, government medical services are locally available to rural populations. The introduction of modern medicine adds another option to the pluralistic base already established and does not eliminate people's use of traditional medicine. Instead, in many instances, traditional and modern procedures are employed together (Alexiades and Lacaze 1996; Cândido 1987; Elisabetsky and Setzer 1985; Wagley 1988). But the increasing influence of national culture certainly leads to changes in local medical settings; some kinds of traditional practitioners may disappear or their roles within community life may change (Queiroz 1980). Under the influence of cosmopolitan lifestyles and easy access to modern medical facilities, people may reduce their use of medicinal plants (Nolan and Robbins 1999).

The aim of this work is to assess utilization of traditional forms of treating illness—chiefly the use of medicinal plants—by dwellers in rural communities that nowadays can also depend on available modern health care facilities and to discuss factors that may be affecting this use.

STUDY AREA

The study site is located in Santo Antonio do Leverger Municipality, Mato Grosso State, Brazil, on the left edge of The Cuiabá River, near the Pantanal and about 30 km by paved road south of the state capital, Cuiabá (Figure 1). The dominant natural vegetation is the *cerrado* (Brazilian savannah), which is, to a certain extent, altered by human activities.

This region, formerly occupied by various indigenous peoples, including the Bororo (Viertler 1990), was settled in the beginnings of the eighteenth century by *paulistas*—descendants of Portuguese and aboriginal peoples (mainly from the Tupi group). They came from southeastern Brazil after the discovery of gold. African slaves, possibly of Banto origin (Bandeira 1988), were taken to work in the mines and in sugar cane spirits and sugar factories. The area near the Cuiabá River soon became important for supplying food for people working in mining. The occupation of these lands had been feasible only after the subjugation or expulsion of the local indigenous populations.

When the gold mines were exhausted, the sugar industry began to flourish. In the nineteenth century, sugar and cane spirit production became the most important economic activity. That industry remained very influential in regional politics until the first half of the twentieth century. Later, its importance declined for number of reasons, among them the construction of technologically more advanced factories in other regions (Póvoas 1983).

Mato Grosso State remained relatively isolated from cosmopolitan influences. Its economy stagnated until the mid 1970s. Since that time, the settlement of

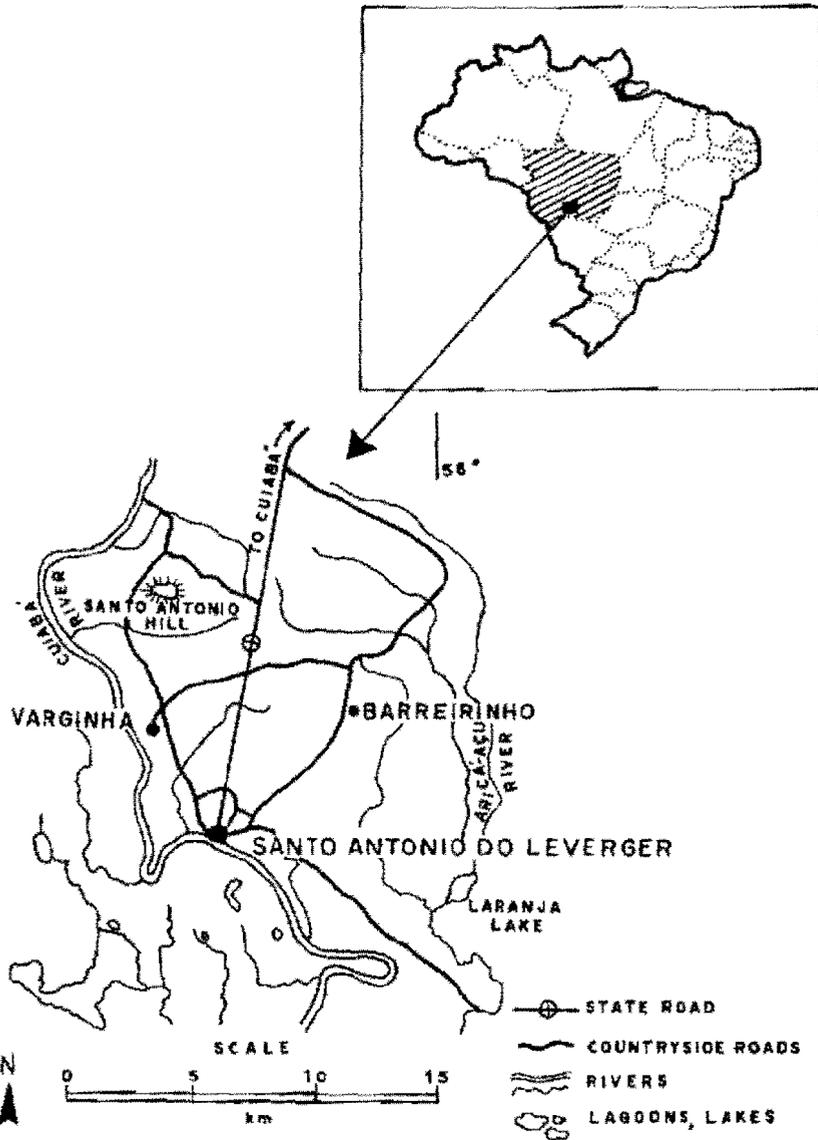


FIGURE 1.—Study area. Source: Fundação de Pesquisa Cândido Rondon, 1991.

farmers from the southern region of Brazil and the establishment of agroindustrial centers in the state brought about changes in land use and social and economic conditions.

In the study area, economy is based on subsistence agriculture, artisanal fisheries, and production of manioc flour for home consumption and sale in the urban market. Modernization—provision of water and electric services, introduction of telecommunication facilities and the enhancement of tourism activities in the

area—is rapidly changing this picture, and contact with the national society is intensifying.

Until a decade or two ago, traditional medical services included various types of specialists: midwives, curers, *benzedores*, and some practitioners of Afro-Brazilian sects, locally known as *tenda* or *congá*. Since modern medical facilities have become more accessible, fewer of these specialists are providing services. For example, midwives are no longer training their replacements; at the time of this study, there remained only three or four very old women said to have been in demand as midwives in their time. Curers who have a deep knowledge of medicinal plants and who know how to diagnose ailments by feeling the patient's pulse are now rare, and none were to be found in the area. In contrast, there are many *benzedores*. They constitute the most important local representatives of traditional medicine at present. Besides "blessing" the ill person, they also prescribe medicinal plants or allopathic remedies (Amorozo 1999). Also, a great number of people, mainly those over the age of forty, control a vast repertoire of knowledge about medicinal plants. In previous research, about 230 plant species employed for therapeutic use have been recorded (Amorozo 2002).

Nowadays, state-run health services include a health care center and a hospital in the small town of Santo Antonio and three health care posts in the nearby rural communities. These services attend to the population at no cost and supply, depending on availability, some of the remedies prescribed by the physicians. The health center operates daily, offering services in general medicine, pediatrics, gynecology, and dentistry. It also performs some simple laboratory analyses. The health posts operate only certain days of the week and offer more limited services. In town, there is also one private physician who attends to the local population for free and two commercial drugstores.

METHODS

Fieldwork has been done in the area since the early 1990s, focusing on the ethnobotany of medicinal plants (Amorozo 2002) and on disease concepts and treatment (Amorozo 1999). For the present study, two quarters in the town of Santo Antonio and two rural communities (Varginha and Barreirinho), approximately seven kilometers away from the former, were selected; all these sites have easy access to government medical services. In June 1998, a survey was conducted in a sample of 44 households (20 in the rural zone and 24 in town). Households were selected by systematic sampling, using a sampling interval suited to ensure 20% of the total in the selected places (adapted from Bernard 1988). In general, interviews were held with female householders, but in some cases, male head or other members of the family also took part. Questionnaires recorded data about socioeconomic position, disease events, and the use of health facilities (both modern and traditional) by family members in the six months previous to the research. Vernacular names of medicinal plants used in this period were also recorded. In addition, all the medicines present in the household at the moment of the interview were inventoried; plants and plant material that the interviewed person considered of medicinal use were recorded—whether growing near the household, gathered fresh, or dried. The majority of species had already been collected

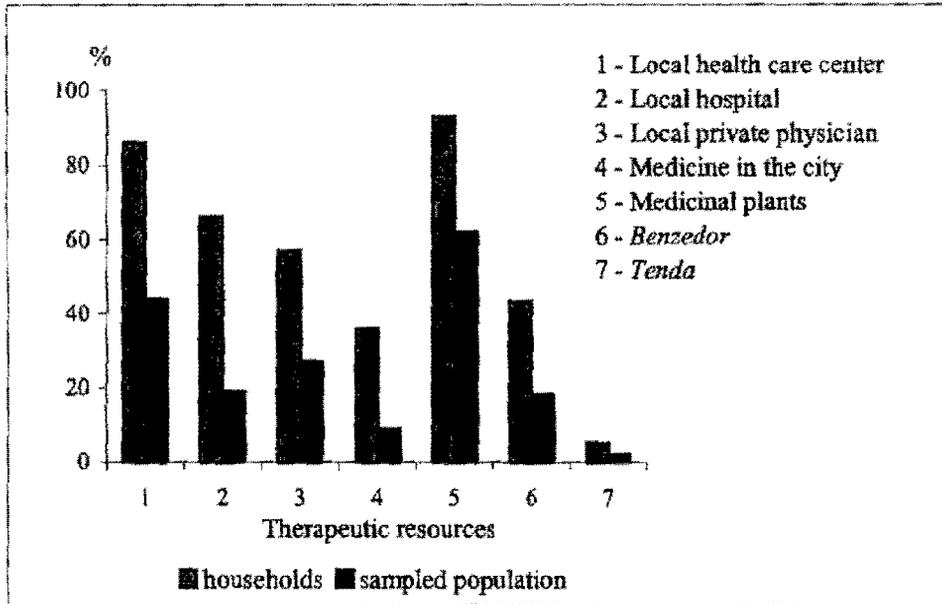


FIGURE 2.—Use frequency of therapeutic resources (number of households = 44; sampled population = 204).

and identified (Amorozo 2002), so collection of botanical material was made, whenever possible, only for those plants that lacked voucher specimens.¹ Data about medical consultations in the area were also gathered in the health center files, encompassing 3320 consultations by general practitioners between June 1997 and June 1998.

An index of therapeutic resources utilization was calculated by age group as follows: $TRUI = \sum_i Nri/N$, where Nri is the number of users of resource i in the age group, and N is the number of persons in the age group. This index rules out the problem of different numbers of people in the age groups, besides condensing data about use frequency in a single figure, making comparisons among them easier. For statistical comparisons, Kendall correlation coefficient, chi-square (Siegel 1975) and binomial test (Ayres et al. 2000) were used.

RESULTS

The sample comprised 204 persons, on average 4.6 per household. Forty-one of the 44 households (93%) reported the use of at least one of the local state-run medical services during the six months previous to the research. Among the available medical services, the local health care center and posts were the most visited by respondents and their families (86% of households and 44% of sampled population). Plants were the most used traditional therapeutic resource; 93% of households and 61% of sampled population used medicinal plants to treat at least one case of illness in this period (Figure 2). Plant-based recipes can be prescribed by anyone, but older, knowledgeable people and *benzedores* are the most sought for such remedies.

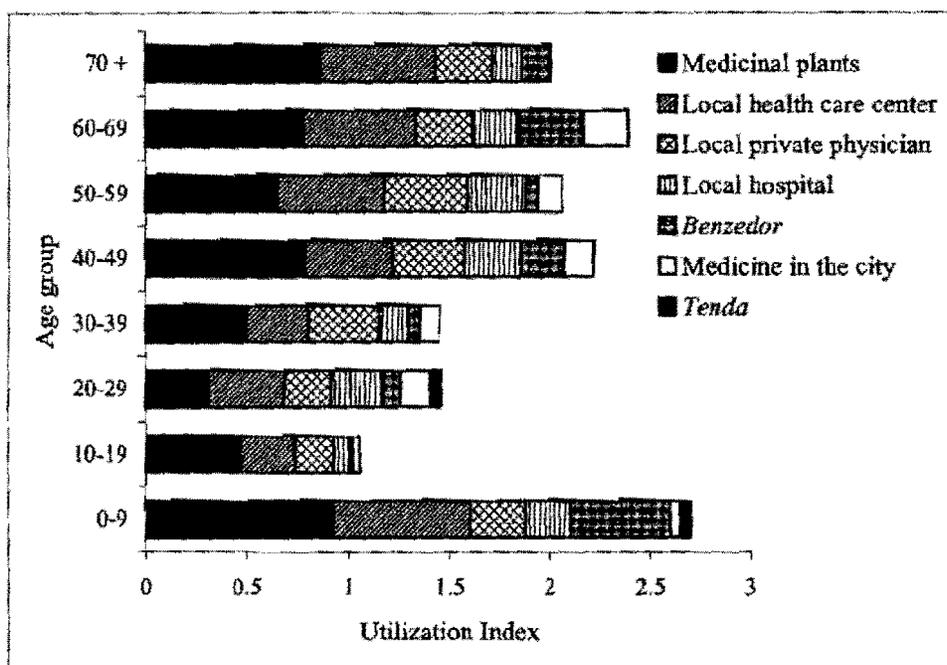


FIGURE 3.—Indices of therapeutic resource utilization by age group.

Differences in the use frequency of therapeutic resources among age classes are to be expected, since people in the prime of life tend to be healthier. In fact, utilization indices (TRUI) were greater for children under 10 and for adults over 40. In the six months prior to research, 93% of children in this age group and 75% of adults over 40 used medicinal plants; they also went to health care center and posts more frequently than did the intermediate age class. *Benzedores* were most sought for treating children under 10 and, to a lesser extent, adults over 40 (Figure 3). Differences among age classes (0-9; 10-39; and 40 and older) by type of therapeutic alternative used were of no statistical significance for medical facilities in Cuiabá, the local private physician and the local hospital. They were significant for the local health care center and posts ($\chi^2 = 10.32, p < 0.01$), medicinal plants ($\chi^2 = 14.24, p < 0.001$) and *benzedores* ($\chi^2 = 34.22, p < 0.001$).² For the comparisons between age classes, all the results were significant, except for the use of health care centers and posts by people under 10 and people aged 40 and older. People aged 10-39 used medicinal plants and sought *benzedores* significantly less than either other class (Table 1). Use of therapies of any kind by people over 14 was 63% higher among females than among males.

The majority of illnesses reported in the interviews received some kind of treatment (Table 2). In general, for ordinary indispositions or minor diseases, self-medication was the first step of treatment; it consisted mainly of medicinal plants (*chás caseiros*) and allopathic medicines that can easily be obtained without medical prescriptions.³ If symptoms persisted or if there were a physician or health service available, people would seek further treatment, even in cases of common

TABLE 1.—Binomial test results for comparisons of therapeutic resources use between age classes.

Therapeutic resource	Age class† (z values)		
	1 × 2	1 × 3	2 × 3
Health center	4.06*	1.54	2.66*
Medicinal plants	5.43*	2.21*	-3.95*
<i>Benzedores</i>	6.54*	3.14*	-3.08*

† 1 = 0-9; 2 = 10-39; 3 = ≥40.

* $p < 0.05$; results not significant in unmarked cell.

ailments. For example, consultation with a health professional took place in more than 30% of the reported cases of influenza and cold symptoms. Likewise, data from the health care center files show that influenza symptoms accounted for almost 6% of consultations by general practitioners between 1997 and 1998. Consultations regarding respiratory and digestive systems ailments, intestinal infections, and helminthiasis accounted for 37% of consultations in the same period. In the rural places studied, in the absence of the physician, who visits only two or three times a week, trained local health agents provided medicines and primary health care.

Medical professionals were sought, locally or in Cuiabá, for serious or acute problems (like heart attack, cerebrovascular accidents, trauma, pneumonia) and undiagnosed illnesses. However, this did not prevent patients from seeking alternative means of healing. For example, two mothers whose young children had been diagnosed with pneumonia reported that they sought government-provided medical care. When the children returned home, the mothers gave them a locally popular tea prepared with some plants and guinea hen feathers in addition to the medicines prescribed by the medical staff.

The combined utilization of modern health services and folk medicine elements, mainly plants, occurred in 45% of reported cases of illness; resort only to modern medicine accounted for 29% of cases, whereas treatment exclusively with plants, and with plants and self-medication with allopathic remedies occurred in 18% of cases, mainly for influenza and cold symptoms (Table 2).

With regard to the medicines inventoried by the time of the interview, allo-

TABLE 2.—Health facilities sought in cases of illness.

Type of health care	Cases (%) ($n = 121$) [*]
Medical professionals + traditional medicine (mainly plants)	44.6
Medical professionals	28.9
Medicinal plants	9.1
Medicinal plants + allopathic remedies	9.1
Allopathic remedies	3.3
Allopathic remedies + medical professionals	2.5
Others	1.7
No treatment	0.8

* If more than one person in a household had the same disease at the same time and treated the same way, only one case was counted.

TABLE 3.—Remedies in the households.

	Frequency (%) (n = 44)	Mean	Range	SD	Total
Allopathic medicines	93.2	5.11	0–29	5.19	225
Medicinal plants	88.6	5.86	0–27	6.01	258
Commercial phytotherapics	18.2	0.27	0–2	0.62	12
Miscellaneous*	34.1	1.29	0–10	1.66	34
Plants used the previous 6 months	93.2	4.27	0–13	3.08	188

* Topical antiseptics, medicinal soaps, animal products.

pathic remedies and medicinal plants were found in most households; the mean number of allopathic medicines per household was around five, whereas the mean number of medicinal plants was around six (Table 3). Some households had a greater number of patent medicines and/or medicinal plants, eventually providing these facilities to neighbors in need. There was a significant positive correlation between number of medicinal plants reported to have been used in the six months previous to research and the number of medicinal plants present in the household (Kendall Tau = 0.40437, $p < 0.001$) and also between this latter and the number of allopathic remedies present in the household (Kendall Tau = 0.261316, $p < 0.01$). Allopathic medicines recorded were mainly analgesics and antipyretics, anthelmintics and remedies for digestive system ailments, antibiotics, vitamins and fortifiers, remedies for urinary tract, hypertension and tranquilizers; antiseptics and antibiotic ointments for treating wounds were also common. About one fifth of the medicines, mainly anthelmintics, antibiotics, vitamins, and analgesics, was supplied free of charge by official health services.

Plant species recorded in the households by the time of the visit numbered 111; about 83 species were mentioned to have been used in the previous six months. In total, about 120 plant species were recorded (Appendix 1). Little more than one-fourth of identified species were native to the *cerrado* or wet areas in the region (Lorenzi 1991; Pott and Pott 1994); cultivated plants accounted for about half of the total plant species. Herbs (37%) and trees (31%) were the most common. Plants cited and/or found in more than 10% of sampled households (Table 4) were mainly cultivated species; at least half of them were exotic species introduced into the area. People aged 40 and older kept on average more than twice as many plants and plant material at home as the group under 40; likewise, mean number of *cerrado* plants and plant material was greater for this age group.

Around 30% of these species were employed to treat illnesses or symptoms of the respiratory system; 20% were used for treatment of gastrointestinal ailments and intestinal worms. Urinary tract ailments, hypertension, disorders related to female reproductive functions (*problemas de mulher*) and wounds were also treated by a variety of plants. Seven species were used to prevent or treat *mau-olho* (evil eye) and envy. It was common to employ the same plant for different diseases.

TABLE 4.—Plant species most frequently present/used in households (%; $n = 44$).

Plant species	Utilization	Present in house- hold	Used last six months
<i>Gossypium barbadense</i> L.	inflammation, "female problems"	23	7
<i>Lippia alba</i> (Mill.) N.E.Br.	tranquilizer	18	14
<i>Coleus</i> sp.	stomach/liver	18	9
<i>Justicia</i> cf. <i>pectoralis</i> Jacq.	influenza/cold	18	7
<i>Vernonia condensata</i> Baker	stomach/liver	18	2
<i>Eucalyptus</i> sp.	influenza/cold	14	18
<i>Stachytarpheta cayenensis</i> (L.C. Rich.) Vahl	cough/influenza	14	11
<i>Punica granatum</i> L.	throat inflammation	14	5
<i>Citrus</i> × <i>aurantium</i> L.	influenza/cold	11	16
<i>Petiveria alliacea</i> L.	<i>mau-olho</i>	11	9
<i>Ruta graveolens</i> L.	"female problems"	11	5
<i>Machaerium aculeatum</i> Raddi	cough/influenza	9	14
<i>Polygonum hydropiperoides</i> Michx.	influenza/cold	7	16
<i>Cymbopogon citratus</i> Stapf.	influenza/cold	5	16
<i>Hyptis</i> spp.	influenza/cold	2	14

DISCUSSION

Data presented above show the combined employment of folk therapies, mainly plants, and modern medicine in almost half the reported disease cases. It is possible that minor complaints were underreported in the recall survey, which could lead to an underestimate of exclusive use of traditional therapies, normally employed in the first place in such cases, or no treatment at all (Brunelli 1987). However, data from the sampled households and from the health center files have shown that even for simple ailments, like influenza or colds, people turn to an official health system professional whenever they can.

The spread of official health care facilities, in the present case, adds more treatment opportunities to a context of health care alternatives constructed after the contribution of diverse influences during the last three centuries. To the practices taken by *paulistas*, already a blend of European medicine of the sixteenth century with medicinal knowledge of indigenous groups from the southeast, therapeutic knowledge of local natives was incorporated. A number of *cerrado* plants used today as remedies were considered *eribo* (that is, magic or medicinal plant) for the Bororo Indians—e.g., *Hyptis* spp., *Macrosiphonia longiflora*, *Anemopaegma arvensis*, *Protium heptaphyllum*, *Byttneria melastomifolia*, among others (Albisetti and Venturelli 1962; Amorozo 2002; Hartmann 1967). Some plants, like *Petiveria alliacea*, used by African slaves in the eighteenth century to poison their masters (Santos Filho 1977) were also included in this pharmacopoeia.

The new therapeutic options brought about by growing access to modern medical facilities coincide with changes in traditional subsistence and production conditions as well as increased influence of urban ideology on rural areas. The impact of this scenario on former therapeutic practices and practitioners is different in each case: for example, for the study area, midwives are no longer nec-

essary because access to institutional obstetric services is relatively easy. On the other hand, *benzedores* still play an important role, not fulfilled by modern medicine. Culturally recognized ailments that are not considered by modern medicine, like *quebrante*, *mau-olho* (evil eye), and *arca-caída*, are treated exclusively by *benzimento* (blessing) (Amorozo 1999). This uniqueness partly explains the great popularity *benzedores* enjoy in the area. But, *benzedores* are also sought when the therapeutic focus of an illness episode concentrates upon elements of modern medicine and in situations of emotional distress, which suggests psychological support plays an accessory role. For instance, the mother of a teenager who was experiencing a delicate emotional situation reported she had taken her daughter to a psychologist or psychiatrist in Cuiabá and also to a local *benzedora*.

Medicinal plants were ordinarily employed to treat ailments like influenza, colds, gastrointestinal disorders and intestinal worms, sometimes in combination with allopathic medicines. Plants aimed at treating these ailments were the most frequently kept at home. The use of plants for these purposes is also common in other parts of Latin America (Bennett and Prance 2000; Trotter 1981) and Brazil (Amorozo and Gély 1988; Hanazaki et al. 1996; Silva-Almeida and Amorozo 1998). It is noteworthy that these ailments accounted for a great proportion of consultations in the health center as well.

People aged 40 and older kept much more plants/plant material at home and made use of them most frequently. Plants were also commonly used to treat small children; young mothers commonly seek advice and plants from older relatives or neighbors.

In sum, the majority of the sampled population used traditional as well as modern therapeutic facilities during the recalled period, taking advantage of all treatment opportunities available to them. The following description illustrates well this therapeutic syncretism.

During earlier fieldwork in Santo Antonio, I collected an account of an illness event, where a woman about 40 years old had been struck by facial paralysis of unknown etiology. In the first few days of her disease until the onset of the paralysis, she complained of an intense headache, blurred vision, and weakness. She first tried some home remedies prepared with plants and a commercial phytotherapeutic, all recommended by relatives and friends. Then she consulted a physician in town and the next day, a neurologist in Cuiabá; both prescribed allopathic medicines. During the first days of her disease, she also sought a *benzedor*, who blessed her and prescribed medicines and baths prepared with plants and other ingredients. Her illness lasted about one month; during this time, she consulted one more physician, a homeopath in the city, three other *benzedores*, one physiotherapist, besides taking advice from a handful of relatives and acquaintances. She used whatever medicine was prescribed to her, both internally and externally, which included several remedies prepared with thirteen plant species, six allopathic and two homeopathic medicines, among others. She and her relatives also prayed and made promises to the Roman Catholic saints in order to ensure her cure.

Though a rather extreme example, this case can give us some insights about the way people in Santo Antonio deal with illness events. In a very short period of time, the patient turned to almost all the therapeutic options available to her,

traditional and modern. There was not time enough to evaluate the treatment efficacy before she changed to another therapy and also no complete shift would take place among treatments. Instead, the whole array of therapeutic resources at hand was exploited virtually simultaneously. Moreover, she made no distinction between different approaches by medical doctors, employing both allopathy and homeopathy.

A remarkable feature of this situation is the interest of relatives, friends and neighbors in restoring the well-being of the diseased person. Everyone took pride in suggesting a recipe, based on their own experience, that of relatives or hearsay. That is, the community was involved in the illness episode, a situation characteristic of traditional rural settings. On the other hand, the array of therapeutic choices has increased, since people can either seek folk health agents and/or the new options made available by the broadening of official health services coverage. Feierman (1979), discussing the size and composition of therapy-managing groups of kinsfolk in Africa argues that, in periods of great social mobility, the extended kinship network tends to cross various lines as related to instruction, social class, rural or urban residence, thus broadening the range of therapeutic preferences. Though one can not talk of 'therapy-managing group' proper in the present case, social and economic mobility in the area tends to have a similar effect. Also, in Santo Antonio, exchanges with society at large are more intense today due to increased tourism and the development of other economic activities in the region. Other authors have already stressed the predominance of pluralism in Brazilian rural societies undergoing social and economic changes due to external influences (Cândido 1987; Wagley 1988).

It seems that in the case of Santo Antonio, this pluralism is sometimes expressed as a sort of therapeutic opportunism. To a certain extent, the availability of free official health facilities encourages this behavior. But, medical services offered locally do not entirely meet people's expectations. For example, there are many complaints about the frequent change of physicians in the health center and posts, which, according to users, hinders patients attendance. They also view clinical and laboratory examinations performed there as superficial, which makes them feel unsupported by medical personnel. Moreover, here, as in many parts of rural Brazil, provision of medical facilities for poor people is a common means of obtaining political advantage and is often used for electoral purposes. This can be done, for instance, by hiring private physicians to tend the population at no cost in times of election.

On the other hand, people continue to turn to traditional ways of treating illnesses that are still available. But, as subsistence activities (like manioc flour production and fishing) become increasingly directed toward production for market and opportunities for wage labor increase, as is the case in the area, people begin to lose control of their working conditions. This limits their ability to follow traditional practices designed to treat illness and maintain health (Feierman 1979)—for example, to stay at home after intake of 'hot' medicines, to avoid hard work in agriculture fields during the hottest hours of the day, or certain foods in some situations.

Medical personnel and cosmopolitan culture despise local conceptions of health and disease, labeling the traditional ways of healing as inferior, supersti-

tious and backward. In fact, traditional therapeutic means are challenged: intensification of exchanges with national society has introduced new health problems and situations they can not cope with. For instance, the resident physician reported that many patients he takes care of, especially women, presented symptoms and complaints typical of stress. According to him, many of them were anxious about their children's future, in view of new problems brought about by the ongoing socioeconomic changes in the area, exposure of youths to illegal drugs, prostitution, and so on.

So this opportunistic strategy may be due to a feeling of unease about the effectiveness of the therapeutic options available to people, be they traditional or modern, which mirrors in fact their present sociocultural situation.

In this changing sociocultural context, medicinal plants are widely used and *benzedores* are often consulted. In an illness event, like the one described above, they work to reinforce family and communal ties. Knowledge about plants and other therapies is shared and taught through advice and prescription of folk recipes for the diseased person.

It is possible that current socioeconomic changes will cause knowledge and use of medicinal plants to decrease in the studied communities for two reasons. First, younger people are becoming increasingly involved in occupations other than those of their parents. They either engage in local wage labor—agriculture, construction, or services—or migrate to Cuiabá, so at least part of the time they do not participate in the sphere of communal life where traditional knowledge is passed on. Second, land tenure and use in the area is rapidly changing. *Cerrado* vegetation has many species valued in folk medicine, but *cerrado* tracts, which were formerly common property, are now privately owned by foreigners. This places severe restrictions on their use by local people; moreover, natural areas are being replaced by cattle ranches and weekend houses.

CONCLUSIONS

Medicinal plant use in Santo Antonio is still an important and living tradition. Nevertheless, easy access to modern medicine, disruption of traditional knowledge transmission and change in land use, with destruction of natural vegetation, will ultimately lead to an erosion in both plant species availability and knowledge about them. Though people will probably continue to use medicinal plants, these will be more and more restricted to cultivated and exotic species, as is already the case for rural areas in more industrialized regions of the country.

These trends are difficult to reverse, but there are measures that could mitigate their outcomes. For example, adoption by local official health services of native medicinal plants of known therapeutic efficacy together with measures to conserve *cerrado* patches and the cultivation of some of these species could contribute to maintain this rich lore and, eventually, achieve a better integration of the various ways of treating illnesses in the area.

NOTES

¹ Voucher specimens are deposited in Herbarium Rioclarense (HRCB).

² *Tenda* and Medicine in the city categories were excluded from statistical tests because of great number of cells with zero.

³ These generally comprise analgesics, antipyretics, drops against blocked nose, but may also include medicines to be used strictly with medical attendance, due to lack of control of sales and employment of medicines.

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APPENDIX 1.—Plant species present in the household/used the last six months. VN = voucher number; it refers either to herbarium (HRCB) or collector number (CA = M.C. Amorozo; MC = M. Carvalho); n.i. = not identified; i.l. = identified, but not collected; LF = life form; tre = tree; srb = shrub; sbt = shrublet; hrb = herb; epf = epiphyte; vin = vine; hpar = hemiparasite; # = purchased; c = cultivated; s = spontaneous; * = most common species; *cerrado* = Brazilian savannah.

FAMILY/Species	Vernacular name	VN	LF	Habitat/occurrence	C/S
ACANTHACEAE					
<i>Justicia cf. pectoralis</i> Jacq.*	anador, anador-de-planta, aspirina	CA277	hrb	homegarden	c
ALISMATACEAE					
<i>Echinodorus</i> sp.	chapéu-de-couro	CA310	hrb	swamp	s
ALLIACEAE					
<i>Allium sativum</i> L.	alho	i.l.	hrb	cultivated field in river bank	c
AMARANTHACEAE					
<i>Alternanthera brasiliana</i> (L.) Kuntze	terramicina	30790	hrb	homegarden	c
ANACARDIACEAE					
<i>Anacardium occidentale</i> L.	caju	i.l.	tre	homegarden	c
<i>Mangifera indica</i> L.	manga, mangueira	i.l.	tre	homegarden	c
APIACEAE					
<i>Pimpinella</i> sp.	erva-doce	—	hrb	#	—
APOCYNACEAE					
<i>Catharanthus roseus</i> (L.) Don.	bom-dia	30791	hrb	garden	c
<i>Hancornia speciosa</i> Gomez	mangabeira-mansa	30805	tre	<i>cerrado</i>	s
ARACEAE					
<i>Dieffenbachia</i> sp.	comigo-ninguém-pode	i.l.	hrb	garden, homegarden	c
ARECACEAE					
<i>Acrocomia aculeata</i> (Jacq.) Lodd. ex Mart.	boucaiuveira	i.l.	tre	<i>cerrado</i>	s

APPENDIX 1—(continued)

FAMILY/Species	Vernacular name	VN	LF	Habitat/occurrence	C/S
ASTERACEAE					
<i>Acanthospermum hispidum</i> DC.	cabeça-de-garrotinho	30707/30709	hrb	homegarden, weedy	s
<i>Artemisia absinthium</i> L.	losna, novônica-macho, noz-vômica	CA432/CA313	hrb	homegarden	c
<i>Artemisia verticillata</i> Lamotte	artemije	30664	hrb	homegarden	c
<i>Bidens pilosa</i> L.	picão-preto	30838/30839	hrb	homegarden	s
<i>Dendrathermum grandifolium</i> (Rav.) Tzav.	camomila-branca, camomila-amarela	30677	hrb	homegarden	c
n.i.	camomila		hrb	homegarden	c
<i>Vernonia brasiliana</i> Druce	assa-peixe	30705	srb	fallow	s
<i>Vernonia condensata</i> Baker*	boldo, bordo, sara-tudo, cura-tudo	30830/30840	tre	homegarden	c
BIGNONIACEAE					
<i>Crescentia cujete</i> L.	cabaça	CA409	tre	homegarden	c
<i>Cybistax antisyphilitica</i> (Mart.) Mart.	pé-de-anta	MC5	srb	cerrado, homegarden	s/c
<i>Tabebuia aurea</i> (Manso) B. et H.	paratudo	30755	tre	cerrado, homegarden	s
BIXACEAE					
<i>Bixa orellana</i> L.	urucum	i.l.	tre	homegarden	c
BORAGINACEAE					
<i>Cordia insignis</i> Cham.	calção-de-velho	30747	srb	cerrado	s
CACTACEAE					
<i>Pereskia</i> cf. <i>grandifolia</i> Haworth	ora-pronobis	CA417	tre	homegarden	c
CAESALPINIACEAE					
<i>Bauhinia</i> sp.	pé-de-boi, unha-de-boi	30851	tre	cerrado	s
<i>Chamaecrista desvauxii</i> (Collad.) Killip	sene	30766	sbt	cerrado	s
<i>Hymenaea courbaril</i> L. var. <i>stilbocarpa</i>	jatobá-mirim, jatobá	CA289	tre	cerrado	s
<i>Senna occidentalis</i> (L.) Link	fedegoso	30849	sbt	fallow	s
<i>Tamarindus indica</i> L.	tamarindo, tamarino	30763	tre	homegarden	s

APPENDIX 1—(continued)

FAMILY/Species	Vernacular name	VN	LF	Habitat/occurrence	C/S
CAPRIFOLIACEAE					
<i>Sambucus australis</i> C. et S.	sabugueiro	30760	srb	homegarden	c
CARICACEAE					
<i>Carica papaya</i> L.	mamão, mamão-macho	i.l.	tre	cultivated field, home-garden	c
CARYOCARACEAE					
<i>Caryocar brasiliense</i> Camb.	pequizeiro, picueiro	30666	tre	<i>cerrado</i>	s
CECROPIACEAE					
<i>Cecropia pachystachya</i> Trec.	embaúba	30681	tre	homegarden	s
CHENOPODIACEAE					
<i>Chenopodium umbrosioides</i> L.	erva-de-santa-maria, santa-maria	i.l.	hrb	homegarden	s
CONVOLVULACEAE					
<i>Ipomoea batatas</i> (L.) Lam.	batata-doce	i.l.	hrb	cultivated field	c
COSTACEAE					
<i>Costus arabicus</i> L.	cana-de-macaco, caninha-de-macaco	CA44	hrb	homegarden	s/c
CUCURBITACEAE					
<i>Luffa</i> sp.	buchinha, buchinha-paulista	i.l.	vin	#	
<i>Momordica charantia</i> L.	são-caetano, melão-de-são-caetano	30820	vin	homegarden, fallow	s
DILLENIACEAE					
<i>Curatella americana</i> L.	lixeira	30808	tre	<i>cerrado</i>	s
EUPHORBIACEAE					
<i>Chamaesyce caecorum</i> (Boiss.) Croizat	sete-sangrias	30803	hrb	<i>cerrado</i>	s

APPENDIX 1—(continued)

FAMILY/Species	Vernacular name	VN	LF	Habitat/occurrence	C/S
<i>Jatropha gossypifolia</i> L.	pinhão-roxo	30797	srb	homegarden	c
n.i.	quebra-pedra		hrb	cultivated field	s
<i>Phyllanthus orbiculatus</i> L.C. Rich	quebra-pedra	30811	hrb	cerrado	s
<i>Phyllanthus stipulatus</i> (Raf.) Webster	quebra-pedra	CA405	hrb	homegarden	s
<i>Ricinus communis</i> L.	mamona, óleo-de-ricino	30798/30800	srb	homegarden	s
FABACEAE					
<i>Acosmium dasycarpum</i> (Vog.) Yakovl.	genciana, quina-genciana	CA294	srb	cerrado	s
<i>Cajanus cajan</i> (L.) Millsp.	feijão-andu	CA355	srb	homegarden	c
<i>Dipteryx alata</i> Vog.	cumbaru	30813	tre	cerrado	s
cf. <i>Eriosema campestre</i> Benth.	bácimo	30852	hrb	cerrado	s
<i>Machaerium aculeatum</i> Raddi*	espinheira, espinheiro	CA269	tre	swamp	s
FLACOURTIACEAE					
<i>Casaria sylvestris</i> Sw.	chá-de-frade	CA5	srb/tre	cerrado	s
LAMIACEAE					
<i>Coleus</i> sp.*	boldo, bordo	i.l.	srb	homegarden	c
<i>Cunila microcephala</i> Benth.	poejo, apoejo	30687	hrb	homegarden	c
<i>Hyptis crenata</i> Pohl. ex Benth./ <i>Hyptis goyazensis</i> St.Hil. ex Benth.*	hortelã-do-campo, hortelã-da-vargem	30842/30674	sbt	cerrado	s
<i>Hyptis suaveolens</i> Poir.	tapera-velha	30688	hrb	fallow, ruderal	s
<i>Leonotis nepetaefolia</i> (L.) R. Brown	cordão-de-são-francisco	30689	hrb	homegarden, weedy	s
<i>Mentha arvensis</i> L. var. <i>pipemscens</i> Malinv.	vick	30671/30675	hrb	homegarden	c
<i>Mentha</i> sp.	hortelãzinho, hortelã	30672	hrb	homegarden	c
<i>Ocimum gratissimum</i> L.	alfavaca	30822/30823	sbt	homegarden	c
n.i.	hortelã-gordo	CA422	hrb	homegarden	c
LAURACEAE					
<i>Persca americana</i> Mill.	abacate	i.l.	tre	homegarden	c
LILIACEAE					
<i>Sansevieria</i> sp.	espada-de-são-jorge	i.l.	hrb	garden, homegarden	c
LOGANIACEAE					
<i>Strychnos pseudoquina</i> St. Hil.	quina	CA251	tre	cerrado	s

APPENDIX 1—(continued)

FAMILY/Species	Vernacular name	VN	LF	Habitat/occurrence	C/S
LORANTHACEAE					
<i>Psittacanthus calyculatus</i> (DC.) C. Don	enxerto-de-passarinho	30826	hpar	homegarden, wetlands	s
<i>Psittacanthus</i> sp.	enxerto-de-passarinho	CA448		homegarden, wetlands	s
LYTHRACEAE					
<i>Lafoensia</i> cf. <i>replicata</i> Pohl.	mangabeira-braba	MC48	tre	<i>cerrado</i>	s
MALPIGHIACEAE					
<i>Camarea ericoides</i> St.Hil.	arnica	30668	hrb	<i>cerrado</i>	s
<i>Heteropterys pinnosa</i> Griseb.	nó-de-cachorro, raiz-de-santo-antonio	MC3	sbt	<i>cerrado</i>	s
<i>Malpighia glabra</i> Linn.	acerola	i.l.	srb	homegarden	c
MALVACEAE					
<i>Abutilon</i> sp. 1	marva, mave	30738/30739	hrb	homegarden	s/c
<i>Abutilon</i> sp. 2	mave	30737	hrb	homegarden	s/c
<i>Gossypium barbadense</i> L.*	algodão, algodão-de-casa	30735	srb	homegarden	c
<i>Sida</i> sp.	sem nome (no name)	i.l.	hrb	homegarden	s
MELASTOMATACEAE					
<i>Tibouchina</i> cf. <i>claxata</i> (Pers.) Wurd.	cibalena	CA445	srb	homegarden	c
MIMOSACEAE					
<i>Stryphnodendron adstringens</i> (Mart.) Coville	barbatimão	CA264	tre	<i>cerrado</i>	s
MONIMIACEAE					
<i>Siparuna guianensis</i> Aubl	negra-mina	30740	tre	<i>cerrado</i>	s
MORACEAE					
<i>Brosimum gaudichaudii</i> Tréc.	algodãozinho	CA441	tre	<i>cerrado</i>	s
<i>Dorstenia asaroides</i> Gardner	caíapiá	CA7	hrb	cultivated field, <i>cerrado</i>	s
MUSACEAE					
<i>Musa</i> × <i>paradisiaca</i> L.	bananinha, bananeira	i.l.	hrb	cultivated field, home-garden	c

APPENDIX 1—(continued)

FAMILY/Species	Vernacular name	VN	LF	Habitat/occurrence	C/S
MYRTACEAE					
<i>Eucalyptus</i> sp.*	eucalipto	CA308	tre	street	c
<i>Eugenia uniflora</i> L.	pitanga	CA377	tre	homegarden	c
<i>Psidium guajava</i> L.	goiaba, goiabeira, goiaba-branca	i.l.	tre	homegarden, cultivated field	c
<i>Syzygium cumini</i> (L.) Skeels	jambo	CA431	tre	homegarden	c
OXALIDACEAE					
<i>Axerrhoa carambola</i> L.	carambola	30700	tre	homegarden	c
PASSIFLORACEAE					
<i>Passiflora edulis</i> Sims	maracujá	i.l.	vin	homegarden	c
PHYTOLACCACEAE					
<i>Petiveria alliacea</i> L.*	guiné	30685	hrb	homegarden	c
PIPERACEAE					
<i>Piper tuberculatum</i> Jacq.	jaborandi, jaguarandi	30669/30670	srb	cerrado, homegarden	s
POACEAE					
<i>Coix lacryma-jobi</i> L.	conta-de-nosso-senhor, erva-de-santa-maria	30711	hrb	homegarden	c
<i>Cymbopogon citratus</i> Stapf.*	capim-cidreira	CA300	hrb	homegarden	c
<i>Saccharum officinarum</i> L.	cana-de-açúcar	i.l.	hrb	cultivated field	c
<i>Vetiveria zizanioides</i> (L.) Nash	capim-santo	30710	hrb	homegarden	c
POLYGONACEAE					
<i>Polygonum hydropiperoides</i> Michx.*	erva-de-bicho	30686	hrb	swamp	s
PUNICACEAE					
<i>Punica granatum</i> L.*	romã	i.l.	tre	homegarden	c
RUBIACEAE					
<i>Rudgea viburnoides</i> (Cham.) Benth.	douradinha, erva-mulá	30742/30782	srb	cerrado	s

APPENDIX 1—(continued)

FAMILY/Species	Vernacular name	VN	LF	Habitat/occurrence	C/S
RUTACEAE					
<i>Citrus</i> sp. 1	lima-de-umbigo	CA341	tre	homegarden	c
<i>Citrus</i> sp. 2	lima-das-peças	CA343	tre	homegarden	c
<i>Citrus</i> × <i>aurantifolia</i> (Christm.) Swingle/ <i>Citrus</i> × <i>limum</i> (L.) Osbeck	limão-galego, limão, li- mão-taiti	CA291/CA339/ CA344	tre	homegarden	c
<i>Citrus</i> × <i>aurantium</i> L.*	laranja	CA340/CA342	tre	homegarden	c
<i>Ruta graveolens</i> L.*	arruda	i.l.	hrb	homegarden	c
SCROPHULARIACEAE					
<i>Scoparia dulcis</i> L.	vassourinha	30727/30728	hrb	homegarden	s
SIMAROUBACEAE					
<i>Simaba trichilioides</i> St.Hil.	calunga	30722	sbt	cerrado	s
SOLANACEAE					
<i>Solanum</i> cf. <i>comptum</i> Morton n.i.	joá beladona	30719 CA433	sbt srb	cerrado, swamp homegarden	s c
STERCULIACEAE					
<i>Guazuma</i> sp.	chico-magro	30726/30720	tre	cerrado, homegarden	s
VERBENACEAE					
<i>Lantana camara</i> L. <i>Lippia alba</i> (Mill.) N.E.Br.*	cambará erva-cidreira, cidreira-de- rama	30691 CA407/CA408	sbt sbt	fallow homegarden	s c
<i>Stachytarpheta cayenensis</i> (L.C. Rich.) Vahl.*	gerbão, gervão	MC2	sbt	homegarden	s
VOCHYSIACEAE					
<i>Vochysia divergens</i> Pohl.	cambará	30846	tre	cerrado, near swamp	s
ZINGIBERACEAE					
<i>Alpinia zerumbet</i> (Pers.) Burt & Smith	colonia	30693	hrb	homegarden	c

APPENDIX 1—(continued)

FAMILY/Species	Vernacular name	VN	LF	Habitat/occurrence	C/S
INDETERMINATE					
1.	babosa	—	hrb		c
2.	cravo	—	tre		c
3.	cancerosa	—	—		c
4.	douradinho	—	—		—
5.	espada-de-nossa-senhora	—	hrb		c
6.	jacarandá	—	tre		s
7.	jequitibá	—	tre		s
8.	quina-do-morro	—	tre?		—