

A Comparison of Plants Utilized in Ritual Healing by Two Brazilian Cultures: Quilombolas and Krahô Indians†

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Abstract—The present study deals with two ethnobotanical surveys carried out in two different segments of the Brazilian population: the first among the Krahô Indians living in Tocantins State, a Cerrado region, and the second one among the descendants of former black slaves, the Quilombolas, living in Mato Grosso State. Both populations use plants which may have effects on the central nervous system (CNS) in their ritual healing ceremonies. Field work was performed during two years by one of the authors (E. Rodrigues) utilizing methods from botany and anthropology. Information was obtained on a total of 169 plants which were utilized in the preparation of 345 prescriptions for 68 ailments seemingly of the CNS, classified as tonics, analgesics, anorectics, hallucinogens, and anxiolytics. The taxonomic families of plants used, the more common therapeutic indications and types of healing rituals are discussed.

Keywords—Brazilian folk healers, ethnopharmacology, healing ceremony, psychoactive plants, shaman, shamanism

Brazil possesses high rates of biodiversity and endemism in the five principal biomes that make up the country: the Amazon Equatorial rain forest, the Cerrado savannahs, the Mata Atlântica rain forest, Pantanal wetlands, and Caatinga semiarid scrublands. There is also great cultural diversity as shown by the existence of 220 indigenous ethnic

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groups (Instituto Socioambiental 2004), groups of Quilombolas (descendants of Afro-Brazilian runaway slaves) and various traditional segments of the population (fishermen, river-dwellers, raftsmen, babaçu gatherers, seringueiro rubber sap gatherers, and sertanejo country folk). The multiple possibilities resulting from this combination of biome versus human groups confers a wealth and complexity in terms of knowledge of the Brazilian flora and its therapeutical potential.

In Brazil, there are a great number of psychoactive plants: those that alter some aspects of the mind including behavior, mood, anxiety, cognition, and well-being (Bertolote & Girolamo 1993). On the other hand, use of these plants is not generalized among the different segments of the population cited above. Use of hallucinogenic plants, for instance, is more common among the Quilombolas and Indians (Rodrigues & Carlini 2004, 2003b) in their practices of healing ceremonies, whether shamanic or Umbanda rituals, that require the use of plants to facilitate communication

with spiritual guides (Camargo 1998, 1988). Use of these plants is rare among the traditional populations.

Ethnobotanical surveys have been carried out among ethnic groups of Indians living in the Amazon region (Milliken 1992; Schultes & Raffauf 1990; Schultes 1979; Cavalcante & Frikel 1973), some focusing on psychoactive plants (Shepard Jr. 1998; Schultes & Hofmann 1993; Schultes 1990, 1973) and in particular those plants indicated for senile diseases (Schultes 1993). There are practically no other ethnobotanical studies on psychoactive plants in the remaining Brazilian biomes.

This study has as its objective to carry out two ethnobotanical surveys: one among the Krahô Indians in the state of Tocantins (Cerrado biome), and the other among the Quilombolas in the state of Mato Grosso (an area of transition between the Cerrado and the Mato Grosso Pantanal wetland biomes), since these groups favor the use of plants acting on the CNS.

STUDY GROUPS

Approximately 1700 Krahô Indians occupy an area of 302,533 hectares of the Cerrado biome (Figure 1) and are distributed among 16 villages. Among them, 58 wajacas (shamans) are sought out for the treatment of various illnesses. In each village, the houses are set out around a large circular central patio used for frequent day-to-day meetings, celebrations, and competition races, and are connected to the patio along paths. The Krahô are known for their wealth of knowledge on medicinal plants, their complex methods of healing, a striking fascination with rituals (Melatti 1978, 1967), and for their relative isolation from conventional medical treatment.

The 300 Quilombolas dwell in a transition area between Cerrado and Pantanal called Sesmaria (a name used by former Portuguese colonizers for vast stretches of land donated by the Portuguese King) or Quilombo Mata-Cavalos ("killing horses"), which occupies an area of 13,620 hectares (Figure 1). Their ancestors were African slaves who arrived at the Sesmaria between 1804 and 1883, originating predominantly from the western coast of the African continent (Rosa 1993). This group of Quilombolas is represented by spiritual and political leader Mr Cezário, who has extensive experience in healing activities over the last 60 years, aided by spirits. He is also a great teacher to aspiring healers.

In both these areas, houses are made of mud and wattle with palm-leaf roofing. There is no running water, no lavatory, and no electrical power. Bathing is done in the rivers from which water is drawn for drinking and cooking and for washing dishes and clothes. The water ingested is not treated in any way. Fishing, hunting and fruit collecting supply food and are supplemented by crops of rice, beans, manioc, banana, etc. and, rarely, by livestock (pigs and chicken).

Figure 1 shows the original area of the Cerrado biome with 1.5 million square kilometers (Proença, Oliveira & Silva 2000); however, two thirds of this biome has lost its original characteristics owing to soybean plantations, cattle raising, and other activities carried out in this area (Paiva 2000). The rich flora consisting of approximately 4,500 species has only recently been studied (Mendonça et al. 1998). The complex flora of the Pantanal wetlands, covering an area of 139,111 sq.km., almost entirely within Brazilian territory, is practically unknown in the scientific world (Adamoli 1986), with the exception of an article by Pott and Pott (1994) that describes approximately 400 plants from the Pantanal and their popular uses.

METHODOLOGY

Fieldwork for this study, which utilized methods from anthropology and botany, took place from July of 1999 through July of 2001 and included a total of seven visits (a total of 49 days) to Sesmaria Mata-Cavalos and 10 visits (a total of 200 days) to three Krahô villages.

Informal interviews (Alexiades 1996) were carried out among the inhabitants in order to select the future interviewees at the start of the field work. Four healers were selected from Sesmaria Mata-Cavalos and seven wajacas from three Indian villages. Subsequent to selection, their knowledge of methods of diagnostics and healing, with answers to questions concerning their beliefs, were obtained through participant observation and field notes (Martin 1995; Bernard 1988). Personal aspects and ethnopharmacological knowledge of the interviewees were obtained by the use of questionnaires with open questions in semistructured interviews (Bernard 1988) in which the following topics were addressed: line of descent, age, level of schooling and the status of each interviewee in his/her community (personal data); composition of a given formula, its respective therapeutic indication, doses, method of preparation and counterindications (ethnopharmacological data). The interviews provided the opportunity to learn about and document the use of plants for any therapeutic purpose. This information was used to select the prescriptions and plants with possible CNS activity, the focus of this study.

Among the Indians, it was furthermore necessary to resort to translation with the help of Krahô teachers since, although they speak enough Portuguese to communicate with non-Indian people, the interviewees also spoke their own language, Timbira, which they used most of the time. Correlations were thereby made between the indications originating from the Krahô and those made according to conventional medicine, where possible: 138 Timbira terms were translated into Portuguese. For instance, it was possible to establish a correlation between the use of "quĩ amã prãm" in Krahô therapeutics with the therapeutic indication "to whet the appetite" in Portuguese official medicine.

FIGURE 1
Location of the Quilombolas and Krahô Indians



Original area of Cerrado biome (shown in gray on the map) and Pantanal Wetlands biome (black) in Brazilian territory. Location of Sesmária Mata-Cavalos in the municipality of Nossa Senhora do Livramento in Mato Grosso State (on the left); and Krahô area is in the municipalities of Goiatins and Itacaj in Tocantins State (on the right).

This translation also allowed us to comprehend certain beliefs associated with the cause of some diseases: in Krahô therapeutics, there are three types of fever, each with its own differentiated origin, symptomatology, and denominations. Similarly, there are six different types of wounds.

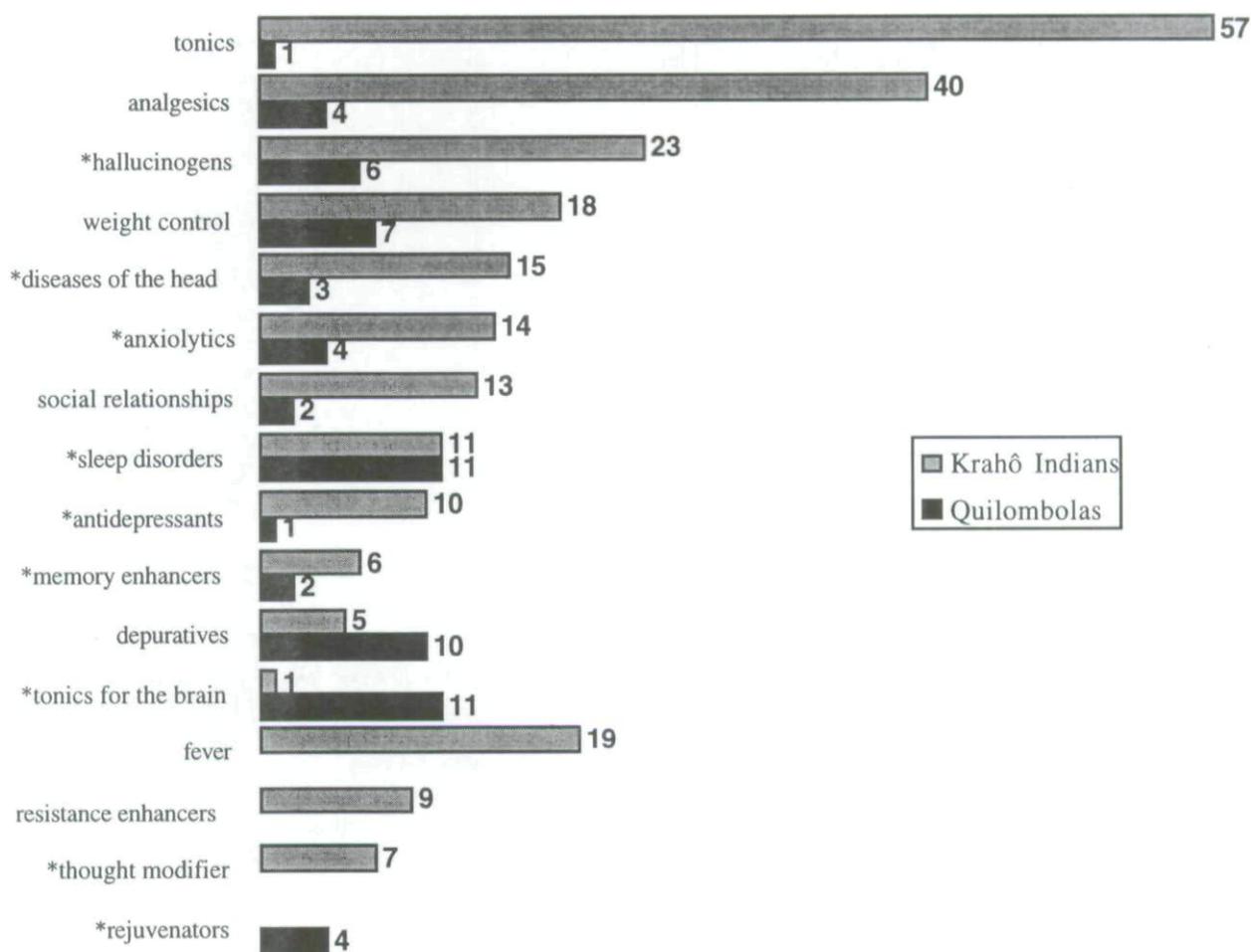
Three samples of each plant were provided by E. Rodrigues in the presence of the interviewees. The plants were collected with a view to the following information: appearance while blooming and fruit-bearing, origin, and location of the collecting, as recommended by Hedberg (1993) and Lipp (1989). Photographs were also taken. The plant material collected was identified at the São Paulo State Botanical Institute (IBt-SP), and a voucher was deposited at this location. The plants were researched with regard to the origin of each specimen identified (native or exotic), based on consultation through the Missouri Botanical Gardens website (www.mobot.org) and the reference books by Rodrigues & Carvalho (2001), Pott and Pott (1994), Ferri (1969), and Pio Corrêa (1926).

Phytochemical and pharmacological research was also carried out using the following databases: Chemical Abstracts (CA), International Pharmaceutical Abstracts (IPA), Literatura Latino-Americana e do Caribe em Ciências da Saúde (LILACS), Analytical Abstracts (ANAB),

OLDMEDLINE, and PUBMED, to verify the existence of reports published during the last 35 years for the species cited in the present study. Annals of the Brazilian Symposium of Medicinal Plants (Simpósio de Plantas Medicinais do Brasil) beginning in 1984 were also consulted.

As with former publications (Rodrigues & Carlini 2004, 2003a, b; Rodrigues 2001, 1998) and in accordance with a recent Brazilian law (Brasil, Medida Provisória n. 2.186-16, 2001), the scientific names of plants indicated by the interviewees have not been included in this article with a view to safeguarding traditional knowledge. In this way, in the case of any future pharmacological investigation that might lead to commercializing of new medication, those populations interviewed would be able to participate in the benefits from the same. On the other hand, five of the 169 species indicated in this survey have been listed in Table 3, since the uses attributed to them by the populations under consideration have been confirmed in former pharmacological studies. Other authors also support selectivity in publishing data resulting from ethnobotanical surveys as a strategy to ensure that the groups concerned share in the benefits (Laird et al. 2002; Clement & Alexiades 2000).

FIGURE 2
The 16 Categories of Use of the 169 Identified Plants used by the Krahô Indians (15 categories)
and Quilombolas of the Sesmaria Mata-Cavalos (13 categories) to Treat Different CNS Ailments



The species may be cited in more than one category. The nine categories of use with asterisk (*) appear to have some relation to psychoactive effects.

RESULTS AND DISCUSSION

Medical Practices of the Krahô

Melatti (1978) describes 40 rites observed among the Krahô Indians, most of them involving the use of plants and animals. There are rites of passage (Van Gennep 1978), such as those at birth, puberty, and initiation. One particular rite of initiation "to be champion in the races" may explain the large number of plants used as tonics (See Figure 2). There is also the rite of healing (Mauss 1974) that will be described below.

The wajaca is the person acknowledged by the Krahô people as the keeper of knowledge of herbal remedies and healing processes, for which he receives instructions and

assistance from his respective pahi (spiritual guide, generally represented by the spirit of an animal, plant, mineral, object, or even the deceased). He may heal or kill another person, acting either as a wajaca or as a sorcerer.

The healing process involves two parts: the first is a ceremony conducted by the wajacas, mainly at night, where they smoke tobacco, marijuana, or other native plants such as caprankohiré; pjejapac, ahkrô, and māputréhô, for which a special pipe is used, called a cõt. The act of smoking may help in communicating with the pahi or produce more power at the moment of healing, according to the interviewees. The smoke exhaled is blown at the patient, spreading out the illness so that it can "be more clearly diagnosed," or even to "gather" the illness which is spread

throughout the body of the patient to a single point so that it can then be "sucked" by the shaman, "removing" the disease from the patient's body. In the second part, after the ceremony, the wajaca chooses one or more plants to be utilized in the treatment and returns several times to the patient's home to follow up on the effects of the medicine administered.

For this ethnic group, every person is composed of a body and a soul named *kari*, there being different remedies for each of these when ill. Each wajaca is a specialist in one or more diseases such as fever, diarrhea, snakebite, wind-borne disease, or even spells cast by other wajacas. Only a few are able to cure diseases that are related to the *kari*. They explain that when the *kari* leaves the body of a very sick patient, the wajaca must bring it back to reestablish the patient's health. In these cure ceremonies, the souls of dead people often dispute over the *kari* of the patient with the wajaca. In the ensuing struggle, two assistant wajacas come to his aid; they must be present to "win the battle." According to Eliade (1998), such therapeutic techniques are commonly observed among indigenous ethnic groups in South America.

Every plant species may be known by more than one Indian (vernacular) name and one name may also describe two species. In the latter case, they are regarded as "companions" and one of them is acknowledged as the stronger. The wajaca will generally associate both plants in the prescription, as if they were complementary, although this is rare.

One plant may have many different uses, depending on the wajaca. Different wajacas rarely refer to a specific species by the same Indian name and for the same use: when this occurred, such plants were referred to by us as "classic," in that we believe their use to be well established in this particular ethnic group. These different uses may be explained, in part, by influence from other Indian ethnic groups (Canela, Apinayé, and Xerente) that are part of the ancestry of the Krahô wajacas. They inherited different therapeutic knowledge about the same plants (name of plants, uses, etc.) from their grandparents and parents. This difference has also been explained by wajacas as resulting from the teachings of their respective *pahis*, which vary from one wajaca to another.

Medical Practices of the Quilombolas (Sesmaria Mata-Cavalos)

Folk healers are the persons sought out in case of illness in this culture. According to reports from all of the neighborhood, Mr. Cezário is regarded as the most respected healer in that he is "the strongest." For 60 years, he has offered his services to persons in the nearby or distant municipalities and has introduced apprentices into the world of healing. Three of these took part in this study.

Syncretism involving three religious traits of thought can be observed in the practices followed for local cures:

Spiritist, Catholic, and Umbanda (a Brazilian religion that mixes elements of several religions and world cultures). Mr. Cezário says he began learning his practices for spiritual cures with his spiritual guides from the age of five; knowledge of medicinal plants was passed down to him by his mother and his grandmother.

The diagnosis of a disease takes place with Mr. Cezário holding both the patient's wrists and gazing fixedly into his eyes. He says that at this time he can verify the "condition of the blood of the patient." Once the disease has been diagnosed, he uses two types of therapy that do not exclude each other: "prescription of medicinal plants" and/or "spiritism," the latter involving "incision-free surgery" using only his hands.

The first type of therapy is utilized in the case of simple diseases: the healer observes the characteristics of the patient and indicates use of one or two plants, taking into account physical-personal factors of the patient. In this way, the same medicine may not always be indicated to different people, even if they do have the same disease; the fact that they may have greater or lesser sensibility to the medicine (because by nature they have "high or low blood pressure," among other factors) must be taken into account.

For more severe cases, he uses "incision-free surgery," a type of cure ceremony utilized to treat patients by means of intervention from "spirit entities that are invoked." In these interventions, the patients are covered with cloths of different colors, in accordance with the guidance the healer receives from his spiritual guide. These surgeries are performed in an Umbanda center, where a variety of medicinal plants are sold.

The day of the surgery involves a series of rituals from dawn to nightfall, when the intervention is performed. To start with, Mr. Cezário himself takes a variety of teas prepared from "sacred herbs" for a time that he describes as "staying far away," with thoughts far removed from worldly things. The teas, along with abstention from food and sex, "cleanse and make the body light," according to him, so that he is closer to the divine—a practice also observed in other groups (Eliade 1992)—which makes a cure possible. Before he prepares one of these "sacred teas," Mr. Cezário blesses the plant to be utilized in the prescription and beseeches permission from a given saint before ingesting the tea. He believes each plant has its respective "owner" who is invariably a saint.

Once it has been cleansed, his body is "visualized" by the spirits, allowing them to reach him and use his body as an instrument for curing practices. Once this is over, the healer will offer a great deal of advice to the patient and may prescribe teas, cigars, bottled brews (extracts consisting of parts of one or more plants that have been immersed in an alcoholic beverage for one or two weeks), a sitz bath (a bath where the posterior part of the trunk is immersed), and even cigarettes (such as *Tira Capeta*, described below). A variety of plants may be prescribed at this time, includ-

TABLE 1
Number of Plants, Prescriptions and Uses Indicated in the Therapeutics of the Krahô Indians and the Quilombolas of the Sesmaria Mata-Cavalos that present a Possible Relationship to the CNS

	Krahô Indians	Quilombolas	Total
CNS			
Plants	138	31	169
Prescriptions	292	53	345
Uses	51	17	68

ing those with possible psychoactive effects (such as anxiolytics, those for sleep disorders, and so on).

A Comparison Between Therapeutics with Plants: Krahô Indians and Quilombolas

Each of the groups studied was observed to have distinct beliefs and practices as to plants and therapeutics. It is possible to outline comparisons as to the taxonomic families more frequently cited in each location, specific uses for each culture, specialties of the healers, composition of the prescriptions, specificity of the species within local therapeutics, use of native or exotic species, and use of rituals (Rodrigues & Carlini 2004, 2003b).

Table 1 presents the number of plants, prescriptions, and uses indicated in each of the therapeutics used by these groups. A total of 169 plant species utilized in preparing 345 prescriptions were indicated for 68 uses that would seem to bear a relationship with the CNS; uses most frequently cited were: "to strengthen," "for pain in general," "to lose weight," "diseases of the head," "to alter the mind," "to calm down," "to sleep," "to stimulate," and "to enhance memory."

The 68 uses were grouped into 12 categories according to the similarity between possible effects on the CNS, such as: analgesics, hallucinogens, weight control, diseases of the head, anxiolytics, social relationships, sleep disorders, antidepressants, memory enhancers, tonics for the brain, fever, and thought modifiers. In addition to these, another four categories—tonics, depuratives, resistance enhancers, and rejuvenators—were also included, in that they represent a possible adaptogen/resistogen effect (to be explained later), making for a total of 16 categories of use related to the CNS. In this way, the 51 uses indicated by the Krahô were grouped into 15 categories, and the 17 uses reported by the Quilombolas in 13 categories (see Figure 2). Thus, for instance, in the category sleep disorders the Krahô therapeutics mention six types of uses ("to stop snoring," "to sleep longer," "to have premonitions in dreams," "to sleep lightly," "to have good dreams" and "to induce sleep") that together involve the use of 11 plants. This same category in Quilombola therapeutics involves only two uses ("to induce sleep" and "as a sedative") that include use of another 11 plants, most of these in association. Some of the categories are exclusive to one particular group; the rejuvenator category, for instance, is

in evidence only in the therapeutics of the Quilombolas, as can be seen below. Meanwhile, fever, resistance enhancers, and thought modifiers are exclusive to the therapeutics of the Krahô Indians.

In Figure 2, the nine out of 16 categories of use indicated by an asterisk (hallucinogens, diseases of the head, anxiolytics, sleep disorders, antidepressants, memory enhancers, tonics for the brain, thought modifiers, and rejuvenators) have possible psychoactive actions/effects. Table 2 shows the uses pertaining to each of these nine categories, indicated by each culture. In the therapeutics of the Krahô Indians, 87 species were cited for 25 uses with possible psychoactive effect/actions, whereas the Quilombolas cited 27 species for 13 uses—a total of 114 species for 38 uses that deserve future pharmacological and phytochemical studies. Twenty-seven species cited by the Quilombolas were indicated for more than one use simultaneously, in a total of 42 citations. However, among the Krahô Indians each species was cited for only one category. These differences will be discussed further.

Uses such as "mind modifier," "to talk to pahn (spirits)" and "to get slow" belong to the hallucinogen category and occur frequently among those of African and Indian descent. Their occurrence is due to the existence of a religious element in the cure rituals in which plants that alter perception are sacred because they facilitate communication with the spirits (Metzner 1998). In addition, it would seem these cultures did not allow themselves to be inhibited by the civilizing process of Christianity (Ribeiro 1996) that would have repressed use of plants with such characteristics among other cultures, such as the river dwellers (Rodrigues 1998) and fishermen (Begossi, Leitão-Filho & Richerson 1993), although there are reports of a strong influence exerted by Christianity via Jesuit missionaries on the Tupi-Guarani Indian ethnic group starting in the sixteenth century (Clastres 1978).

Plants in the rejuvenator category are used by elderly people; they seem to concomitantly produce four effects on the patients: increasing sexual desire and performance, forestalling age, enhancing memory, and thinning the blood. According to reports, those who resort to these plants "feel stronger, with nerves more alive; they experience more pleasure and do not age; neither do they fall ill." These effects have some similarity to those reported for adaptogen plants (Wagner, Nörr & Winterhoff 1994).

TABLE 2
The 38 Uses of 114 Species Cited by the Krahô and Quilombolas with Possible Psychoactive Effects, Grouped in Nine Categories

Category of Uses with Possible Psychoactive Effects	Krahô Indian Uses (number of species)	Quilombolas Uses (number of plants cited)
1-Hallucinogens	1. "mind modifiers" (16) 2. "to talk to pãhis (spirits)" (4) 3. "ancient smoke replaced by tobacco" (1) 4. "to get slow" (2)	1. "to modify the mind" (3) 2. "for clear thinking" (3)
2-Diseases of the head	5. "to prevent going crazy" (1) 6. "illnesses of the karô (soul)" (5) 7. "for tremors" (1) 8. "craziness" (8)	3. "for craziness" (3)
3-Anxiolytics	9. "anxiety"(2) 10. "to calm down" (12)	4. "to calm down" (4)
4-Sleep disorders	11. "to stop snoring" (2) 12. "to sleep longer" (1) 13. "to have premonition dreams" (1) 14. "to sleep lightly" (1) 15. "to have good dreams" (1) 16. "to induce sleep" (5)	5. "to induce sleep" (7) 6. "as a sedative" (4)
5-Antidepressants	17. "for being happy" (6) 18. "to remove sadness from the body" (1) 19. "stimulant" (3)	7. "to render the body pure and light"(1)
6-Memory	20. "to enhance memory" (5) 21. "to remember dreams" (1)	8. "to enhance memory" (2)
7-Tonics for the brain	22. "to rest the head" (1)	9. "to enhance cognition" (11)
8- Thought modifiers	23. "to help thinking" (5) 24. "to have an open mind" (1) 25. "to clear one's thoughts" (1)	
9- Rejuvenators		10. "to increase sexual desire and performance" and 11. "not to grow old" and 12. "to enhance memory" and 13. "to thin the blood"
Total	25 Indians uses (87 species)	13 Quilombola uses (42 citations of plants related to 27 species*)
9 categories	38 possible psychoactive uses (114 species)	

*27 species of plants with probable psychoactive effects were used by the Quilombolas. Some of these were cited in more than one category simultaneously so that there are 42 citations of plants in this table for this culture.

One of the plants utilized in the above-mentioned prescriptions is *nó-de-cachorro* ("a dog's knot"; *Heteropterys aphrodisiaca* O. Mach.), a species that has been studied (Galvão et al. 2002; Mattei et al. 2001) and that presents positive effects in terms of benefit to memory in old rats when administered chronically.

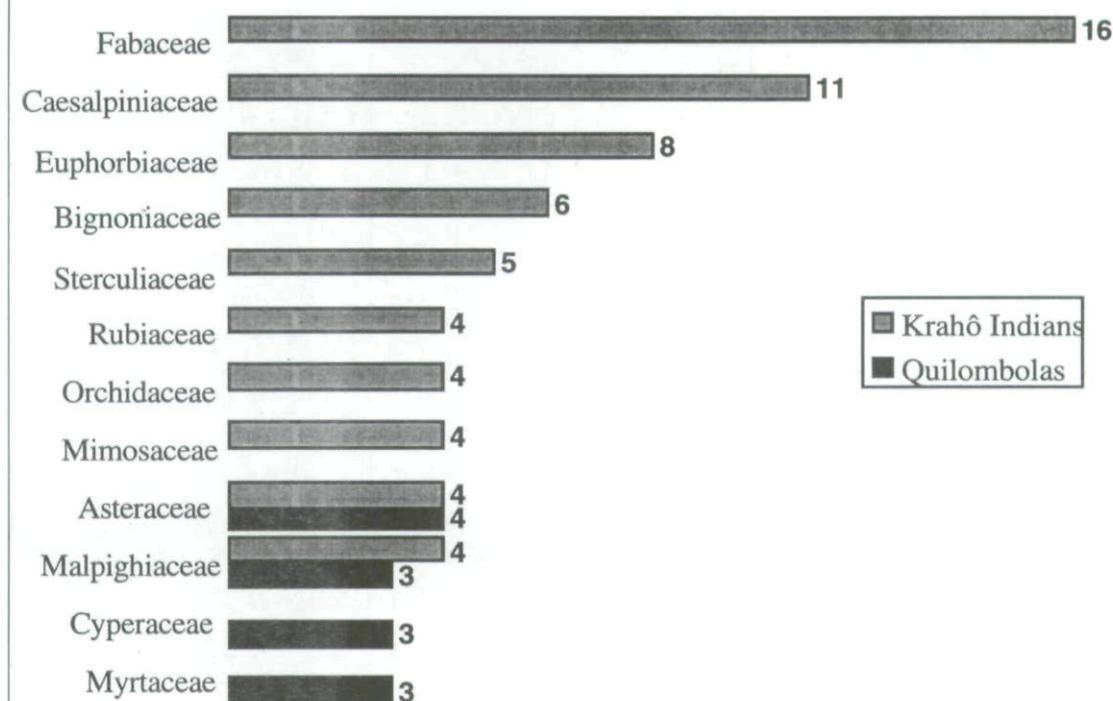
In the therapeutics of the Quilombolas, of the 11 plants belonging to the category tonics for the brain, eight are used to produce a cigarette known as "Tira Capeta" ("remove the devil") and may be consumed both by the healer and by the patients, including children. They are recommended

for persons who are mentally exhausted owing to an excess of work and also to improve the performance of children and teenagers in learning activities at school. This same category in Indian therapeutics is represented by a plant utilized "to rest the head."

Although the category thought modifier (exclusive to the Krahô) is often associated with the category tonics for the brain, the former concerns more improvement of the mind. Five plants were cited to "help thinking" that is, they believe that by consuming such plants the person is able to solve problems. Another was used to "clear one's thoughts,"

FIGURE 3

Main Taxonomic Families (Only Those That Represent Three or More Species Related to CNS) Present in the Therapeutic Practices of the Krahô Indians and of the Quilombolas of the Sesmária Mata-Cavalos



when a person wishes to relieve himself of a persistent thought. One particular formula is used to “have an open mind”; after drinking a tea prepared with this plant, many thoughts enter the head rapidly, almost concomitantly.

It is of interest to note that, although both areas of study are located in the Cerrado biome, and therefore on occasion share the same plant species, both populations use plants that are totally different in their therapeutics. Figure 3 shows that the taxonomic families with the greatest number of representatives (three or more species) share little similarity in the therapeutics of the groups under study, the Fabaceae and the Caesalpiniaceae being the most studied in Krahô therapeutics; and Asteraceae, Malpighiaceae, Cyperaceae, and Myrtaceae in Quilombola therapeutics. In addition, an additional 53 families were cited in the Krahô therapeutics and 16 in the Quilombolas, each with one or two representatives. Although 16 of these families are common to both therapeutics (Asteraceae, Apocynaceae, Bignoniaceae, Boraginaceae, Caesalpiniaceae, Labiatae, Malpighiaceae, Mimosaceae, Monimiaceae, Moraceae, Myrtaceae, Ochnaceae, Oxalidaceae, Rubiaceae, Smilacaceae, and Sterculiaceae) superimposition occurs in only five genera, namely *Smilax* sp., *Oxalis* sp., *Dorstenia* sp., *Siparuna* sp., and *Hyptis* sp. Nevertheless, the number of taxonomic families present in both therapeutics was very

different; there were 20 among the Quilombolas and 63 among the Krahô, which may be accounted for by the difference in number of plants collected in each culture: 31 and 138, respectively. The 138 species indicated by the Krahô are native, originally from Brazil, whereas of the 31 species indicated by the Quilombolas, 25 are native, with five originating from other countries, and one broadly distributed worldwide.

As to the specificity of the use of the plants, the Quilombolas were observed to use a great number of plants in one single prescription, in some cases as many as 10. The Krahô, on the other hand, generally use one plant per prescription. In the same way, one specific plant can be used for up to seven different uses in Quilombola therapeutics, whereas among the Indians, one plant usually possesses one single use.

The practice of using a great number of plants per prescription observed among the Quilombolas is similar to that observed among the “river-dwellers” (Rodrigues 1998; Amorozo 1993; Amorozo & Gély 1988) and other groups of Quilombolas (Camargo 1998, 1988) in Brazil; also in Africa among the Yorubas (Verger 1996); in India, in Ayurveda therapeutics (Scartezzini & Speroni, 2000; Palani, Senthikumarani & Govindasamy 1999; Wu et al. 1998), and among the Chinese (Armstrong & Ernst 1999).

TABLE 3
Scientific Studies Found in the Literature for Five of the 169 Species Cited by the Quilombolas of the Sesmaria Mata-Cavalos and by the Krahô Indians with a Probable Effect on the CNS

<i>Scientific name</i> (family) Voucher	Uses Reported by Quilombolas and Krahô	Pharmacological studies found in the literature	Effect/action Described in the Studies
<i>Cybistax antisyphilitica</i> (Mart.) Mart ex DC. (Bignoniaceae) Rodrigues 510	headache*	Martins et al. 1994	analgesic
<i>Cymbopogon citratus</i> (DC.) Stapf (Poaceae) Rodrigues 499	soothing*	Palmieri 2000	anxyolytic
<i>Heteropterys aphrodisiaca</i> O. Mach. (Malpighiaceae) Rodrigues 516	rejuvenating*	Mattei et al. 2001 Galvão et al. 2002	antioxidant improves memory
<i>Petiveria alliacea</i> L. (Phytolaccaceae) Rodrigues 498	alters the mind*	Morales et al. 2001	CNS depressant
<i>Cochlospermum regium</i> (Mart.) Pilger (Cochlospermaceae) Rodrigues 754	headache**	Castro et al. 1998	antinociceptive

*Uses reported by the Quilombolas.

**Uses reported by the Krahô Indians.

Verger (1996) tries to explain this logic: "A single plant may perhaps be compared to one letter in a word: on its own, it has no significance, but associated to the others, it contributes to the significance of the word." From the pharmacological point of view, this may signify that the association of plants could well have a synergic effect, as explained by some authors (Gilbert & Alves 2003; Williamson 2001).

Ayahuasca is an example of this, in its use by some Indian groups of the Northwest Amazon as a hallucinogenic in religious ceremonies. This is a beverage made with two plants: *Banisteriopsis caapi* (Spruce ex Griseb.) Morton, which possesses the β -carboline alkaloids harmine, harmaline, and tetrahydroharmaline, is added to *Psychotria viridis* R et P, which possesses dimethyltryptamine. The latter when ingested alone does not produce hallucinations, for its dimethyltryptamine is inactivated by MAO (monoamine-oxidase) in the intestine; however, the presence of harmine and its derivatives inhibits the MAO and permits the action of dimethyltryptamine, and therefore the hallucinogenic effect of the beverage (Carlini 2003; Schultes & Hofmann 1993; Schultes 1979).

The nonspecificity as to the use of plants observed in the therapeutics of the Quilombolas may be explained, in part, by the fact that those interviewed believe that the cure occurs not only by consuming these plants but also through beliefs particular to this culture that are revealed during

the rituals. In addition, different plants are indicated for individual patients for the treatment of the same disease, indicating that the person seems to be the focus of the therapeutics, and not the disease.

On the other hand, among the Krahô Indians, in a manner similar to that observed among other Indian ethnic groups in Brazil, the opposite occurs: use of a single plant in each prescription was observed and, in general, that plant was specifically for one use. A similar pattern was observed among the Yanomami (Milliken & Albert 1996), the Xingu-Yawalapiti (Emmerich & Valle 1991), and the Tyriô (Cavalcante & Frikel 1973) in Brazil.

Some aspects bring the two cultures under study closer to each other. First, the use of a great number of plants in both therapeutics under analysis is associated with a ritual (food and sexual restrictions with specific purposes in these societies), whether for a celebration, a process of cure, or a lying-in. Second, during the curing rituals plants are used with probable hallucinogenic effects that, according to those interviewed, in addition to facilitating communication with spiritual guides, strengthen the healers/wajaca. The smoke exhaled over the patients during the consumption of these plants also plays a fundamental role in the treatment. According to Clastres (1978), the function of smoke—above all, tobacco—as a means of communication with the supernatural occurs in various Indian ethnic groups. When this ritual is over, the healers/wajacas prescribe plants with

diverse CNS effects, as listed in Figure 2. Another aspect of convergence is the restricted diet and sexual abstinence, which, associated to the consumption of plants is intended to cleanse the body of the healer/wajaca, rendering his efforts towards a cure feasible.

Finally, another characteristic common to the therapeutics under analysis is the presence of a reasoning similar to that of the principle of the Doctrine of Signatures of Paracelsus (1493-1541), whereby it is possible to recognize the peculiarities and virtues of each herb by its "signature" (outline, shape, color). Several prescriptions show this reasoning; for example, a flower with sexual parts clearly visible is used "to marry," this being one of the uses included under the category social relationships. Another instance is the use of the reddish parts of plants as "general strengtheners," belonging to the category tonics, since according to those interviewed, they "supply blood." According to Johns (1950), these associations are universal

and can be observed also in the therapeutics of the river-dwellers of the Amazon forest (Rodrigues 1998) and of several African peoples: the Azande (Pritchard 1978) and the Ndembu (Turner 1967), for example.

Pharmacological Studies Published for Some Species

Pharmacological studies were found in the literature for only 13 of the 169 species cited in this study. For five of these—four indicated by the Quilombolas and one by the Krahô—it was possible to establish correlations between their uses as indicated in this study and their effects on laboratory animals (Table 3).

To conclude, data obtained by the present study corroborate the suggestion that ethnobotanical surveys carried out among the cultures of Krahô Indians and Quilombolas in Brazil are indicative of plants with potential uses for the central nervous system.

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