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REGULAR ARTICLE

Ethnobotanical study of medicinal plants in Tarumã Mirim's settlement, Manaus – Amazonas, Brazil

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Abstract

Medicinal plants are cultivated by farming communities at the Tarumã Mirim's settlement in Manaus, capital of Amazonas state in Brazil. These plants come from a group of non-timber forest products intercropped between systems, used for health treatments. They also move a production chain that is offered at street market fairs in Manaus. Among the Amazonian species, 136 species were identified that had origin centers and genetic diversity far away from the referred settlement. Small producers from other parts of Brazil and the world moved to Manaus and brought with the plants and traditional knowledge about their use, thereby introducing then to the area. Some of them are more widely used because of their efficiency in treatments of some diseases. Other herbs grow at a much lower rate and are cultivated by just a few agricultures or sometimes just by one. Several of these plants are has scientific resources and there is literature available about them, which will not only provide their botanic description but also their economic potential. But many of them are the focus of scientific research in Brazil and the world in general, due to the potential they have for drug and pharmacological companies. The market where medicinal plants can be purchased is located in Manaus city, mostly at "Expoagro" and "Manaus Moderna" fairs, the prices varying between R$ 1.00 and R$5.00 per plant seedling.

Key words: Medicinal Plants, Ethnobotanical, TarumãMirim's Settlement, Potential for Bioprospection

Introduction

The traditional use of medicinal plants has been maintained by generations of farming families who had contact with these plants. Their use was transmitted by culture, entering knowledge on the dynamics of these families through a tool inherent to their way of life, the Ethnoknowledge, which according to Costa (2008) is not only the observation of nature, because if it were, all societies would have the same knowledge when they have contact with nature, on the other hand, this knowledge is permeated and shaped by culture, inherent to group or that was inserted into their daily life.

About that, Emperaire and Santilli (2006) apud Santilli (2012) says:

"Traditional knowledge associated with a plant which is domesticated and selected by local communities is expressed in the existence of biological object itself, which is the plant. Without the agronomical knowledge of local communities, their techniques and experimentations in selection and conservation, these objects would not exist, whether they are plants used for food, medicine, ornamental or others. Agricultural diversity is in itself an expression and materialization of traditional knowledge."

As the authors mention, the plants undergo a process of domestication of their populations and as the agricultural intention therefore they have a function, in other words, the materialization of traditional knowledge. That's why, in general, the production of medicinal plants grows in home gardens, where there is a variety of landscapes that coexist (Amorozo apud Albuquerque et al., 2010), and which has a projected biodiversity, this is not only has aesthetic character, but functional and to help the needs of the family. These home gardens are breeders of different spaces within the same batch (territorial unit of family labor), are carriers of a cultural biodiversity, working are territorialized there, and nexus of family work and their culture.

The aims of this study were to identify the use of medicinal plants, ways of use, by farming community in Tarumã Mirim's Settlement, Manaus,

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Amazonas - Brazil, as well as traditional knowledge associated with the use.

Materials and Methods

In order to obtain information about the medicinal plants and their use, field work with interviews was conducted to analyze all information between 2010 and 2013 from the Tarumã Mirim's Settlement. According to the objectives of qualitative research, semi-structured interviews were conducted (Amorozo & Viertler, 2010 apud Albuquerque et al. 2010) with open questionnaires that used the "Snowball" technique (Bailey, 1994 apud Albuquerque et al., 2010) for the intentional selection of informants in the communities of experts to identify the use of medicine plants. Informants are between 18 and 79 years of age, and they were interviewed during the present study.

Data Analysis

Ethnobotanical data was analyzed and summarized by using Microsoft Excel (2010 edition) and statistics to determine relative frequencies of citations so as to identify the most commonly used plants in the study area.

There's no botanical scientific studies and descriptions or about the use of some of the plants mentioned by the informants, and some plants were only mentioned in an interview, but these interviews were keep it (number of interviews), because it is not objective of this research to validate the interviews, but get the information. In some cases, the informant mentioned a medicine plant but did not provide information about the use because whoever makes use of this plant was not present and/or was from another family, so the plant was kept for research, and those identified on literature were maintained, considering the primary use mentioned. During this process specific bibliographic literature was employed.

Results and Discussion

It is often argued that popular culture identifies symptoms, but does not characterize or understand diseases as they are characterized by medicine, so that information does not serve as a basis to help develop medicinal drugs (Elizabetsky, 2002 apud Noda, 2007). The same author points out that the method ethnopharmacological allows the formulation of hypothesis: H0 = the remedy does not cure the disease; H1 = the remedy to cure "disease". So, it is necessary to test these hypotheses with all the rigor of science, taking into account the dosage that traditional knowledge brings with (Noda, 2007).

In this sense, to identify the 136 medicinal plants was emphasized the importance of understanding the production of seedlings, cultivation, drying, preservation, storage, forms and care in the preparation of herbs. Their preparation methods may be only one herb, two or more mixed, and the dosage depends on the condition and severity of "illness". The main forms are prepared by infusion, decoction and maceration.

The Tarumã Mirim's Settlement was created from political land reform of the Brazilian Federal Government through the National Institute of Colonization and Agrarian Reform (INCRA) in 1992, but farmers only had possession of the land in 1997. Is localized in the rural area of Manaus, capital of Amazonas, between the west bank of the Igarapé Tarumã-Açu and eastern Igarapé Tarumã-Mirim, left bank tributaries of the Negro River. It has a total area of 42,910.7601 hectares divided into 1,042 lots, three forest reserves with 7.088.62 ha, with each having an average of 25 hectares for the production systems guided by the family. The main access is through the extension of Pau Rosa which is localized at KM 21 BR 174 which connects Manaus (AM) to Boa Vista (RR).

To long of the years inside the settlement were developing various production chains based on the exploitation of nature by producers, circulating in space, creates different realities and social dynamics change and agroecosystems under the State's inability to formulate public policies which can demonstrate the effectiveness of existing demands. The relationship between society and nature is shaped mainly by the ways of life (*what* and *how* they do) socio spatial relations of the production chain, and the State and government, while that biodiversity does not only exist in the strict sense of the word, here it comes one designed biodiversity has contains within a landscape inherited. This way, reproducing the territory under the ways of life in order to meet their material needs and simultaneously reproduce the territory to meet the demands of the reality of the economic system in which they exist.

The use of plants as medicine and food is one element that stands out to meet the consumption needs of the settlers and the resolution of health problems while medicinal plants contribute as part of way of life, whether as a use value and exchange value, which highlights the importance of biodiversity in everyday settlers (Souza, 2008). Although Brazil have access to Public Health Service for the general public and for free, the Tarumã Mirim's Settlement has only one service station, public health, and that is only for first aid

and diseases that don't have such urgenc. So when someone needs specific medical treatment is necessary goes to the urban center of Manaus, which does not happen easily because the settlers suffer from a lack of adequate infrastructure of roads within the settlement, while the use of medicinal plants also reflects the pressure on public service of health in rural areas.

Calixto (2003) mentions that Brazil has the biggest biodiversity in the whole world estimated at about 20% of the total number of species on the planet. But, this number seems overrated to some authors, since most of the plants found in Brazil have been introduced and are reported also for others regions.

However, in the Brazilian Amazon region there are approximately 13,800 species of vascular plants, which 17% are reported only for Brazil, even been not exclusively from Amazonian region. This identified number of plants are cataloged in the herbarium of the National Institute Research of Amazonia (INPA), the Emílio Goeldi Museum and Western EMBRAPA Amazônia (Brazilian Enterprise for Agricultural Research), which for years has been working not only in cataloging, but the knowledge and traditional use of these species. At Tarumã Mirim's Settlement are 136 species and ethnospecies (species classified by farmers), there is a possibility that some of them are in fact cryptic species (morphologically identical, but with different genetic and biochemical composition).

Between 2008 and 2010 the plants with higher frequency of use at the Tarumã Mirim's Settlement is Corama with 30%, Limão 19%, Boldo liso 16%, Capim Santo, Carapanaúba, Jatobá simultaneously with 14% Crajiru, Cubiu, Hortelã grande, Jucá, Pião Branco 12%, and Alfavaca, Arruda, Elixir Paregórico, Hortelãnzinho, Mangaratáia with 9%. However, these numbers have been declining for some species, such as Noni (*Morinda citrifolia*) now being replaced by other plants or with other plants, no longer found in the markets of Manaus. The table available is presented with 136 plants and uses reported by farmers.

Table 1.The structure of the open questionnaire.

1. Name and age
2. Location (community)
3. Total of people living in the house
4. Location of origin of the farmer. For what reasons / what year arrived.
5. Size of the area planted
6. Size of “Roça” / plantation / Production
7. Selling / shipping / price of the plants in market
8. Problems that hamper the production
9. Family helps or mutual help in the community?
10. Family helps cultivate, it happens mutual help in the community?
11. What medicinal plants have?
12. Why it uses this plant, for which disease is used this plant??
13. How to cultivate this plant? (In flowerbeds, directly in the land, etc.).
14. What form of preparation and dosage for a particular disease?
15. With who learned knowledge about the plant? (in the family, neighbors, etc..)?

Table 2. Medicinal plants and their traditional uses.

Family	Plant	Scientific Name	Uses
Lauracea	Abacateiro	*Persea americana* Mill.	Weak Organism
Bromeliaceae	Abacaxi	*Ananas comosus* (L.) Merr.	Inflamed Bladder
Sapotaceae	Abil selvagem	*Pouteria caimito* (Ruiz et Pavon) Radlk	Gastritis
Menispermaceae	Abôta	*Abuta grandifolia*	Female Inflammations
Arecacea	Açaí	*Euterpe oleracea* Mart.	Amebiasis
Malpighiaceae	Acerola	*Malpighia glabra* L.	Flu
Fabaceae	Alecrim	*Holocalyx balansae* Micheli.	Wash The Head
Lamiaceae	Alfavaca	*Ocimum basilicum* L.	Headache
Apocinácea	Amapazeiro	*Parahancornia Amapa* (Hub.) Ducke	Clear the eyes

Table 2. Contd…

Family	Plant	Scientific Name	Uses
Fabaceae	Amor agarradinho	*Desmodium adscendens* (Sw) DC.	Diabetes
Portulacaceae	Amor crescido	*Portulaca pilosa* L.	-
Roseaceae	Amora	*Rubu ssellowii*	Inflammations
Asteraceae	Anador	*Artemisia voluntorium* Lam.	Replacement of female hormone
Meliaceae	Andiroba	*Carapa guianensis* Aubl.	Inflammations
Anonacea	Araticum	*Annona montana*	Rheumatism Headache
Rutaceae	Arruda	*Ruta graveolens* L.	Flu
Asteraceae	Artemísia	*Artemisia absinthium* L.	Flu
Myrtaceae	Azeitoneira	*Syzygium Jambolanum* (Lam.) DC.	-
Asphodelaceae	Babosa	*Aloe vera* (L.) Burm. F.	Cholesterol Control
Musaceae	Bananeira	*Musa paradisiaca* L.	Cholesterol Control
Asteraceae	Boldo	*Peumus boldus Molina*	Stomach
	Boldo da folha pequena	*Plectranthus ornatus*	Cholesterol Control
Asteraceae	Boldo liso	*Vernonia condensata* Baker	Stomach
Rubiaceae	Café	*Caffea arabica* L.	Liver
Anacardiaceae	Cajá do mato	*Unidentified*	Stomach
	Cajueiro	*Anacardium occidentale* L.	Pain in eyes
Poaceae	Cana-de-açúcar	*Saccharum officinarum*	High Pressure
	Canapum	Unidentified	Flu
Piperaceae	Capeba	*Piper marginatum* Jacq.	Wash Wounds, Inflammations
	Capim	Unidentified	Weight Loss
	Capim furão	Unidentified	-
Poaceae	Capim santo	*Cymbopogon citratus*	Inflammation
	Carambola	Unidentified	Hemorrhoids
Apocynaceae	Carapanaúba	*Aspidosperma nitidum* Benth	Inflammation
Verbenaceae	Carmelitana	*Lippia* spp.	Soothing, Stomachache
	Castanha da índia	Unidentified	Flu
	Cibalena	Unidentified	Typhoid, Hepatitis, Liver, Malaria
Bignoniaceae	Cipó-alho	*Adenocalymna* sp	Stomachache
	Cipó bôta	Unidentified	-
	Cipó escada de jabuti	Unidentified	Headache
	Cipó tuíra	Unidentified	Sinusitis, Flu, Stomach Pain, Headache
Poaceae	Citronela	*Cymbopogon winteruanus*	Malaria
	Comida de abelha	*Unidentified*	Inflammations
Febaceae	Copaíba	*Copaifera langsdorffii*	Anemia
Crassulaceae	Corama	*Bryophyllum pinnatum*	-
Bignoniaceae	Crajiru	*Fridericia chica*	Healing
Asteraceae	Cravo difunto	*Tagetes minuta* L.	-
Solanaceae	Cubiu	*Capsicum*	Infection
Fabaceae	Cumarú	*Ambucana cearencis* (Allemão)	Inflammations
Lamiaceae	Elixir paregórico	*Ocimum selloi* Benth	Inflammations
Cecropiaceae	Embaúba	*Cecropia glazioui* Snethlage	-
Verbenaceae	Erva cidreira	*Lippia Alba* (Mill.) N. E. Br.	Sinusitis/ Calming
Piperaceae	Erva comida de jabuti	*Peperomia pellucida* (L.)	Diabetes, Cholesterol
	Erva de passarinho	Unidentified	High Pressure
Myrtaceae	Eucalipto	*Eucalyptus globulus* Labill.	Pain in the ear

Table 2. Contd…

Family	Plant	Scientific Name	Uses
	Flor roxa	*Unidentified*	Asthma, Pneumonia, Rheumatism
Pedaliaceae	*Gergelim*	*Sesamum indicum* L.	Constipation
Myrtaceae	*Goiabeira*	*Psidium guajava* L.	Headache, Soothing, Stomach Pain
Annonaceae	Gravioleiro	*Annona muricata* L.	High Pressure
Lamiacae	Hortelã grande	*Plectranthus amboinicus*	Infection
Lamiacae	Hortelanzinho	*Mentha piperita* L.	Fever
Asteraceae	Jambú	*Acmella oleraceae* (L.) R. K. Jansen	Leakage
Asteraceae	Japana breca	*Eupatorium ayapana Vent.*	Diarrhoea
Fabaceae	Jatobá	*Hymenaea courbaril* L.	Kidneys
Rubiaceae	Jenipapo	*Genipa americana*	Flu
Fabaceae	Jucá	*Caesalpinia ferrea var cearensis* Huber	Colic in children
	Jurubeba da fruta grande	Unidentified	Diarrhoea
Solanaceae	Jurubebinha da fruta pequena	*Solanum paniculatum* L.	Rheumatism
Rutaceae	Laranja	*Citrus aurantium*	Flu
Rutaceae	Lima	*Citrus limetta*	Flu
Rutaceae	Limão	*Citrus limon* (L.) Burm. F.	Liver
Rutaceae	Limão galego	*Citrus aurantiifolia*	Inflammations
Rutaceae	Limão tangerina	Unidentified	Leakage
Malvaceae	Malvarisco	*Althaea officinalis L.*	Shortness, Breath
Zingiberaceae	Mangaratáia	*Zimber officinale* Roscoe	Bronchitis
Zingiberaceae	Mangaratáia amarela	*Curcuma longa* L.	Breakage
Limiaceae	Manjericão	*Ocimum brasilicum*	Anemia
Amaranthaceae	Mastruz	*Chenopodium ambrosioides* L.	Flu, Inflammations
	Mata calado	Unidentified	Ulcer / Stomach
	Monjongona	Unidentified	-
Passifloraceae	Maracujá	*Passiflora edulis* Sims.	Sedative
Phytolaccaceae	Mucuracaá	*Petiveria alliaceae* L.	-
Malpighiaceae	Muruci amarelo	*Byrsonima crassifolia* (L.) Kunth	Diabetes
	Muruci branco	Unidentified	Flu
	Muruci nativo	Unidentified	Flu, Cough
Araceae	Mururé	*Pistia stratiotes* L.	Flu
	Mutuquinha	Unidentified	Flu
Rubiaceae	None	*Morinda citrifolia*	Inflammations
Limiaceae	Oriza	*Pogostemon heyneanus* Benth.	Flu
Fabaceae	Pata de vaca	*Bauhinia cheilantha* (Bong.) Steud	Flu
Limiaceae	Patchuli	*Pogostemon*	-
Bignoniaceae	Pau da angola	*Handroanthus impetiginosus* (Mart. Ex DC.) Mattos	-
	Pau d'arco	Unidentified	Irritation in Child
	Pau de adão	Unidentified	Influenza, Tuberculosis
	Pau milagroso	Unidentified	-
	Pau rosa	Unidentified	-
Euphorbiaceae	Pinhão-branco	*Jatropha curcas* L.	-
Euphorbiaceae	Pinhão-roxo	*Jatropha gossypifolia* L.	Cough
Piperaceae	Pimenta de macaco	*Piper aduncum* L.	Headache
Costaceae	Pobre velho	*Costus spicatus* (Jacq.) Sw.	Tuberculosis
Lauraceae	Preciosa	*Aniba canelilla* (Kunth) Mez	Tuberculosis
	Puruí	Unidentified	Tuberculosis
Euphorbiaceae	Quebra-pedra	*Phyllantus niruri* L.	Antilithiatic Action

Table 2. Contd…

Family	Plant	Scientific Name	Uses
Rubiaceae	Quina quina	*Countarea hexandra* (Jacq.) K. Schum.	Rheumatism
Rubiaceae	Quina quina amarelo	*Cinchona calisaya* Wedd.	Hemorrhage
Verbenaceae	Rinchão	*Stachytarpheta cayennensis* (Rich.) Vahl	Inflammations, Cancer
Euphorbiaceae	Sacaca	*Cróton cajucara* Benth	Labyrinthitis, Heart problems
	Saião	Unidentified	Diabetes
	Samambaia	Unidentified	Headache
	Saracura	Unidentified	Inflammation
	Saracura mirá	Unidentified	Headache
Malpighiaceae	Saratudo	*Byrsonima intermedia* L	Warts and ring worms
	Sova de marajó	Unidentified	Shortness of Breath
Asteraceae	Stevea	*Stevia rebaudiana* (Bertoni) Bertoni	-
	Sucuba	Unidentified	Leshimaniose, Myocardial
Fabaceae	Tamarina	*Tamarindus indica* L.	Worms
Anacardiaceae	Taperebá	*Spondias mombin* L.	Uterine Cancer
	Teca	Unidentified	-
	Tiririca	Unidentified	-
	Trefrósia	Unidentified	Kidney Stone
	Trevo roxo	Unidentified	Constipation
	Uixí amarelo	Unidentified	Stomach Pain, Headache
	Uixí branco	Unidentified	Kidney Stone
	Uixí Coroa	Unidentified	Malaria
	Uixí liso	Unidentified	Fever, Malaria, Liver, Soothing, Stomach Ache.
Bignoniaceae	Unha de gato	*Dolichandra unguis-cati* (L.) L. G. Lohmann	Kidney Stone
Bixaceae	Urucum	*Bixaorellana* L.	Malaria
Plantaginaceae	Vassourinha	*Scoparia dulcis* L.	Clean Wounds
Rubiaceae	Vassourinha de botão	*Spermacoce verticillata* L.	Loss of Hair
Rubiaceae	Vick	*Menthas piccata*	Antibiotic
Malvaceae	Vinagreira	*Hibiscus sabdariffa* L.	Shortness of Breath
	Vinde cá	Unidentified	Inflammation
	Xixarró	Unidentified	Gastritis
	Xixuá	Unidentified	Antibiotic

Potential for Bioprospecting

Over the last 40 years several species have been subjected to research to find molecules with pharmacological potential. In Brazil, some studies actually achieved significant goals for research for prospecting. Some examples that have demonstrated pharmacological activity are Embaúba (Cecropiaceae), Maracujá (Passifloraceae), Quebra-pedra (Euphorbiaceae), Andiroba (Meliaceae), Copaíba (Febaceae).

If the use of a plant is constant for a given illness is possible that has pharmacological potential, active molecules or complex pharmacological as well as the results mentioned above. It is worth noting that this is one of the factors that validate the rationale for initiating research and production of phytotherapics: the time of traditional use for a particular group, following dosage and timing. One of sides are the research for herbal medicine, another in various situations natural products are used for starting point for syntheses. And this type of research has the High Throughput Screening method used by researchers in natural producers in order to collect material that leads to results that contribute to reach standardized extracts.

To this, in Brazil, to have access to genetic heritage and associated traditional knowledge has the Provisional Ruling 2.186-16 which has the force of law. The body responsible for registration

and control of the research is the Counsel of the Genetic Heritage Management - CGEN. To access only access to genetic heritage is the license referred to the Brazilian Institute of Environment and Renewable Natural Resources - IBAMA, and have access to indigenous land control is done by the National Indian Foundation - FUNAI.

Actually, the institutions interested and working with natural products research in the Amazonas State are the National Institute of Amazonian Research, Federal University of Amazonas, Oswaldo Cruz Foundation and the Hospital of Tropical Medicine and there is potential to work also in the Amazon Biotechnology Center (CBA), the latter has the largest number of devices in the area throughout the Amazonian Region and excels in Brazil, but is almost unused for management problems.

The Manaus city has one of the most important and expressive economy of Brazil. However, it is necessary to increase investment in scientific research base, as well as technology. It is necessary to discover the potential of Amazonian flora, but it is even more urgent to understand what has already been identified. The results are mentioned 136 plants that need more discussion, to value the traditional knowledge and local culture to develop conservation policies, usage, prospecting and benefit sharing attracting research and pharmaceutical laboratories to explore this potential.

It is worth noting that there is a possibility that some or manymedicinal plants mentioned there's no pharmacological potential. May be that the effect is actually placebo (autosuggestion), or even part of a myth where the effect for the treatment or cure suggested plant related to an illness is associated (by the informant) to a disease of "spirit" or religious beliefs, as the "Mau Olhado" or "Quebranto", however, in this case, the search ethnobiological need to analyze the Emic and Etic (Posey, 1992), in other words, the intrinsic significance to the farmer; their culture and spiritual beliefs, needs a interpretation with scientific rigor to understand the extent to which their beliefs are actually linked to factual reality, the diseases that are classified as "disease of spirit".

Conclusion

The traditional use of medicinal plants and the market exist and are the embodiment of Ethnoknowledge and work-force territorialized; factual realities that builds a production chain, which circulates in the geographical space. Change the dynamics of ecosystem function by inserting plants that fit the needs of social subjects involved. Intercropping farming systems, the marketing of these plants directly addresses the use value of these plants, it's an income supplement to meet the material needs of producers.

The use of medicinal plants reflects a way of life, the way they develop their material forces, the knowledge acquired by generations of family and culture that is permeated with the family. The lack of adequate public health infrastructure makes the settlers use medicinal plants as an alternative. Developing Ethnomedicine as an alternate way of treatment differ from individual to individual and characterized by the uniqueness of each individual and proper dosage.

Beyond to maintain good health with the use of medicinal plants, cultivating these 136 medicinal plants stimulate On Farm Conservation and avoid coming into extinction or genetic erosion, the simple fact that uses and exist a market demand.

The settlement and their communities are spatialities produced in the logic of agrarian and land reform in Brazil, where territories are means of production processes with their economic, political and cultural.

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