Ethnoveterinary observations and practices used in a rural community in the State of Acre, Western Amazonia, Brazil

Sara Lucena Amorim1, Maria Antônia Ferreira Moniz Pereira2, Alex Cicinato Paulino Oliveira2, Ana Célia Rodrigues Athayde2

1. Médica Veterinária e Doutora em Medicina Veterinária (Universidade Federal de Campina Grande, Brasil); Professora da Universidade Federal do Acre, Brasil. saravet.la@bol.com.br
2. Doutor em Medicina Veterinária (Universidade Federal do Acre, Brasil); mariaantoniavterinaria@gmail.com

ABSTRACT

This study aimed to identify, register and analyze the ethnoveterinary knowledge of medicinal plants employed in rural communities of the State of Acre–Brazil. Sixty families were interviewed; the personal data and specific questions about the use of medicinal plants for the treatment of diseases that affect the animals were obtained. The results indicated 43 species of medicinal plants, distributed in 28 botanical families, highlighting Lamiaceae (16%), Asteraceae (11.6%), Euphorbiaceae (7%) and Myrtaceae (7%). The use value of species per informant (UV /UV) shows Mentha spicata (h ortelã) (17/0.28), - Mormodica charantia (milho de são Caetano) (17/0.28), Arrabidaea chica (crajiru) (14/0.23), - Carica papaya (mamão macho) (13/0.22), Chenopodium ambrosioides (mastraça) (11/0.18), - Ficus carica (pêra-branca) (9/0.15), Melissa officinalis (cêntaro) (9/0.15), and Cymbopogon citratus (lemongrass) (9/0.15) as the most cited plants. The values of the informant consensus factor (ICF) show that the digestive category presented the highest values (0.39), followed by integument (0.83), anti-inflammatory (0.80), diverse (0.72) and respiratory (0.70). As for the parts of the plant, fresh leaves (54%) were the most cited. Regarding the preparation mode, infusion tea (74%) was the most cited. This work will serve as a database for future research in the area of study.

Keywords: Ethnoveterinary; Medicinal Plants; Amazon Region – State of Acre – Brazil.

Observações Etnoveterinária e práticas usadas em comunidades rurais no Estado do Acre, Amazônia Ocidental, Brasil

A utilização de plantas medicinais por comunidades ribeirinhas da Amazônia é um hábito comum, no entanto a obtenção etnoveterinária ainda é desconhecida em algumas regiões da Amazônia. Assim, a apresentação do estudo referente à identificação e análise da conhecimento etnoveterinário de espécies vegetais de uso medicinal em comunidades rurais do estado do Acre–Brazil. Foram entrevistadas 60 famílias, contendo perguntas com os dados pessoais dos entrevistados e perguntas específicas sobre a utilização de plantas medicinais para o tratamento de doenças que acometem os animais. Os resultados indicaram 43 espécies de plantas de uso medicinal, distribuídas em 28 famílias botânicas, destacando-se a Lamiaceae (16%), Asteraceae (20%), Fabaceae (12.5%) e Myrtaceae (12.5%). O valor de uso de uma espécie por informante (UV /UV) mostra o hortelã – Mentha spicata (17/0.28), milho de são Caetano – Mormodica charantia (17/0.28), crajiru – Arrabidaea chica (14/0.23), mamão macho – Carica papaya (13/0.22), mstraça – Chenopodium ambrosioides (11/0.18), pêra-branca – Ficus carica (9/0.15), cêntaro – Melissa officinalis (9/0.15) e o capim sant – Cymbopogon citratus (9/0.15) como as plantas de maior indicação. Os valores dos fatores do informante consenso (ICF) mostram que a categoria digestiva apresentou os maiores valores (0.39), seguido do tegumentário (0.83), anti-inflamatório (0.80), diverso (0.72) e respiratório (0.70). Do ponto de vista das partes da planta, folhas frescas (54%) foram os mais citados. Quanto ao preparo, infusão de chá (74%) foi o mais citado. Esse trabalho servirá como base de dados para futuras pesquisas na área de estudo.

Palavras chaves: Fitoterapia, Plantas Medicinais, Amazônia Brasileira, Animais domésticos.

Introduction

Brazil has great plant biodiversity capable of making it one of the largest forests with a significant number of species used for medicinal and therapeutic purposes. It is estimated that approximately 20% of the plants on the planet are in the Brazilian forests (SANTOS et al., 2012). Great part of them, are harvested from nature or cultivated in peridomestic environments for medicinal use (SIVIERO et al., 2012).

The use of medicinal plants comes from ancient civilizations, where the popular knowledge is transferred from generation to generation (GARLWTT; RGANG, 2011). The World Health Organization defines a medicinal plant as plants that contain properties or compounds that can be used for therapeutic purposes or those that synthesize metabolites to produce useful drugs (WHO, 1998).

Ethnobotany studies the knowledge and the uses of plants for therapeutic and medicinal purposes (COSTA; MAYMOR, 2011). According to Amorozzo (1996), ethnobotany encompasses the way a social group classifies plants and use them. Ethnobotanical studies can contribute to the understanding and the conservation of biological and cultural diversity. In the Amazon, phytotherapy represents the appreciation of local traditions, becoming necessary to carry out studies that report the biological diversity, interrelations, and quality of life of the existing living beings (MARTINS et al., 2013). The search for information of those populations is crucial to obtain and redeem the content of cultural aspects, often specific to each location. The knowledge on medicinal plants is often the only therapeutic resource in many communities and ethnic groups, especially in Amazon.

The therapeutic potential observed by locals, on the use and efficacy of medicinal plants, has been arousing the interest of researchers from fields like botany, pharmacology, and phytochemistry (MACIEL et al., 2002). Since 1990 several ethnobotanical surveys from medicinal plants have been recorded in extractivist reserves (KAINER; DURUEA, 1992; MING, 1995) indigenous tribes (EHRINGHAUS, 1997) and traders of natural products (SILVA, 1997) in the state of Acre. Siviero et al. (2012) and Haavethor & Freitas (2008) reported in their research the major medicinal plants in urban backyards of Rio Branco - Acre, Brazil and its main therapeutic indications, growth habits and cultivation of the species, as well as socio-economic characteristics. Martins et al. (2013) conducted a survey on medicinal plants and their applications by healers in the city of Cruzeiro do Sul, Acre, and reported the diver-
The study was conducted from May 2015 to September 2015 in the rural community of Pôlo Hêlio Pimenta, 19th km, Porto Acre municipality, Acre State, Brazil. Located 52 km from the capital Rio Branco, Acre, it has 164 meters altitude, in the geographic coordinates of 9°35'16" South, 67°31'56" West. It is bordered to the north by the Amazon, to the south by the municipalities of Buijari and Rio Branco, to the east by the municipality of Rio Branco, and to the west by the municipality of Buijari.

This community was chosen because it presents great potential in medicinal plants, with a way of life centered on the use of natural resources, and easy access to them. The Ethics Committee approved this research under protocol number 69/2015.

An interview was carried out with sixty families from the community previously informed about the structured questionnaire containing personal data of the interviewees and specific questions about the use of medicinal plants to treat diseases that affect animals, as well as, the parts used, the preparation method and the purpose of use.

The study was realized respecting the cultural, social, moral, ethical and religious values, as well as, the habits and customs of the community. The interviewees should live in the community. The study was conducted with individuals over 18 years. The meetings were carried out directly at the interviewee’s home, where the study was explained in details.

The plant material was collected, pressed, dried and sent to the herbarium of the Federal University of Acre – UFAC to identify the species. The data collection and the plants’ samples were obtained in backyards or locations nearby when indicated.

All information collected was transferred to an electronic database, systematized and processed. Later, the data were transformed into percentages and displayed as graphs and tables.

The data were tabulated in Microsoft Excel spreadsheets and analyzed using two quantitative ethno-botanical methods, informant consensus factor (ICF) and use value (UV), according to the methodology of Ritter et al. (2012).

The species were grouped into categories based on medicinal uses in diseases reported by the interviewees, to calculate the ICF. It was calculated as follows, ICF = n - r / n - 1, where n represents the number of citations in each category and r, the number of cited species (SHARMA et al., 2012).

The UV was calculated using the formula proposed by Phillips and Gentry (1993) to calculate the use-value of a species for an informant (UVi), the formula UVi = ΣUi /ni, was used, where UVi is the number of uses mentioned by the informant for the species and ni is the number of interviews with the informant. For the present study, ni = 1, the number of interviews per informant. Therefore, the UV value always will be equal to the Ui value. To calculate the use-value of each species (UVi), the formula UVi = ΣUi /ni was used, where UVi is equal to use-value of a species by an informant and "ni" is the total of informants. The value of "ni" corresponds to the "ns" value identified by Phillips and Gentry (1993), since any interviewee can cite all species.

### Results

The results indicated 43 species of medicinal plants, distributed in 28 botanical families, highlighting Lamiaceae (1.6%), Asteraceae (1.6%), Euphorbiaceae (7%) and Myrtaceae (7%). Between several therapeutic indications, plants with digestive action (23%) followed by respiratory (21.8%), anti-inflammatory (12.5%) and integument (12.5%) were highlighted among other therapeutic implications.

The use-value of species per informant (UVi) UVi shows Mentha spicata (mint) (17/0.28), Mormodica charantia (mellão de São Caetano) (17/0.28), Arrabidaea chica (crajiru) (14/0.23). - Carica papaya (mamão macho) (13/0.22), Chenopodium ambrosioides (mastruz) (11/0.18) – Jatropha curcas (pinhão branco) (9/0.15), Melissa officinalis (cideira) (9/0.15), and Cymbopogon citratus (lemongrass) (9/0.15) as the most cited plants.
The values of the informant consensus factor (ICF) show that the digestive category presented the highest values (0.84), followed by integument (0.83), anti-inflammatory (0.80), diverse (0.72) and respiratory (0.70). Table 2 shows the values of the informant consensus factor (ICF) per category or system. In the digestive category, problems with endoparasites (anthelmintic) stood out with the largest number of indications (46.6%) in the integument category the use as a repellent (37.5%) also stood out, respiratory cough was the main indication, and in the diverse category, kidney problems were highlighted. Table 2 shows the individual indications by category with the respective numbers of cited plant species and the number of citations per informant.

Table 2. Medicinal plants category of use and the informant consensus factor (ICF).

<table>
<thead>
<tr>
<th>Medicinal use category</th>
<th>Species</th>
<th>Number of citations (nur)</th>
<th>ICF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digestive</td>
<td>15</td>
<td>89</td>
<td>0.84</td>
</tr>
<tr>
<td>Integumentary</td>
<td>8</td>
<td>44</td>
<td>0.83</td>
</tr>
<tr>
<td>Anti-inflammatory</td>
<td>8</td>
<td>37</td>
<td>0.80</td>
</tr>
<tr>
<td>Diverse</td>
<td>20</td>
<td>70</td>
<td>0.72</td>
</tr>
<tr>
<td>Disease, Respiratory Tract</td>
<td>14</td>
<td>45</td>
<td>0.70</td>
</tr>
</tbody>
</table>

Number of species = number of citations.

Discussion

The Lamiales and Asteraceae families are the most common in the state of Acre, Brazil (SIVERIO et al., 2012; MARTINS et al., 2013).

The plants mentioned by the interviewees present one or more therapeutic indication. Plants with anthelmintic action were the most highlighted in number of indications per informant, probably because it is a common disease in domestic animals, and easy to diagnose once the symptoms, such as diarrhea abdominal pain, vomit, and anorexia, are easy to observe (RITTER et al., 2012).
Plants with anti-inflammatory action stood out with a large number of species cited. Of the 43 medicinal plants identified, 26 different medicinal uses were mentioned, grouped into five categories (digestive, anti-inflammatory, respiratory and diverse). The category “diverse” covers multi-symptoms (such as fever, hemorrhage, and anemia) and undetermined categories and those indications that did not have citations were obtained by the informants, as well as, the number of species mentioned.

The use-value (UV) of a species per informant shows a direct correlation with the informant consensus factor (ICF) where the species most frequently mentioned per informant are grouped into most indicated categories, i.e., the digestive and integument categories. The most indicated species such as Mentha spicata, Arrabidaea chica, Chenopodium ambrosioides, and Melissa officinalis, were also reported by Mallick et al. (2013) as medicinal plants frequently used by the healers Cruzeiro do Sul municipality, Acre-Brazil. These species with a higher use-value already have a proven scientific knowledge regarding their phytochemical composition and their pharmacological activities, the fruits, leaves, and roots of Mormodica charantia are used for diabetes, as a diuretic, for endo (CORDEIRO et al., 2010) and ectoparasites, and cramps. Phytochemical studies have been demonstrating biologically active compounds such as the curcumin glycosides and curcuritaine (CHEN et al., 2008). Jatropha curcas presents secondary metabolic compounds such as tannins, catechins, and triterpenes, presenting anahelmintic (MONTEIRO et al., 2011), purgative (MCOWAN; ELOFF, 2010) and molluscicidal (GUBITZ et al., 1999) action. Melissa officinalis popularly known as “erva cidreira” has been mentioned by its several properties, such as antibacterial (NASCIMENTO et al., 2000), antioxidant (DASTMALCHI et al., 2008), in the treatment of gastrointestinal diseases (VOGL et al., 2013), as soothing (KENNEDY, 2004), as a potent inhibitor of GABA transaminase, which explains its anxiolytic effect and was identified as rosmarinic acid (AWAD et al., 2009); as a bioactive substance acts as a repellent (KIM et al., 2005), and in the mental performance by acting on muscarinic and nicotinic acetylcholine receptors (KENNED et al., 2013, CHAYANA; OKONOGI, 2012). Their main secondary metabolic compounds are eugenol, tannins, and terpenes. Cymbopogon citratus known as “capim santo” has been demonstrating an anahelmintic effect in the control of gastrointestinal nematodes on small ruminants, where has been observed the presence of tannins, saponins, and flavonoids (MACHEDO et al., 2015), antifebrile in stomach problems, and tranquillizers (ARNOGHO et al., 2012). The flavonoids as secondary metabolic in Arrabidaea chica, are the possible cause of its anti-inflammatory and anti-tumor activity (MICHEL et al., 2015). Carica papaya has anhelmintic properties such as, cytoine proteinase, popularly known as papain, which provided 97% efficacy against Trichuris suis infections in swine (LEVECKE et al., 2014). It has also been observed a potent effect on in vivo nematodes of abomasum such as Haemonchus contortus in small ruminants (BUTTLE et al., 2011). Mentha spicata has bioactive substances such as carvone, a monoterpen eketone with anti spasmodic (SOUZA et al., 2013), analgesic (GONSALVES et al., 2008) and antifungal (ADAM et al., 1998) action.

In the preparation of medicinal drugs, the leaves are the most common part used, since the plants are not stored or bought, they are harvested directly from the backyards. Ritter et al. (2012) and Monteiro et al. (2011b) found similar results, once they observed a higher frequency in using leaves, bark, and roots as the main part of the plants, used in Ethnoveterinary research in eastern Amazon. It is important to distinguish the vegetal part to be used, since the active principles are distributed by the different parts of the plant, being possible to find lethal substances in some parts (PINTO et al., 2000). The way of preparing a plant with medicinal purposes is extremely important for the chemicals responsible for their pharmacological effects be properly removed from the plant without changing its chemical properties (PINTO et al., 2000). Regarding the interviewees, there is a strong relationship between the age and knowledge of medicinal plants. Many researchers believe that older interviewees have greater knowledge about medicinal plants since they have more free time to cultivate and manage their yards (CARNIELLO et al., 2010; AMARAL; GUARIM NETO, 2008). On the other hand, the knowledge about medicinal plants tends to decrease with the level of schooling; this is also because of the migration of young people to the big cities seeking better education and employment. It was observed that Evangelicals interviewees stood out from the Catholics, this is related to a large number of evangelical churches in rural communities. According to Camargo (1998), there is a relationship between popular medicine and religious beliefs. Martins et al. (2013) also noted the influence of religion on practices and knowledge of medicinal plants in curing diseases.

Of all the interviewees, 93% reported using medicinal plants to treat diseases in their animals, 7% reported not to treat. According to Andrade et al. (2012) the key factor is the insecurity of using it in the treatments. The lack of information on the use of herbal medicines and research on the effectiveness of medicinal plants in diseases that affect animals is a great obstacle; thus it requires further studies in this field to confirm and identify the active principles responsible for their actions. Therefore, human health care should be as important as adequate treatment for domestic and farm animals, thus ensuring quality and safe food for human consumption (GALDINO et al., 2001).

Conclusion
From 43 species, Mentha spicata (hertléi), Mormodica charantia (melão de são caetano), Arrabidaea chica (crajoira), Carica papaya (macão macho), Chenopodium ambrosioides (mastraz), Jatropha curcas (pinhão branco), Melissa officinalis (cidereira), and Cymbopogon citratus (capim santo) presented the higher use-values by informant, and the digestive category, followed by integument and anti- inflammatory were the most indicated by the informant consensus factor. The fresh leaves were the part most used, and tea infusion was the preparation method most employed.

The rural community Pilo Hídio Pimenta, far 19 km from the city of Porto Acre - Acre / AC, Amazon region of Brazil, has been using medicinal plants in the treatment of diseases that affect domestic animals; contributing to ethnoveterinary practices, thus stimulating the interest of the scientific community to confirm and validate the great diversity of medicinal plants and the variety of applications in the prevention and the cure of domestic animal diseases.

Acknowledgements
To the National Council for Scientific and Technological Development (CNPq) for the Research Productivity Scholarship granted to the author. To the Federal University of Acre and the Post Graduate Program in Veterinary Medicine of the Federal University of Campina Grande/CESTR, Patos Campus-PB.

References