

An Ethnobotanical Survey of medicinal plants used in the Camarones community of Manabi, Ecuador

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ABSTRACT

The Camarones community is located between Jama to the south and Pedernales to the north and has a relatively new paved road. Therefore, the loss of traditional plant knowledge is a great reality. The present study attempts to assess the current medicinal plant knowledge of the community.

The project was carried out during mid-August and the first week of October 2013. Data was collected through household interviews, sample collection of medicinal plants in home gardens, forest walks, a walk along a river, participant observation, informal conversation, cross check through the information gathered in the data.

There were 104 medicinal plants were indicated to treat 59 different ailments and diseases. The majority of the medicinal plants were found in the homegardens (59%), followed by the dry area (15%) and the forest (13%). Of the reported taxa 33% was wild and 67% was cultivated.

Despite the vicinity and ease of access to the cities, this high number of plants given by fifteen people indicates a high knowledge of plants with a wide variety of ailments and diseases treated. However, this number represents only a small fraction of forest plants. This could be due to the community history of colonos that can be traced to a little over a hundred years. Future studies in the community can be made in order to gain a better understanding of the overall plant knowledge in the community.

INTRODUCTION

Ecuador is one of the most biodiverse countries in the world. Because of its location on Earth, it is home to a variety of rich fauna and flora. It has more plant species per unit area than any other country in South America. There are around 17,508 vascular plant species, 15,306 of these species are native and 27.3% only exist in Ecuador. It has 7% of all registered vascular plants in the world, 218,677.ⁱ

The characterization of the Pacific Equatorial Forest is possible because of the climate and topography variations, the wettest forest in the world on the Colombian coast is created by the warm waters of the El Niño ocean current in tropical Central America, the Andes mountain region to the east, the Humboldt ocean current off the South America tip which creates the Palmira desert on the south in western Chile and

Peru. The 2,237 km of coastal Ecuador is located between the two ocean currents and the extremes created which account for the tropical weather experienced on the coast.

The country has a diverse cultural background which is comprised of mestizos (mixed Amerindian and white) 71.9%, Montubio 7.4%, Afroecuadorian 7.2%, Amerindian 7%, white 6.1%, and other 0.4%. The Camarones community is considered to be comprised colonos or mestizos, people who came to this area in search of new opportunities for work and land, were comprised of four to five settling families who settled the community, and therefore this study concentrates on a community that is non-indigenous.

Medicinal plants are an important resource to people who live in rural communities and lack access to health care systems due to the distance and/or to their economic situation. This is a common condition in developing countries wherein the majority of the populations still rely on medicinal plants for primary health care.

There is little ethnobotanical research that centers on the northwest coast of Ecuador, that is the Manabi coast or in a non-indigenous community, this paper will generate new information on the area of Camarones located in Manabi and made up of colonos. Previous available research has concentrated on the Ecuadorian Amazon or southern Ecuador in Andean Highlands with indigineous communities who are well-known for their medicinal plant usage, such as the paper "Traditional medicinal plant use in Loja province, Southern Ecuador" by Rainer W. Bussmann and Douglas Sharon. In this paper centered in southern Ecuador there are still Andean traditional practices with a rich though declining medicinal plant knowledge. Much of the traditions such as using plants for "magical purposes" that are still present in Peru have mostly disappeared in Ecuador: the "Peruvian *curanderos* have started to fill this spiritual void in Southern Ecuador." The paper documented a total of two-hundred plant species which "represents only a fraction (about 5%) of the flora of the region." This result is interesting in understanding the richness of the area and the relationship between the people and their environment. Also, the paper concluded that "the same species might be used for various medical conditions" and "same medical condition might be treated using different plant parts and/or involved different applications". This conclusion helped derive the hypothesis of this study since the Loja area is also a biodiversity hotspot and therefore the Camarones community is likely to have similar results wherein the people use various plants in various methods for various medical reasons given their proximity to a biodiversity hotspot. The other research paper which was carried in a similar environment is entitled "Ashaninka medicinal plants: a case study from the native community of Bajo Quimiriki, Junin, Peru" by Gaia Luziatelli. The research was carried out in a biodiverse ecosystem in Junin, Peru wherein four-hundred and two plants were recorded for treatment of 155 different ailments. Conclusions derived from this paper were that the Ashaninka, an indigenous community in the Andean region, still greatly rely on medicinal plants, most of which were found in the forest. This is interesting in that many of the plants had various purposes which contribute to the hypothesis that many plants are used in the treatment of various ailments. This study is important in that new information of these plants and the people who use them will allow for better choices in the future management of the reserve, bring about stronger ties between conservationists like the Lalo Loor reserve and create a more complete informative approach such as contributing to the shared interest of

creating medicinal gardens, using the marked medicinal plants along the three forest trails for tourists, to then perpetuate this knowledge from the local community to the staff and to the visitors, of the link between human reliance of nature and why this forest is valuable not only for what it is known to offer but for the immeasurable potential it still has to contribute to this link.

The Camarones community is located between Jama to the south and Pedernales to the north. Here, the majority of the population does not rely exclusively on medicinal plants for self-medication but there is still a wide usage of medicinal plants given its past reliance on them. The proximity of Jama and Pedernales is thanks to the main paved road and the availability of private cars that will take anyone from the Camarones community to Pedernales for around 50 cents to \$1 or buses that pass by the road that travel from north to south, these are the greatest threat to the survival of medicinal usage in this community, which is already relying heavily on Westernized medicine. The younger generations increasingly assimilate a “Western” way of life and the disintegration of plant knowledge is obvious. The link of using plants and conserving the forest correlates with the reality of the effects of acculturation in this community. Many studies have validated that medicinal plant usage is relatively susceptible to acculturation and this cultural attrition due to a globalized economy and its innumerable effects on indigenous cultures is written in various papers.

The purpose of the study is to see if the members of the Camarones community who all live in close proximity to the tropical cloud forest, one of the most diverse areas on earth, have a more complex medicinal plant usage, that is use one plant for various ailments and/or various plants for one ailment, given their close proximity to this area of abundant flora. Since the opening of the paved road has been recent, within two years, and a gravel road is more than thirty years old where the usage of an open bus was the quick mode of transportation and where people would still use horses to travel to Jama for instance, the mode of using cars and buses is still relatively new, and from informal conversations it has been derived that in the past the people of Camarones relied on medicinal plants for their overall health. Therefore, it is quite likely this knowledge is still intact and that each plant mentioned will have various ailments treated. Thus, the aim of this paper is to document the distribution of Camarones’ medicinal plant usage in terms of understanding whether the medicinal plants have or have not a similar usage.

METHODS

Study area

The Pacific Equatorial Rainforest has 2,750 endemic plant species therefore there is a great potential for a rich usage of various plants in the Camarones community, which is the closest community to the Jama-Coaque reserve and within the Tumbes-Chocó-Magdalena Hotspot.

The Camarones community is located between the towns of Jama and Pedernales. It is 7 km from the newly paved road called Ruta del Sol. From Camarones to Pedernales there is a 25.7 km distance and from Camarones to Jama there is a 24.2 km distance. (Google maps) The climate corresponds to a tropical-humid forest where in “December, the warm El Niño current moves southward and brings with it heavy

rains that last through June. Starting in July or August, the cold Humboldt current pushes the El Niño current back north and accordingly generates cool, dry weather.”

The population of Camarones includes 53 households of colonos (non-indigenous Ecuadorians). The houses, most of them near each other while others are dispersed at various distances from the main community gravel road, usually have habitants belonging to the same family living close by. The homes have one or two levels with wooden support poles, cane walls and palm frond thatching. Most homes have a piece of land called ‘finca’, the size of this varies from a couple of hectares to hundreds. Most of the women work in nearby shrimp factories or tend to their homes and families while the men work on their agricultural land, someone else’s land or a certain number in shrimp factories.

Methods of collection of ethnobotanical information

The project was carried out during mid-August and the first week of October 2013.

During this process, the people in the community were informed through informal conversation about what the project entails, why it is being done and if they were willing to participate in the surveys.

Data was collected through household interviews, sample collection of medicinal plants in home gardens, forest walks, a walk along a river, participant observation, informal conversation, cross check through the information gathered in the data.

The informant for the forest walk and the deforested drier areas was selected because he was indicated as being the most knowledgeable on medicinal plants by the Jama-Coaque reserve and by the people in the community. I attempted as much as possible to have more informants accompany me in a forest walk but most of the time this was not possible due to impossibility of them walking in the forest because of age or a busy work schedule, while another meeting was set to collect plants in the forest for a snake bite concoction but never occurred due to the informant changing plans.

The arriba section of Camarones for the most part (in a couple of homes the people were not home) was knocked on door to door. I attempted to understand first off if the people were willing to set up a certain day for me to stop by and do an interview with them and to try to explain the purpose of my interview. The other sections of Camarones were chosen randomly where I would walk along the main road and chose any of the homes for interviews. There were about five individuals who were recommended as knowledgeable on the subject, one woman of 89 years and three men ranging from 50-75 years. One man was recommended by the reserve as being knowledgeable on plants and he lives near the town of Calceta. I spoke with all of these individuals. The walk on the river bank was done with one female informant of 46 years old.

Household interviews

Interviews were carried out in 14 out of 53 households (26%). The informants were seven men and eight women. Semi-structured interviews were carried out in order to have a little structure and also flexibility as Alexiades suggests. The use of a lead pencil and survey sheets were used to carry out the semi-structured interview where the date and approximate time was recorded. During the interviews the respondents name, age,

profession, place of birth, number of years spent in the community were asked. They were then asked who they thought to be the most knowledgeable on medicinal plants in the community and towards the end of the interview, they were asked who they relied on in case of illness and what is the most frequent illness they find in the community and in their household. Informants were asked to provide detailed information about the plant name; ailments for which the plant was used; best harvesting time and season; plants parts used, mode of preparation and application; specific instructions for preparation of remedies, including adding other plant species. All of the interviews were carried out in Spanish and no interpreter was needed to conduct the interviews.

Collection of medicinal plants in the homegardens

A walk through the informants' homegarden followed the interview if they were willing to do so and if they had a garden around their balcony and/or yards. They were asked to describe the plant found in their yard, any application and preparation of the plant. The identified medicinal plants were recorded on the field notebook, pictures were taken with a Yashica digital camera, and once the informant allowed for the collection sample, the samples were placed in a plastic bag. Information was also collected on plants that grew spontaneously in the yards and were indicated as medicinal.

Forest Walks

In this particular study, the ethnobotanical information on forest plants was done with forest walks rather than transects or quadrants. This method was applied because there were no particular pieces of land with already identified species in the reserve itself or in the community and also did not want to limit the study to certain plant species such as trees and lianas with a certain diameter at breast height, as reported in many studies, given that medicinal plants are often herbs. The Jama-Coaque Reserve trails that were walked on during the time available were chosen by the informant as he more or less knew where we would likely find the medicinal plants along the trails. Medicinal plants identified by the informant were marked with an orange flag tape where the Spanish name of the plant was written in black marker. The approximate location of the plant was recorded on a field notebook with a lead pencil by means of the meter marks along the trails and our own estimate; we did not have a GPS available. The informant was asked its medicinal use, plant parts used and preparation which was recorded on the field notebook and pictures were taken with the Yashica digital camera which were later saved on a usb.

Walks on the river banks

There was one river walk that occurred with a woman from the community of forty-seven years old living near the community house. We walked along the river behind her home for about twenty minutes. She would point out the medicinal plants and describe the uses and preparation of each one. She was able to point to four medicinal plants in a short walk and therefore she knew where these plants could be found along the river.

Preparation and identification of the voucher specimens

The preparation of herbarium specimens was carried on by following the guidelines of Dr. Peter Giovannini. The samples of the plant were taken from the forest and drier

areas were to be pressed once we arrived at the reserve. There were about three to four plant specimens that were brought in by the informant to the reserve without my presence and were pressed in the press box. The samples were not taken in the first couple of weeks because the pressing and drying process had to be set up, that is obtaining the cardboard from Pedernales, understand the pressing method, and build another presser to be used during the community interviews. A line string was used to tie the two sides down and press the plant samples. The samples taken from homegardens were pressed on the same day in a press box that is located in the community house. It was built specifically to be able to press the plant samples on the same day or as soon as possible, once the interviews were done. To be able to press and dry the plants, two pieces of cardboard and one newspaper sheet were used to cover the samples while the common name identification, date found, approximate location, reference number, and who identified the plant were recorded with a pen on a cut piece of orange masking tape and stapled to the bottom of the newspaper sheet that contained the specimen. The specimens were stacked on top of another in the order they were found. (See Index 1) The pictures of the plants identified during the walks were saved and organized in a usb for future reference. The scientific names and identification of some plants were possible thanks to the pictures taken and the cross-check of plants from people. (See scientific names) For instance, the forest and drier area walks were done before the homegarden interviews and therefore some of the plants were able to be identified by more than one person. If more than one person identified a certain well-known plant, I recognized this plant from the pictures and the previous walks and confirmed its name and its characteristics. The common name and the pictures helped to identify the scientific names of some of the plants mentioned in this study.

Results

Medicinal Plants –

A total number of 104 taxa were indicated by the informants as having medicinal properties when applying different ethnobotanical methods. The plants that were identified and seen firsthand were mostly herbs, but there were also trees, vines, epiphytes and ferns.

The majority of the medicinal plants were found in the homegardens (59%), followed by the dry area (15%) and the forest (13%). Of the reported taxa 33% was wild and 67% was cultivated. (Figure 1)

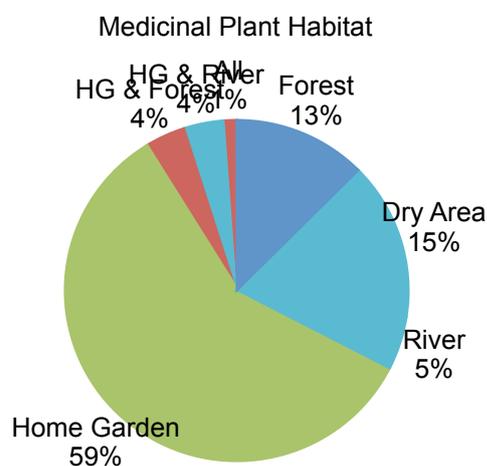


Figure 1

Plant parts used, ways of preparation and administration

Leaves were the most commonly used plant part followed by the stem, other such as seeds, sap, and leaves and stem. (Table 1) The species were prepared mainly via decoction (52%) or used fresh (14%) (Table 2) while the most common way of administration was oral (63%), followed by topical (25%) and inhalation (11%). (Table 3) During the household interviews, two out of fourteen households had a preserved remedy in their household. One remedy was a concoction for snake bites and another was for the evil eye. The evil eye is described as a condition in which the person feels weak, pains all over body, fever. It is said to come about when someone looks at the person or thinks about the person with zealous jealousy and/or bad feelings which is why the person then feels weak and sick. The man that had the snake bite concoction was not able to uphold the meeting to look for the plants and prepare the remedy. The other man for the evil eye concoction did not want to reveal all of the ingredients used in the remedy.

Ailments treated

The 104 medicinal plants were used to treat in total 59 different ailments and diseases. (Table 4) The most commonly treated ailments relate to the digestive system, cultural belief system, and musculoskeletal and articular system, which in total represent 47% of all the medicinal applications.

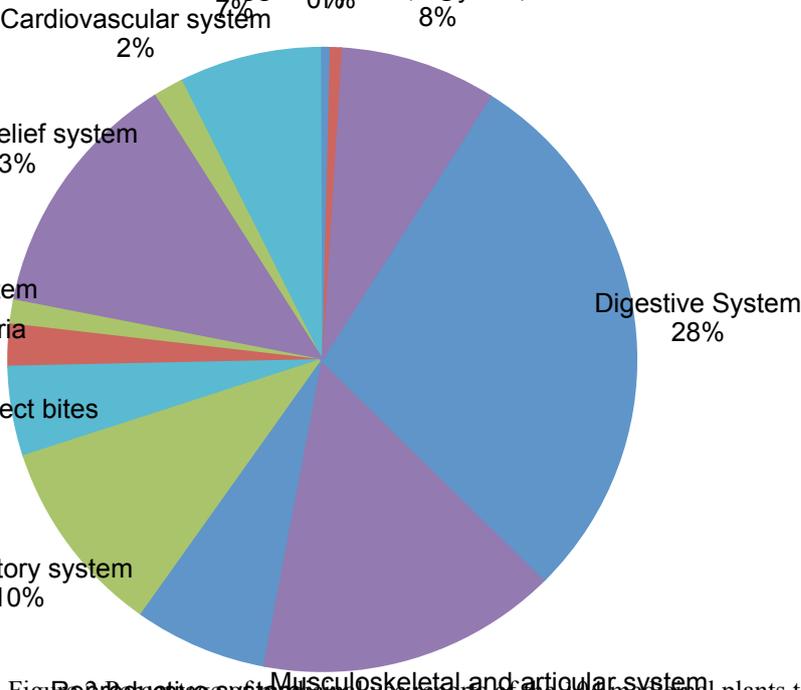


Figure 1. Medicinal use reports of the 104 medicinal plants to disease categories. Problems relating to the digestive system, cultural belief system, and musculoskeletal and articular system were among the most frequent ailments treated with medicinal plants, representing 52% of all medicinal use reports. (n=323)

For the digestive system, thirty-one different plants were used and twenty-nine medicinal use reports (MUR) were reported for diarrhea, the second most treated

ailment of all the reports. All of the remedies against diarrhea were taken orally by preparing a hot tea or eating a fruit.

The most treated ailments which relate to the cultural belief system where twenty-two various plants were used include mal aire and ojeado. Mal aire is a condition where the person feels cold either because of taking in too much cold wind or by encountering a spirit; this was cured in the majority of cases by a topical or inhalation method, either through a vapor bath, inhaling smoke from burning the plant or by hitting the body with the particular plant. The evil eye was reported twenty-seven times and was the third most common ailment treated with medicinal plants. This high number of reports shows the importance of this particular ailment in the community. The evil eye as described beforehand is cured by combining a variety of plants and drinking the liquid for more than one day, making a tea, or by grinding the plant parts and applying the liquid directly on the body. Usually the treatment in many cases involved the sick person participating in a cleansing ceremony (limpia) which varies depending on the person performing the ceremony. For example, there could be the use of rubbing an egg with a prepared liquid all over the body, breaking the egg in a clear cup of water and seeing if the egg white goes up or down, if it is up then the person has the evil eye and has to undergo a three day treatment with the egg and drinking concoction of plants. The most treated ailment of all was the common cold with thirty-two different reports, treated with twenty-five different plants. People treated this ailment with vapor baths and/or fresh teas, drinking the liquid of crushed plants, or drinking teas for a variety of days (agua de tiempo).

Plants used ‘contra la culebra’ against snake bites

There were particular plants that were mentioned that could be used to make a concoction to be used against snake bites. Hiel de Sapo, Doña Juana, Caucho, Muñeco, Zaragosa, Palo Amargo, Kinime and one unidentified plant were combined with sugarcane alcohol to make a preserved remedy which one drinks to treat snake bites. The Caucho (*Ficus elastic* Moraceae) and Muñeco were identified.

Plants found in the forest

There were a total of ten plants found in the forest by the informant. On Aug 22, 2013, we hiked through the Sendero Nuevo trail that will be used for tourism purposes. At around 200 mt, a Caucho tree was marked while at 400 mt the Rabo de Mono that grew on another tree was also marked. Once we headed back to the reserve, the informant headed down on his own to find a Zaragosa vine he knew was on a steep area of the forest and marked the beginning entrance for it along the main trail heading towards the reserve in orange flag tape. We marked the Challa plant that was planted on the sur quadrant of the reserve and a San Juanito near the casita. On the same day, we proceeded to hike along the three forests trail Aguas Frias-Cerro Sagrado. At about 680 mt, the big leaf Santa Maria plant was marked and at 1100 mt a San Juanito plant was marked. At around 960 mt, a Cana Agria plant was marked. On September 26, 2013, we hiked along the Sendero Coati (lower) trail where a San Juanito at 850 m was marked near the cacao plantations, a Caña Agria in the same location of 850 m, and a Muñeco at 200 M in the Escondido trail. On September 12, 2013, we hiked the Ronquillo trail where two Rabo de Mono were marked at 300 M and 500 M respectively and a San

Juanito at 600 M. At 1550 M, a Cana Agria was marked as well as a Caucho at 1700 M. Along the Punta Vista trail, a Bodoqueda plant was marked at 400 M. The Calaguala was found in Cordillera-Aguas Frias at 1 km 600 mt but it was not marked since this was during the beginning of the internship through the group hike. But it was possible to identify it later on since one person had the root cultivated in his household and it is *Polypodium vulgare* Polypodiaceae that grows in the forest. There were many Malacapa plants that were also found along the forest trails but were too small to be marked and grew along the main trail where it was likely to be stepped on or injured in some way. The Malacapa was marked in the reserve on September 25, 2013, in drier areas and pictures were taken of the plant. At each of these identifications with the informant he explained his knowledge on these medicinal plants: parts used, preparation and application and ailments treated.

Plants found in drier areas

At the end of walking the Sendero Nuevo trail early in the afternoon on August 22, 2013, we proceeded to walk along the main pathway heading to Camarones and took pictures of the Tiatino, Chochilla, Santa Maria, Golondrina, and Malacapa. All of these plants were not marked because they were found on the main pathway and the informant said they would not be there after the tractor would clear the road in a couple of weeks. The pictures taken of these plants though are good indicators in finding the plants since the Tiatino, Chochilla and Golondrina are quite abundant in the drier areas like weeds and are along the main trail to the reserve. On September 12, 2013, along the main trail and near the Finca de Madera, a Quitasol tree was marked 200 M before the entrance coming down from the reserve. A Zaragosa growing on the marked Quitasol was also marked at 200 M. There was another Quitasol a little below this where the banana plantations are located next to the entrance of the same side of the trail. As we walked down the trail and crossed into the finca next to a white Guayacan and a Quitasol in the south side of the finca a Muñeco was marked. Next to the fence about 50-60 M from the entrance of the Finca de Madera a Ruda de Gallinazo was marked on a corner where there are cañas planted at the end of the entrance road. Seeds from the plant were taken to the reserve. A Chochilla was marked at the entrance fence of the Finca de Madera. On September 25, 2013, pictures of the Bodoqueda, Hierba Mora, Golondrina, Moral Fino were taken but were not marked because they were found in private property, heading towards the informant's finca. At the informant's finca two medicinal plants were recorded which include the Verbena and Cutumbai. Sample of the Verbena and Cutumbai were taken after pictures were taken and pressed in the reserve press box. There were also seeds of the Verbena that were taken to the reserve.

Plants found in homegarden

The people that were mentioned as most knowledgeable by the community were three men and one woman. The eighty-nine year old woman had a balcony garden in her home where she pointed to each one and described its uses. She also mentioned that the weather conditions and the surroundings have changed over time: it is now drier and hotter than before and there is also less forest and less water, so it has become difficult for her to find some plants around the community because getting to the tropical forest is farther away. Another informant of seventy-five years also mentioned similar changes

in the environment. There were no curanderos, shamans, vapor healers, tabaqueros, or midwives in the community. Thirteen of the fifteen people interviewed had a homegarden for medicinal purposes which explain the high number of plants found in this study that were cultivated. One man of seventy-five years old had an extensive medicinal and general homegarden and had an extensive knowledge of medicinal plants, he was recommended various times by the community. He is the person that can be considered the most knowledgeable in the community for medicinal plants both in the forest and cultivated.

Discussion

Medicinal Plants

There were 28 medicinal plants that were able to be identified in scientific terms.ⁱⁱ The plants that were observed were prevalently herbs and trees, with leaves and stems as the most commonly used plant part, which is what has been observed in this study of Camarones. The use of these plant parts allows the plants to stay alive rather than digging out the root of the plant. The identified plants in the forest did have a variety of uses and were well known in the community. Caucho was mentioned to be good for headaches, colds, and snake bites. Calaguala was used for stomach pain, diarrhoea, pain, menstrual pain, and cleansing after giving birth. Zaragosa was used in the treatment of stomach pain, diarrhoea, pain, evil eye, and ear pain. The two Rudas, Ruda de Gallinaso, Ruda de Castilla, and Rosa de Muerto were often used together for the treatment in reproductive system ailments. The Espanto plant was mentioned eight times to be effective against the evil eye. It was observed that the plants that had more than one mention were often found in the homegardens or around the forest, river, drier areas, which contributes to the observation that people exchange plant knowledge in the community involving mainly local plants. Yet, it is also true that plants that were mentioned once were not found to be easily accessible. The plant knowledge of the forest was more limited than the homegarden because of the reliance of this study on one informant. The short fieldwork study of 2 months decreased the chances of finding more annual plants.

Knowledge variations

The use of medicinal plants was not limited to certain individuals. In fact, as mentioned beforehand, most of the households purposely have a homegarden with medicinal plants for ailments. It was often mentioned by the most knowledgeable in medicinal plants that people would come to them to ask them for certain plants to treat certain ailments, either because they were recommended as familiar with plants and/or because they had the plants available in their homes. This contributes to the idea that knowledge of the medicinal plants is accumulated over time as people communicate with each other and that people still make use of medicinal plants for the treatment of various ailments. The most knowledgeable in medicinal plants were almost exclusively persons over forty-five, with the exception of one young man of twenty-seven years old who was interviewed with his mother of seventy and who was able to mention the same plants as well as some his mom did not mention. Edilberto Marquez (48) was the informant indicated as most knowledgeable in forest plants, his childhood and whole life have

been spent in close relationship with the forest, and he remembers his father taking him through the forest and pointing to the plants that were medicinal. He also accumulates his medicinal plant knowledge when people come to him to ask him for particular plant parts for certain ailments. Ernesto Campo (75) was also very knowledgeable in a variety of plants and has an extensive array of plants in his homegarden. He mentioned many times that people come to him to cure certain ailments and that he usually has a good idea of which plant can be of good use. He is considered to be the closest to a *curandero* as can be in the community. The most knowledgeable people for medicinal plants in the community have lived in the community their whole lives as well as past generations of their families. For instance, Ernesto Campo and Teresa Campo are cousins while her daughter Alida Murillo also had an extensive list; Dolores Campo is also related to Ernesto and Teresa as well as Milton Puerta. This contributes to there being an extensive medicinal plant tradition that can be narrowed down to a certain family in the community.

There was not a significant number of plants that were used for different uses that contributed to over half of the reports. The medicinal plants mentioned by the individuals interviewed were used for the same ailment or for the same system yet there were also a good number of plants that were mentioned to be good for a variety of ailments. There were 41 plants that had only one use while 6 plants had no record of the ailment treated, and 57 had more than one ailment treated. The plants that had only one mention were more than likely non-native plants or plants that were not well-known in the community. This could be a sign of certain plants that are from other regions becoming a part of certain individuals' plant use or a plant that is native that is not well-known as medicinal in the community. The medicinal plants that had more than one mention were more easily found in the community and were well-known.

Conclusions

In the community of Camarones, despite its vicinity to the nearby cities of Pedernales and Jama, traditional plant knowledge is still available. Given the fact that fourteen households out of fifty-three were interviewed there is a potential to continue understanding medicinal plant knowledge in Camarones. The arriba barrio was scanned for individuals who did mention they would be interested in an interview and who knew about plants, therefore there were many households that acknowledged they did not have medicinal plant knowledge and would go to the doctor in case of illness. There were 104 medicinal plants that were indicated to treat 59 different ailments and diseases. Of these, the common cold, diarrhoea, stomach pain and the evil eye were reported as the most common among the community.

The majority of the medicinal plants were herbs, prepared through decoction and administered orally, although other types of plants were also mentioned. Other ways of preparation include steam baths and directly applying the concoction on body. The majority of the medicinal plants were found in the homegardens and the drier areas.

Medicinal plant knowledge was not limited to a certain number of specialists as most people had a homegarden with these plants. There seems to be a limited number of exotic plants that are used by the community and people still look for plants along the river and in the walking trails. The data leans towards there being a diverse use for each medicinal plant as there were a greater number of plants which had more than one use

mentioned but it is not conclusive. There was not an extensive list of medicinal plants from every single person, around four people averaged twenty plants while two of the informants mentioned Edilberto Marquez and Ernesto Campo averaged forty plants. Even though people mentioned that the people who used medicinal plants extensively for the treatment of ailments had died, there is still a great knowledge intact, but it is centered on the older generation of the community. The lack of having more than one individual walk in the forest and cross-checking the plants thoroughly are limitations to this study and should be taken into consideration in the conclusions. The interviews were also less than perfect and there were some discrepancies so it is recommended that if there are interviews done in the future, the use of a recorder would be best to go back to it and fill in any gaps. The use of a GPS would be best to figure the exact location of the plants. Medicinal knowledge in the community is transmitted orally and people do ask the most knowledgeable in the community about treatments through plants. It was interesting though to see that many plants were easily found in the drier areas of the community rather than in the forest, which could be another limitation of having one informant walk through the forest, although he is more than likely the person in the community who knows the forest very well. Other people did mention they were knowledgeable of forest plants but could not accompany me due to work or not being capable of going on hikes due to health and age. This is one interesting point in that the forest itself has great potential for a greater number of medicinal plants either because this knowledge has over time declined or because this knowledge is just beginning given the community's history of colono families settling the area in a relatively recent past, estimated at around one hundred years more or less. Therefore, the data is inconclusive since it cannot definitely contribute to the hypothesis that there is a complex medicinal plant usage given the proximity to the forest. Most of the plant usage found in this study was cultivated, in a homegarden, and there can be a different reasoning than the one mentioned of using one plant for a variety of ailments that does not necessarily have to do with a complex knowledge. It could be a borrowing of ethnobotanical knowledge from other communities or an indication of ongoing experimentation of the plants themselves and also possible secrecy of plant knowledge confined to certain individuals. The results therefore are limited in that many of the plants were not seen first-hand, identified and much of the information can be attributed to one person. Camarones does have the background of a community who has a close link to its environment, but it is also in danger of acculturation given the ease of transportation to the nearest town, the high number of people in arriba who did not acknowledge medicinal plant knowledge or would say they go to the doctor for treatment, and the younger generation's assimilation to another mode of treating ailments. The continuation of this study in the community could be extended for a future study as there are many more households in abajo that can be interviewed and there are more individuals who did mention they could point out medicinal plants in the forest in order to gain a more in-depth understanding of medicinal plant knowledge in Camarones. Camarones does have a relatively significant number of medicinal plants that treat a variety of illnesses. Please refer to medicinal plants excel sheet.

Table 1 Plants parts used

Plant parts used	n	%
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Leaves	165	6548%
Leaves and stem	10	397%
Stem	17	675%
Root	4	159%
Latex (milky substance)	2	79%
wood	2	79%
vine	12	476%
flower	7	278%
Fruit	9	357%
other	16	635%
cogollito	8	317%
	252	10000%

Table 2 Preparation Modes

Preparation	n	%
Decoction	114	5205%
Fresh	31	1416%
Steam Bath	25	1142%
Boiled application	15	685%
fresh application	21	959%
sugarcane	5	228%
heated	5	228%
other	3	137%
	219	10000%

Table 3 Administration

	n	%
oral	157	6382%
topical	62	2520%
inhalation	27	1098%
	246	10000%

Index 1: List of medicinal plants in Community House Press Box

- BFS1 Ruda de Castillo
- BFS2 Ajenjo
- BFS3 Espanto
- BFS4 Jorra
- BFS5 Peregrina (wrote Badea on the tape but it is actually Peregrina)
- BFS6 Limon
- BFS7 Hierba de Chivo
- BFS8 Malacapa
- BFS9 Cigarro
- BFS10 Mancai
- BFS11 Paico (by river)

BFS12 Alivia Dolores

List of Medicinal Plants in Reserve Press Box

- BF01 Challa (Front)
Challa (back)
- BF02 San Juanito (seeds)
San Juanito (leaf)
- BF03 Rabo de Mono
- BF04 Caucho
- BF05 Zaragosa
- BF06 Quitasol
- BF07 Ruda de Gallinaso
- BF08 Muñeco
- BF09 Chochilla
- BF10 Verbena
- BF11 Cutumbai
- BF12 Santa Maria (big leaf)
- BF13 Sapan de Paloma

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