

PEST CONTROL METHODS USED BY RIVERINE FROM RIO VERMELHO COMMUNITY, SOUTH OF MATO GROSSO STATE, BRAZIL

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ABSTRACT - Riverine communities have vast popular knowledge about plants and animals, and concomitantly, the pests that threaten their farming, mainly insects. Ethnoentomology, subarea of Ethnobiology, is responsible for studying the relationship between humans and ethnocategory "insects", which includes the characterization of the insects by popular culture. The present study approached the interactions and knowledge of riverine from Rio Vermelho Community about insects and their main pest control methods, and the implications of this practice to ecologically important area in which they are inserted, nearby Rio Vermelho river and Jurigue stream, in south of Mato Grosso state. We used semi-structured interviews to collect data, registered in audio files or noted, according to preference of interviewee. The riverine have considerable knowledge of main pest and the use of insecticide and herbicide is the most widely method used to control undesirable species.

Key-words: Ethnoentomology, Riverine Community, Pest-control.

MÉTODOS DE CONTROLE DE PRAGA USADOS PELOS RIBEIRINHOS DA COMUNIDADE RIO VERMELHO, SUL DO ESTADO DO MATO GROSSO, BRASIL

RESUMO – Comunidades ribeirinhas possuem um vasto conhecimento popular sobre plantas e animais que cultivam, além das pragas que os ameaçam, principalmente insetos. A Etnoentomologia, subárea da Etnobiologia, é responsável por estudar as relações do homem com a etnocategoria “inseto”, que engloba a caracterização dos insetos vista sobre a cultura popular. O presente estudo abordou as interações e o conhecimento dos ribeirinhos da Comunidade Rio Vermelho sobre os insetos e as suas principais técnicas de controle de pragas, além das possíveis implicações que essa prática apresenta para a região ecologicamente importante na qual se encontra, próxima do Rio Vermelho e do córrego Jurigue, no sul do estado de Mato Grosso. Para a coleta de dados foram feitas entrevistas semi-estruturadas, registradas na forma de gravações de áudio ou anotadas, conforme a autorização do entrevistado. Os ribeirinhos demonstraram um grande conhecimento sobre as principais pragas presentes na região, e o uso de inseticida e herbicida é o manejo mais usado para combater e controlar as populações indesejadas.

Palavras-chave: Etnoentomologia, Comunidade Ribeirinha, Controle de Praga.

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INTRODUCTION

In a million years of evolution, insects have developed an extraordinary capacity of adaptation in almost all terrestrial ecosystems (except the sea) and comprise about 75% of living organisms on the planet (Borror & DeLong, 1969). These animals play important ecological functions such as nutrient cycling, pollination of plants, structure and maintenance of soil fertility, control of populations of other organisms, direct source of food for many species, biological control of pests and weeds (Borror & DeLong, 1969; Morris *et al.* 1991; Stores *et al.* 1995, Fisher, 1998).

The relationship between human beings and insects is studied by Ethnoentomology, which can be defined as the study of perception, classification, and knowledge of the use of insects by human societies (Costa Neto, 2004).

Insects are important in socio-cultural life of human beings. From an anthropocentric point of view, the sociological impact which insects have done and continue to make in our lives can be observed in different areas: oral and written literature, food, medicine, arts, religion and mythology, entertainment (music, dance, theater, cinema, etc.); eroticism, economy and etc. (Costa Neto, 2002). Since some arthropods threaten human health and crop productivity, competing directly with humans for food and space, it is not surprising that several species have occupied a notable place in organizational structure of different human communities and in their beliefs, economy or culture material (Posey, 1986).

Communities with traditional farming systems usually keep a more refined knowledge about insect species present in the most important crops. Thus, ethnoentomological studies are important for community development, from the traditional knowledge about life cycle of pest insects, as well as their niche and correct time to control them, it can bring environmentally sustainable solutions for biological control (Costa Neto, 2002).

It's notable the role of traditional people play in the exploration of natural environments, providing information on different forms of management performed in your daily life and enjoying the exploration as way to support these people. Thus, before the urbanization and the possible influences of acculturation, it's necessary to redeem the knowledge that traditional populations has about the use of natural resources (Cabral & Pasa, 2009).

It is important to develop ethnobiology research because it provides principles for applied research. The knowledge of traditional populations has recently been rescued through ethnobiological data and techniques of approaching and interviewing. People living in traditional communities and riverine communities have vast knowledge about management and control of plants and animals because they live in direct contact with the conflicts and benefits of nature.

This project aimed to record the way people from Rio Vermelho community control pests which threaten their crops and the importance of this kind of community to the conservation of rural environment, which makes transition with preserved environments.

MATERIALS AND METHODS

The Project was developed in a rural area of Rondonópolis City, the Rio Vermelho Community (16° 30'35.66"S, 54° 36'24.80), nearby Rio Vermelho river and Jurigue stream, at August/2010 to March/2011. The area is characterized by implantation of agroecosystems with 20 occupied farmsteads from a total of 48, extending from the bank of Jurigue stream to a highway toward Rondonópolis City.

First we applied a pre-test with those living in the community aiming to promote cultural and socioeconomic survey data of local people.

After pre-testing techniques, we conduct the research field which involves the questionnaire, which is the closed technique to cope with speech of the informants, to the other extreme, the participant observation. Between the extremes, we used the interview technique. The interview technique is more flexible than the questionnaire by the type of language used and it may be more or less open to the culture of the informant (Pasa, 2007, 2005).

We collected information about riverine methods of insects-control, as well as information about plants and weeds. The data was registered in audio recorder or annotated, as the informant desire.

Ethnobiological aspects reviewed: name and classification of considered pest species, control methods to pest species.

RESULTS AND DISCUSSIONS

Studied Area

The area is inserted in Cerrado biome and it is observed impacts of human activities, mainly agricultural practices. Before occupation of the region by riverines, it belonged to a farm along to the community and is also common to see the regeneration of vegetation together with remnants of native forest in unoccupied lots. The climate is the tropical continental hot (megathermal) humid and dry, due to changes of tropical, equatorial and extratropical systems (Sette & Tariffa, 2001).



PICTURE 01 - Image of Rio Vermelho community next to Rio Vermelho river and Jurigue stream, 2009. Source: Google Earth.

As Amorozo (2002), backyards are constituted by complex arrangements, characterized by simple experimental activities which translate the local manage. These practices show the way of life of local people, with a cosmology that involves the history of individual and collective life, creeds and myths. Products obtained with these practices supply mainly feed, medicinal and ornamental necessities. So, to protect their crops and breeding against pests is necessary to have a great response and then, higher profit.

Socioeconomic data from local people

From a total of seven farmsteads, we interviewed 11 people, which 30 % belonged to female sex and 70% to male sex. Age of responders varies between 31 to 65 years, mean 52 years old. It shows that population from Rio Vermelho community is generally occupied for older people. Guarim & Carniello (2008) said that these people usually come from other states, especially from south Brazil, to buy cheap and unexplored properties. In this study we registered four people from Central-West and South regions, two from Southeast and one from Northeast. Although they earn some money from their crops and breeding, almost all the interviewees are employed or retired and came to rural areas after a long time living in cities and as they say they are “tired of city life”.

The scholarity of informants is low. Six informants didn't complete their elementary school and only three informants have completed secondary school, its shows that people living in that area don't have high levels of education and it is also observed in many ethnobotanical studies as Cabral & Pasa (2009), Santos & Guarim-Neto (2008), Maciel & Guarim-Neto (2008). Some of the informants have lived their childhood in rural areas and this implicate in their education because they were designated to legwork for earn money to supply family necessities. Others lived their childhood in cities but were also designated for working.

It's during the rural working childhood lifetime that these people acquire the most part of their ethnobiological knowledge. It's because a few decades ago, the access to pharmacological and pesticides products were not as easy as it is today, so these people were forced to create solutions to daily problems.

The Importance of riverine communities

For riverine, in backyards systems there are several species of plants that are grown alongside other crops, besides the presence of animals (mainly chickens, pigs and cattle) that can be used both for their own sustenance and to earn money. These products are found in front of their own homes or at fairs in the city of Rondonopolis. The crops are located at the rear of the residence, as was also reported by Pasa (2005). They dedicated the familiar demand with greens and vegetables, medicinal plants and fruits. The crops are small, just to maintain themselves. In most cases the presence of onion, lettuce, cilantro, kale and arugula. By producing food for family subsistence, the backyards play

considerable economic role in their lives and in some cases it is the only source of income for these people. The manpower is mostly familiar: father, mother and children. In the back of the house dominates the cultivation of a small orchard that caters to family demand. We refer to the orchards and gardens home for having various kinds of fruit species often brought from various regions of the country that serve as a supplement to feed the family. The garden, also a landscape unit, was found in several researches as a management area of the culture of sugar cane, cassava, bananas, among others (PASA, 2007).

The slash is a unit of food landscape, with its diversity of food, medicinal and ornamental, mainly found in Rio Vermelho community. The landscape unit is also a socializing site. Children use the site to develop their games, and teenagers and adults enjoying the place to entertain friends, have meetings, parties and family life. According to Geertz (1989) culture is seen by the symbolic system, which is nothing more than the social action. So we can understand that the gardens are not just landscape units, but local people also use it as a cultural center. Approaching the Ethnobiology, which interacts with plants and insects, the activities of life of local residents express the daily contact with the wildlife resources in the landscape units such as gallery forest and rivers, giving them an analysis of perceptions about the importance of flora as habitat to entomological resource sites. (PASA *et al.*, 2010)

Pest-control methods

The practices used by residents from Rio Vermelho community involve modern techniques of pest-insects control, e.g. specific insecticides, or the use of domesticated practices to control undesirable organisms.

Both practices are considered valid by the informants, however, domesticated practices, usually made with products and objects easily accessible by these populations are high valued. These practices are considered cultural because they are inherited by the experience of work in rural areas and/or traditional communities, which favors the valorization of these practices. So, while it is developed and valued by a particular group, it creates a cultural value, and cultural values are passed on through generations, especially orally.

One homemade method for controlling pests (mainly aphids and caterpillars) was described by three farmstead owners. They use basically tobacco, alcohol, soap, buds and seeds of *Anadenanthera* sp. tree ("angico branco") and they mix these products in water. The mixture is the "homemade poison" to combat pests. According to respondents, tobacco is useful to kill caterpillars and the parts of *Anadenanthera* tree to kill aphids. Here we notice that the products used in fabrication of "homemade poison" are very accessible by riverine, as *Anadenanthera* tree is typical from cerrado biome. This tree is easily found in the riverine's farmsteads, and it's not necessary to plant them because they are native and they naturally grow, riverine like to keep them because they are big trees and good for shade.

Lorenzi (1998) said that species of *Anadenanthera* genus grows in semi-deciduous forests in transition to cerrado, and its wood is very heavy, hard and of medium texture, with natural occurrence since Tocantins state to Rio de Janeiro state.

They use grease to avoid ants and other crawling insects that attack plants. They grease the base of the plants to prevent these insects to scale the plant. They also throw ashes around their houses to avoid crawling insects to come in and use water and detergent to kill ants, they inject the solution with a syringe on the nest entrance. The detergent kills the ants but we don't know exactly why this occurs, perhaps by drying or clogging respiratory pores in the gaster of the insect. From a total of 8 specimens cited as pests, 3 are ants (see Table 01). Although they know methods to avoid ants to come into houses or "bother" them, they use insecticides to kill them.

In *Solenopsis* ant, only one interviewee, Mr. E.B., 41, said to use specific insecticide. This insecticide contains a fungus that must be applied in the forager ants, and when foragers enter into their nests they infect other ants with the fungus, it was supposed to kill all ants of the colony, however, it was not what happened. He said "the poison seems to act like vitamin to ants. It made them multiply". He is correct to affirm this behavior, it is characteristic of polygynous ants, especially *Solenopsis* spp. Queens of this genus, when feel threatened, leave the nest with other ants and each queen founds a new nest. Thus, from only one disturbed nest, you have other new nests.

TABLE 01 - Pest insects cited by riverine and the damage registered in way to their speech. Source: Valadares, (2011).

Pest-Insect "portuguese name"	Percentage of citations:	Insect damage
Thief-Ant " <i>Formiga Lava-pé</i> " (Fam. Formicidae)	100%	"This ant is so evil, as much as insecticides we applied, the ants appear even more". E.D, male, 41 years old.
Aphids " <i>Pulgão</i> " (Fam. Aphidoidea)	80%	"I don't know what to do; the aphids are damaging my plants". J.V, male, 65 years old.
Leafcutter ant " <i>Saúva</i> " (Fam. Formicidae)	60%	"You may find a lot of saúva here but at least we can control them". R.G, male, 61 years old.
Leafcutter ant " <i>Quênquem</i> " (Fam. Formicidae)	60%	"The quênquens sometimes get so close of my house because of flowers I have, and I fear they may bite my children". L.C, female, 31 years old.
Caterpillar " <i>Lagarta</i> " (Order: Lepidoptera)	60%	"I do not crop vegetables anymore, those caterpillars eats everything" J.F, male, 53 years old.
Termite " <i>cupim</i> " (Order: Isoptera)	60%	"The termites suck the plant roots and it kills the plant" E.D, male, 41 years old.
Bettles " <i>Besouros</i> " (Order: Coleoptera)	10%	"There is a beetle that "eats" my orchids and the same one attacks the cashews" M.F, female, 47 years old.
Army-ants " <i>Formiga correição</i> " (Fam. Formicidae)	10%	"This ant often attacks my chickens; we have to take care about our chickens when they are close" J.F, male, 53 years old.

The informant, J.F., male, 53, has his property along the Jurigue stream and he only use herbicides to kill weeds that are really hard to kill with domesticated practices as weeding and combing (e.g, *Vernonia longiflorum*, popular known in brazilian portuguese as "assa-peixe"). *Vernonia longiflorum* is also considered a medicinal plant for ethnobotanical studies as seen by Fonseca-Kruel & Peixoto (2003), Cabral & Carnielo (2008), Guarim-Neto & Pasa (2009). He doesn't apply herbicide in all weeds because he fears these chemicals can contaminate the river, although he applies insecticides to pest-insects. When asked if they consider important the insects, 100% of informants said that they do not consider any insect important.



PICTURE 02 - Herbicide application in a farmstead from R. V. community. Source: Valadares, 2011

CONCLUSION

Riverine from Rio Vermelho Community do not have a vast knowledge about domesticated methods of pest-control, they often use herbicides and pesticides to control undesirable organism. Obviously, it implicates in impacts on the region they are inserted, although they demonstrated to know that the use of chemicals can negatively impact the environment from Rio Vermelho community.

Our study shows that riverine from Rondonópolis are responsible for supplying the region's horticulture and also commercialize their products in markets and stalls. Fruits and vegetables come from these communities are generally more free from pesticides than the imported ones, so, the valorization of these kind of community must be supported because they contribute to the valorization of culture and feed people with healthier vegetables. They also demonstrated to understand the behavior and life cycle of pest-insects, nevertheless, when asked if they consider these insects important, they do not. It shows that the meaning of the word “important” is related only to positively things.

The ethnobiological knowledge of riverine may be restricted because this population shows a mixture of people with different origins. Although they have a low scholarity, half of informants do not passed their childhood in contact with traditional communities or working in rural areas, but in cities and far from massive ethnobiological information.

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