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Some Considerations Regarding the Origin and Functions of Parasites among Two Mbya Communities in Misiones, Argentina.

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PETER LANG

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EDITED BY BRENDA GARDENOUR
AND MISHA TADD

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SOME CONSIDERATIONS REGARDING THE ORIGIN AND FUNCTIONS OF PARASITES AMONG TWO *MBYA* COMMUNITIES IN MISIONES, ARGENTINA

Marta Crivos, María Rosa Martínez, Carolina Remorini, and Anahí Sy

Ethnographical and ethnological studies such as the pioneering work of Levi-Strauss and Evans-Pritchard suggest that in the religious and traditional belief systems of indigenous populations, certain people, animals and spirits, are said to have the power to injure individuals and/or the community as a whole.¹ Physical injuries, including sickness and death, are often inflicted by entities in response to perceived transgressions of fundamental laws and social boundaries that regulate relationships between the natural and supernatural realms. In fact, the violation of taboos regulating the interaction between natural and supernatural entities appears to be one of the main causes of illness and death in many indigenous communities. In these cultures, the human and natural environments expand beyond their empirical or biological features to encompass a variety of entities that can transgress permeable boundaries—including those of the human body—at will. The study of indigenous ideas about and representations of illness, especially when caused by supernatural entities, provides a window onto indigenous perceptions of the human body, human relationships, and the interactions that exist between human and non-human entities that live in and share a particular environment. The focus of this study will be the relationship between worms—natural and supernatural, beneficial and harmful—and the people of the *Mbya Guarani* communities of the Argentinean Northeastern Rainforest.

In their everyday activities, members of *Mbya Guarani* communities categorize and utilize their natural environment—the sub-tropical rainforest—and give different values (positive, negative, or neutral) to different components of that environment. The relationships between the *Mbya Guarani* and the non-human entities of the forest that sustains them are surprisingly elastic; some of the most complex and ambivalent relationships are those between *Mbya Guarani* and worms. In many cultures, the penetration of the body by worms is a cause of both fear and disgust. In *Mbya Guarani* culture, however, certain types of worms are seen as

completely natural, and their presence and activity in the environment and the human body are thought to be not only harmless, but also beneficial. For example, the worms that grow in the marrow of the *Pindo* palm tree (*Syagrus romanzoffiana*) are ascribed a positive value because they serve as a delicious and nourishing source of protein. There are also worms that are born with and within a person, and live in the human body as their macrocosmic environment; these worms are seen as a natural part of a person's body and not as invaders or as pathogens. Worms from the soil and water that enter the body unbidden, however, can become pathogenic and provoke illness, and are ascribed a negative value.

For the *Mbya Guarani*, then, the presence of worms or "bugs" in the body does not always imply a state of illness. Because of the complex nature of *Mbyan* conceptions of the human body and its connections to the natural and supernatural worlds, the relationship between worms and humans is not always parasitical (beneficial for one species at the expense of the other) but instead is often symbiotic (beneficial to both species). This reciprocal relationship, however, may become unbalanced if the worms' habitual behaviors become pathogenic thereby causing damage to the host's health. For the *Mbya Guarani*, worms not only cause damage but also are the result of "damage" (*paye*), which in this culture is closely allied with maleficence. *Paye* is the negative action of one human being who wants to inflict evil on another human being, which often results in either sickness or death. One of the deadliest forms of *paye* materializes in the shape of a worm that invades and attacks the body, consuming internal organs until the afflicted individual finally succumbs. *Paye* worm infestation is considered by far to be the most frightening; unlike natural worms that serve as food or are born within the body, *paye* are imbued with supernatural power. This kind of situation is the result of an interpersonal conflict between members of the community, which can be due to different reasons. These worms are feared, as they are the expression of evil, of a conflict.

From the perspective of modern Western biomedicine, the presence of worms in the human body—no matter their nature or source—is always considered to be negative. Health policies set forth by medical and governmental agencies, therefore, focus on the complete elimination of worms by means of medical, pharmacological, hygienic, and environmental intervention. Recent research done on intestinal parasitoses among indigenous people in the Amazon confirms that parasitic worms are a

medical problem requiring the attention of government officials, medical authorities, and environmental experts. In the Argentinean rainforest, the combination of clayey, damp soil containing a high concentration of organic materials together with a climate characterized by sustained high temperatures provides a suitable environment for the development, spread and chronicity of enteroparasitosis. Despite the fact that enteroparasitosis are endemic in this region, these pathologies tend to be underestimated by both the general population and the local sanitary staff because they are often asymptomatic. Undetected, parasitic infections wreak havoc within the body and are responsible for increased morbidity, especially when coupled with malnutrition. The integral relationship between geohelminth infections, malnutrition and anemia has been demonstrated by several authors, including Navone et al in their 2006 article, "Parasitosis intestinales en poblaciones Mbyá-Guaraní de la Provincia de Misiones, Argentina: aspectos epidemiológicos y nutricionales."²

Our research reveals that while the *Mbya* and the biomedical sector converge in their belief that many types of worms are detrimental to the human body, they diverge in their ideas regarding the origin, mechanisms of pathogenic action, and suitable therapeutic actions to be taken in the treatment of parasitic infection. The growing presence of modern biomedicine in *Mbya* culture as well as the increase in the number of individuals from these communities who train in sanitary institutions has led to a significant transformation in local conceptions and practices regarding parasites and parasitoses. This new knowledge has been integrated into traditional belief systems, resulting in a changed perception among the *Mbya* of the risks associated to the presence of worms. Our paper analyzes *Mbya* beliefs and practices concerning the existence of parasites in humans, especially the representations of their origin and behavior in the human body, as well as on practices associated with the diagnosis, prevention and therapy of parasitoses. The information included in this paper is the result of ethnographic and interdisciplinary research on human parasitology carried out between 1999 and 2008 in two *Mbya* Guaraní communities in the Province of Misiones, Argentina. This research was developed by a team of ethnographers, biologists, parasitologists, ethnobotanists and biological anthropologists belonging to the Facultad de Ciencias Naturales at Universidad Nacional de La Plata³.

The Mbya Guarani Communities

The *Mbya*, together with the *Kayova*, the *Ñandeva* and the *Ava Guarani* or “*Chiriguano*,” are the *Guarani* groups with the largest number of members. They speak the languages belonging to the *Tupí-Guarani* linguistic family. According to recent estimations⁴ the total number of *Mbya* in Brazil, Paraguay and Argentina adds up to about 19,200 individuals. According to the 2005 ECPI (Complementary Survey of Indigenous Peoples), there exist in Argentina around 3,975 people who identify themselves as belonging to the *Mbya Guarani* people in Misiones province.⁵ The *Mbya* presence in Misiones dates back to the end of the nineteenth or beginning of the twentieth century⁶ when they begin migrating outward from the mid-southern region of the forest in modern day Paraguay.⁷

The *Mbya* inhabit the Paranaense rainforest, one of the most complex and biologically diverse ecosystems in South America. The Paranaense forest encompasses all of Misiones province and extends northeast to the province of Corrientes in Argentina, and continues eastward into Paraguay and south to Brazil. Over recent generations, the natural resources of this ecosystem have been seriously depleted and, as a result, the very boundaries of the forest have contracted until only a very small amount of its original territory remains. The contraction of the forest is the consequence of several factors, including: the exploitation of timber resources in the rainforest; the substitution of native species for exotic tree species; the building of hydroelectric dams; and the advent of agricultural colonization and the growth of lucrative crops for the export market, such as tea, yerba mate, tobacco and tung tree.⁸ Also contributing to the transformation of the rainforest is the sustained use of its natural resources through hunting and fishing, gathering, and “slash-and burn” agriculture—all of which are the subsistence strategies of aboriginal groups in the area.⁹

Mbyan culture has been, until recently, characterized by their constant spatial mobility as they exploit forest resources and search for areas having favorable conditions for *Mbya reko*, that is, the *Mbya* way of life. Periodical movement within the ecosystem’s limits has allowed them to recover and reuse previously occupied spaces. At present, the *Mbya* population tends to form small, relatively stable settlements, although some individuals or small family units still move regularly. The more sedentary lifestyle embraced by the *Mbya* in recent years is the result of several factors, the central one of

which is the shortage of available land having the conditions necessary for their survival. Much of the land in the Paranaense has been claimed as private property or has been incorporated into the state national parks or designated as natural reserves, all of which either limit or ban the settlement and use of that space. Another factor favoring sedentarization among the *Mbya* is provision of subsidized housing by the government and ENDEPA (National Aboriginal Pastoral Team).¹⁰

The *Ka'aguy Poty* and *Yvy Pyta*, the two *Mbya* communities that are the focus of our research are settled in *Valle del Arroyo Kuña-Pirú*, in the middle of Misiones province, between the departments of *Cainguas* and *Libertador General San Martín*. These communities are connected with neighboring settlements including *Aristóbulo del Valle*, *Jardín América*, and *Ruiz de Montoya* as well as with other *Mbya* communities on the basin of *Cuña Piru I* and *II* streams, by Provincial Route N° 7 which slices across the northern part of the Reservation (see Figure 1: Map). Within the *Ka'aguy Poty* and *Yvy Pyta* communities, the *Mbya* language is spoken, and most adults and school children also speak Spanish. As a result of the migration and settlement of communities near convergence of the borders of Argentina, Brazil, and Paraguay, Portuguese and *Yopará* (Paraguayan *Guarani*) are also spoken. According to a census conducted by our team in May of 2003, the population of both communities totals 280 people. From a demographic point of view, it is a "young" population, as the greatest number of individuals is between 0 and 14 years of age (54%). Percentages decrease with an increase in age; only 6% of the population is over 60. As for sex distribution, we found predominance of men, who accounted for 56.07 % of the total population, while women accounted for only 43.92 %.

At present, the *Ka'aguy Poty* and *Yvy Pyta* practice a variety of subsistence strategies including a combination of horticulture, hunting, fishing and gathering—the latter of which takes place in both the "chacras" (orchards) and the "monte" (forest). Subsistence activities are combined with temporary employment in "colonias" (rural settlements devoted to the production of yerba mate, tea, tobacco and tung) and the selling of handicrafts. Some individuals receive government allowances, while others earn salaries from working as teaching assistants or sanitary agents. The money obtained from these activities allows the *Mbya* to purchase industrialized goods, such as clothing and shoes, as well as processed foods. These individuals no longer rely on the forest as their sole provider of

nourishment. Changes in the natural environment, a shift towards a more sedentary lifestyle, and a processed diet high in lipids and carbohydrates have altered *Mbya reko*, leading not only to changes in culture broadly construed, but also to the culture of the human body.



Figure 1: Provincia de Misiones ©Marta Crivos, et al.

Health Assistance in Mbya Communities

In both the *Ka'aguy Poty* and *Yvy Pyta* communities, a diversity of actors play roles in the provision of healthcare. Many conditions are routinely diagnosed and cured within the domestic environment by members of the sick person's immediate social network. The extent of the participation of these actors depends on their knowledge and previous experience in the treatment of each specific illness, as well as the general availability of the necessary therapeutic resources. Many of traditional healing resources are collected in the "monte" (forest); the gathering, compounding, and application of these resources requires not only a familiarity with natural medical resources, but also a wide range of experience with disease and healing. For this reason, elder members of the community play a central role in the healing of the sick. Furthermore, there exist in every community some individuals—generally elderly men and women—who are recognized as therapeutic experts, known in the *Mbya* language as *Karai* or *Kuña Karai* (men and women respectively). The term *Karai* is used to refer to prestigious people within a community who have displayed extensive knowledge not only of natural remedies (*poã*), but also of the prayers and other rituals associated with treatment of illness. Some of these *Karai* are called *poro poãno va'e*, an expression that generically refers to someone having the ability to cure "*con remedio de yuyo*", that is, by using vegetal therapeutic resources.¹¹ Some of these *Karai* are also recognized as religious leaders within the community, in which case they are called *Pai* or *Opyguã*. What is distinctive about the religious leader, and confers him/her with the distinction of *Pai* or *Opyguã* is the "call" or vocation he or she receives from the gods. Unlike other specialists, the *Opyguã's* performance goes beyond the therapeutic domain; due to their extraordinary powers, they are the only ones who can lead the ceremonies related to natural, annual, and human life cycles.¹²

In addition to local healers and traditional therapeutics, the *Mbya* also have access and frequently resort to the *Aristóbulo del Valle Sanitary Unit* (US:AV:), which includes medical, odontological and biochemical staff, as well as an admission service. The *Ka'aguy Poty* and *Yvy Pyta* can also obtain medical care at the *Jardín América Hospital* (40 km away), which provides a broader range of more advanced medical services. Other alternatives include the hospitals in *Oberá* and *Posadas*, both of which are

farther away from the settlements, 58 km and 147 respectively. Until 1998, there was a sanitary station in the *Ka'aguy Poty* community that provided both communities with medical attention. The staff there included a nurse, who consulted with patients presenting with routine problems, a sanitary agent (aboriginal) who was responsible for monitoring children's weight and height and distributing food supplies as provided by the Provincial Mother-child Plan. A doctor from the *Dirección de Asuntos Guaraníes* visits the communities to deliver primary health attention (PHA), but does not stay on a permanent basis. This is done with the help of a local sanitary agent who gathers the population at the local school building, consults with those who present with health conditions, performs routine clinical examinations, and measures and weighs children. The doctor on duty generally has the basic medicine (antibiotics, anti-feverals, anti-parasitics, and pain killers) necessary for the most common conditions, as well as food and supplements for those families who have under-weight children. Many members of the *Mbya* communities take the opportunity to consult with the doctor (either because of an illness or a routine check-up) when he is available.¹³ It should be emphasized that, although the *Mbya* mark in their speech a contrast between traditional (*Mbya*) medicine – or “natural medicine” as some people call it – and the *jurua* medicine (that of the white people), they use both types of medical resources in a complementary, combined or alternative way when facing concrete illnesses. Nevertheless, there are some ailments that are considered by the *Mbya* as belonging to them (“propios de los *Mbya*”), and can only be solved by appealing to traditional specialists or therapeutic resources, as they believe them to be beyond the purview of biomedicine.

Methodology

Our ethnographic research investigated *Mbya* perceptions and categorizations of disease, and strategies to recover health. We gathered data regarding the processes of health-illness processes through the application of techniques stemming from qualitative research. We conducted semi-structured interviews aimed at recognizing the most frequent illnesses affecting individuals of different sexes and ages. We also asked individuals about their beliefs regarding the origins and symptoms of their particular conditions, as well as the diagnosis, prevention and therapeutic practices:

associated with their conditions. Due to the local population's concern with parasitic infections in conjunction with the results of parasitological studies and the high number of consultations regarding parasites in health centers, we decided to focus our work on gastrointestinal illnesses¹⁴.

We closely studied cases of gastrointestinal disease by interviewing various adults who had personally experienced or participated in the events surrounding parasitic infection.¹⁵ Further work was done with adults and children on the graphic representations of the different kinds of parasites recognized by the *Mbya* population and their locations in the human body. This allowed us to gain information about *Mbyan* perceptions of the human body, the physiological processes associated with digestion and food metabolism, and the effects of gastrointestinal parasitic illnesses upon them. As a complement to interviews, we observed daily health care practices with the purpose of identifying activities oriented towards the prevention of illness as well as recording scenes that involved the gathering, preparation and administration of traditional therapies. Members of our team also accompanied adults (both experts and laypersons) on expeditions aimed at gathering natural substances used in the treatment of parasitoses; as part of our participation in these expeditions, we gathered samples for future examination.¹⁶

Motivated by the local people's concern about constant re-infection and chronicity of parasitoses, ten workshops and meetings were carried out between 1999 and 2008 with the purpose of promoting discourse between the population's perspectives, knowledge and practices regarding parasites and those of the medical staff in relation to the prevention and therapeutics of enteric parasitoses. Participants were the members of the interdisciplinary team of UNLP, doctors, nurses, sanitary agents, health agents, teachers and members of the *Mbya Guarani* population and those of the *Aristóbulo del Valle* locality. The methodology applied in successive workshops combined presentations done by experts, working in smaller groups, plenary debates, and the collection of soil samples and fecal samples from domestic animals for later laboratory examination. This process allowed the members of the community to become familiar with the tools and techniques used by microbiologists as well as the procedures for the diagnosis of parasitoses by trained medical personnel. Children attending the workshops participated mainly in the graphic representation of the places and risk behavior related to

parasitoses, parasite location in the human body and the images resulting from their observations in the microscope.¹⁷

During one of the first workshops in the *Ka'aguy Poty* community, conducted in 2000, some members of the *Yvy Pytã* community who were in attendance invited our team to a meeting where they presented their own perspectives about parasitoses. This workshop took place two days later in the community's school and was run by one of the members of the population, allowing for discussion and participation of the community as a whole as well as members of the UNLP team. The productive discussion that followed allowed us a window on *Mbya* knowledge about the body and parasites and granted us access to a set of traditional values and experiences regarding parasitoses. The result of these discussions was a refocusing of our ethnographic interviews and the incorporation of new factors into our characterization and assessment of the problems associated with *Mbyan* parasitoses.

Results

"We come with tachó": Parasites and the Digestive Process

"Acho" or *"tachó"* is the *Mbya* word for parasites in general. It is translated into Spanish as *lombrices, bichos o parásitos* (*worms, bugs or parasites*). According to the *Mbya*, *tachó* are normally located in the *"tripa"* (the guts), that is, inside the bowels, which are called *"gekue"* or *"tyekue"* in the vernacular language.¹⁸ There often seems to be a distinction between *"guachu kue"* and *"gekue guachu kue"* (the large intestine) and *"gekue poi"* (the small intestine). In this respect, *"py`a"* refers to the thoracic cavity and *"tye"* to the abdominal cavity (*tye*: abdomen) and the term also involves the stomach. That is, *"py`a"* and *"tye"* are usually used to refer to the cavities and also to the organs inside them. Therefore, the names of some illnesses are also derived from these names.¹⁹ Thus, *"tyerachy"* means "stomachache" and *"gerachy"* means "diarrhea". The suffix *-rachy* derives from *"mba`achy"*, an expression used by the *Mbya* to designate "illness"²⁰.

Parasites in the digestive tract are considered to be necessary for human life and their beneficial action is closely related to the way food is transformed.

In this sense, they are seen as a basic component of the normal physiological processes of digestion. This is how some of our informants express this fact:

“children already have tachó, we come with tachó... they are inside the person, come with you when you are born. Every child, since very little, has the 3 kinds of tachó.” (CR, 65-year-old man, opyguã, YP, 2000)²¹

“you have to have it, no matter what...it must die together,... together it has to die... (the person and the worm must die together). There you are, finished (dead) because you don't have any liquid, nothing...our parasite mother... that one is born with us...yes, it doesn't come out of the body, either, it comes with us, because we raise it since we are babies, little babies and we come with the parasite, “ñande racho”, that's the way we call it, ‘our parasite’, the mother... “ñande racho chy” ...if you don't have any parasites, if you eat a big one (piece of food),you won't chew,... the parasite is the one who chews.... It makes molinares (it crushes it), it is like the mom of this other one (parasite)”... (MG, 30-year-old man, YP, 2000).

There would be two kinds of parasites normally living in the digestive tract: *mba'e che vera*, (“the saliva's owner”), located in the throat, and *ñande racho chy* (“our parasite mother”), located in the gut (“*tripa*”). *Ñande racho chy* produces eggs that give rise to two other forms of parasite: *tacho ovy*, green parasites, and *tacho pytã*, red parasites. The latter ones, *tacho ovy*, and *tacho pytã*, are the ones which, under certain circumstances “become agitated” and alter their behavioral patterns. When this happens, the physiological balance of the gastrointestinal system is likewise altered, giving rise to different symptoms that the Mbya refer as characteristic of parasite illness. Although parasites are located in the digestive tract, some types migrate throughout the body and may travel to the heart, stomach, through the trachea, and to the mouth. In these cases, when the “bugs” appear outside the “*tripa*”, some informants express that this is another kind of illness, associated with some kind of intentional “damage” to which they give the name “*paye*”. These “bugs” are the material and tangible expression of the willful damage sent by another person. Unlike other types of worms, which are treated with vegetal therapeutic resources, the treatment of *paye* worms requires the intervention of traditional specialists and the implementation of religious rituals. In the words of one of our subjects:

“it isn't any kind of worm, there is a spiritual part, too ... it is not to be cured only with the yuyo or with... because payé is an evil spirit, there are some people who learn to do things to other people, they can directly kill another person, it is not

natural, it is sent (by another person) to do something like that ... doctors can do nothing; payé may be a worm, a spider, or any other bug that gets into your throat, into your heart ... a healer must take it out ... and bug eats only from your body ... sometimes it comes out of your nose, it gives you fever ... and it dies, and out went the payé, when it comes out it must be killed, must be put into the fire and burnt ... because if you don't, it gets into other people" (SP. 46-year-old woman KP, 2001)



Figure 2: Bodily representation and *tacho* location in the abdominal cavity © Anahí Sy



Figure 3: Children modeling a human figure in clay © Anahí Sy

Morphological criteria are central to the identification and classification of worms found in fecal matter. Using their own taxonomic system, the *Mbya* distinguish five types of *tacho* classified according to color and size, with each type being associated with different pathogenic causes and levels of morbidity. *Tacho ovy* and *tacho pytã* are the most common pathogenic parasites found in human feces, and are either yellowish-white (*tacho morotí*) or yellowish-orange (*tacho ju*) and very small, not often reaching two centimeters. These parasites are called “*tacho i*” because of their small size. Initially, a correspondence could be established between *Enterobius vermicularis* (oxiuros) and *tacho piriri* or *itachí*, and the two sexual forms of *Ascaris lumbricoides* as well as *tacho pytã* (male) and *tachó ovy* (female). All of these forms are macroscopic and easily observable by the *Mbya*. Along with these smaller worms, the *Mbya* have also identified a worm known as the *tacho guachu*, or “the solitary one,” whose special features are its length and its flat shape. The *tacho guachu* is known in scientific circles as the *Taenia saginata*, and is more commonly known as the beef tapeworm. For the *Mbya*, each worm, small or large, must be treated with different

therapeutic means according to its nature, size, and origin. According to our respondents:

“... there are several kinds of parasites. There is a remedy for each of them. One, the smallest one, is cured with *cangorosa*²². The biggest one- the one that clings to the gut- is cured with *ka'are*²³, which is stronger. There is also another *tachó*. There are three all together: the smallest is called *itachí*, the other one -that is bigger- is called *tachó sebo'i pytä*, it is reddish, the *itachí* is white. There is another *tachó*, *tachó morotí*, of a brown color, and it is cured with *parí paroba*.”²⁴ (CR, 65-year-old man, *opyguã*, YP, 2000)

“...worms, right? There are longer ones and thinner ones. There are some... green ones... *ovy*, that is green, and there are some that are redder... red is *pytä*. The one that stung him more is red and it is the most serious. There are green ones, there are bigger ones, smaller ones, thinner ones, there is a little bit of everything. There are only three. Because we have three kinds, the other is kind of orange, but much, much bigger. The ones that are bad are red, the one that is green, is not. The red ones are more dangerous”. (MG, 30-year-old man, YP, 2000).

[And the bug that falls, what is it like?] “It’s like this.” (She shows us the bug’s size with her fingers, approximately 5-6 cm.) [And what color is it?] “Some have a real yellow color, and the other one is orange, yes, two kinds there are, see ... they are different, one is big like this, and it falls.” [And that one, the bigger one, which one is it?] “It’s the orange one.) [What is that called?] “*Tacho*, *tacho ju*, yellow, *pyta* is this one, *pyta ... tacho pyta* and *tacho ju*.” [And they are together, both of them?] “Yes, two, or three, the bigger ones like this or the small ones like this.” [And how many fall?] “Well, just one.” (S.P, 46-year-old woman, *Ka'aguy Poty*, 2000)

“Well, yes, it had more or less two parts, yes.” (He cuts a branch and shows me) and a little more, like this ... yes, but when it was inside your belly it curled like this, like a ... like *mboi*, a snake” (RR., 27-year-old man, *Yvy Pytä*, 2003).

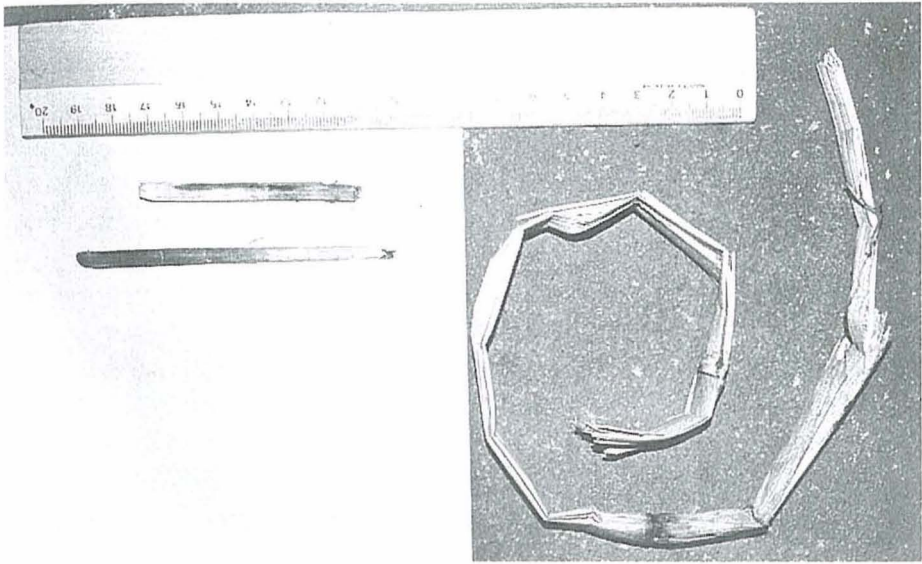


Figure 5. *Tacho guachu* or “solitary” © Anahí Sy

Being Ill: Main Symptoms of the Pathogenic Action of Parasites

Symptoms characteristic of parasitic infection are vomiting, green diarrhea (*okaa ovy*), stomach ache (*tyerasy*) pallor, loss of appetite, an increase in abdominal size, dryness of the eyeball, irritability, and disruption of sleep patterns. Diagnosis is made through observation of the individual’s behavior, identification of physical symptoms, and examination of the feces for abnormal color and consistency and for the presence of macroscopic organisms. According to the *Mbya*, the symptom most frequently cited in cases of parasitic infection—that of intense abdominal pain—is produced because the parasites “bite the guts” and “cling to the guts with their teeth” or they thrash about the digestive tract. According to one respondent, “Your belly hurts, because the parasite bites from inside [and the child] wants to eat candy, because the parasite likes sweet... they are heard inside the belly, it [the parasite] clings and it doesn’t let you eat” (E.V, 49-year-old man, Ka’aguy Poty, 1998).

From this we see that, in traditional *Mbya* culture, narratives have been created to explain the symptoms of parasitic infection and the behavior, including dietary cravings, of intestinal parasites. Children, for example, can be seen eating soil or sweet things because the parasite within it “*asks for that*”. That is, parasites are assigned human appetites and desires; they express their cravings or preferences for certain kinds of foods and their displeasure of other types of food—especially those that are considered taboo in *Mbya* culture. Because the worms “*are hungry*,” they will fight with each other “*inside the gut*” to eat up the food that the human ingests. One subject tells us that an infected child “*starts to eat things that are not normally eaten ... many times he/she eats earth too ... any kind of earth (s)he gets hold of, so mud, dust ... that’s because they say that’s what the body needs ... eh... vitamins or iron ... but it affects their body too ... the parasites take all that again, that is, it’s the parasites that ask for that, (s)he feels like eating earth, and (s)he starts to eat earth, and drinks water, it likes sugar a lot ... fruit, corn, everything that is sweet, and meat, it must be meat, if it isn’t meat (s)he doesn’t eat, ... if you prepare something like corn meal (s)he won’t eat ... doesn’t eat anything, starts to eat earth*” (F.R, 30-year-old man, Yvy Pytã, 2003). Another man says of the worms, “*They are calm inside the gut, but if the person does not eat, it is hungry, the tachó is also hungry, the tachó shouts inside the belly, it can be heard, it bites. That is why it is not good to be hungry. The tachó likes food—it likes meat, it likes “asado” (barbecued meat) even more..*” (MG, 30-year-old man, YP, 2000). Moreover, when a person, whether an adult or a child, “*has too many parasites*,” the opposite happens, that is, the desire to eat is replaced by a loss of appetite. The *Mbya* say that this person *hacho rema ndo karu che* (“*He doesn’t want to eat any more.*”) and, therefore, he loses weight and gets weaker: the person that “*...has a lot of parasite, doesn’t want to eat ... that’s why he is skinny*” (E.V., 49 year-old man, Ka’aguy Poty, 1998)

Etiology and Prevention of Parasite Illness: “Tradition” and Changes in *Mbya Reko*.

As mentioned above in our discussion of the various origins of parasites according to the *Mbya*, some of worms are present in the human from the moment of birth and are necessary for human survival. Others, however

“*are bred*” when the individual transgresses certain food prescriptions. Dietary transgressions can be intentional or accidental; this is especially evident in one *Mbya* man’s ideas about dietary restrictions and infants:

“... they (infants) may eat pig meat 15 days after birth, and they say they (the infants) get dizzy, or have a fit, because of parasites, that’s why it is forbidden ... the father can’t (eat pork) either,, that is, the baby can be attacked if the father eats and sometimes, well, gets diarrhea but there are things that only the *opyguã* know what it is, that only they can save the children...”

“... my dad says it comes from the mother’s way of eating ... when my dad asked what I had eaten excessively, we became aware it was pig’s meat ... when she (my mother) was pregnant we used to eat the meat a lot ... and no, that meat mustn’t be eaten... the baby already had it, was born with it ... when you are pregnant, any food you can’t eat ... it makes it (the parasite) breed (inside the body of the fetus) ...”

“Yes, it breathes, like this, inside, then the parasite is produced... If you cook *coati*, you hunt the *coati*, and this little baby doesn’t eat yet, then it comes in with the wind, and it gets in, and there the parasite produces... (it breeds because of) the smell of the foods, that’s the way it gets into the little ones, it comes to them, with the wind, and he breathes, the *coati*’s smell, you make the barbecue and it comes with the wind, it’s a smoke, let’s say, then you swallow it and it is produced...” (MGo. 30-year-old man, Yvy Pytã, 1999).

As evident from the statements above, the parasitoses in toddlers under the age of one can be attributed to three main causes: the consumption of the meat of “forest animals” by women during pregnancy; the exposure of children (who haven’t been “baptized”²⁵ yet and as such are uninitiated) to the smell given off by the cooking of “woodland animals” or the mixing food that should be eaten separately, both of which constitute “bad eating.” The probability for a little child to get parasites is closely related to taboo transgression during pregnancy and the first months of the child’s life, when the baby is considered to be “new” (*mita pyta*). During gestation, both parents must closely adhere to a set of restrictions centered on the food they consume. In this regard, forest animals, especially the *coati* and *kure* (wild pig) are considered to be the most dangerous of foods for the infant. One informant told us about two of his children who have had parasites since they were born; according to him, they are infected because his wife ate *kure* while she was pregnant and, although she was not affected, this type of “*meat makes the worm breed, ...makes it grow inside the little one*”.

Although the children were currently being breastfed, “(s)he (one infant) was skinny, because (s)he also vomited and threw up the milk, (s)he was pale” (F.R., 30-year-old man, Yvy Pytã, 2003).

Just as infants are not to consume the flesh of wild animals before they are baptized, so too are they not to inhale the aroma of wild meat as it is being grilled. Thus the second cause of parasitic infection in toddlers, like the first cause, is related to the transgression of dietary and cultural taboos. Although the wind is described as the agent enabling the “activation” and growth of parasites that exist “naturally” within the infant’s body from its formation in utero, it is nevertheless the parents’ responsibility to protect the child from exposure to the smell of grilling meat and the possible parasitic infection that may result. The role of the parent in protecting the child is also evident in the third cause of infection: inappropriate food choices and regimen. Feeding a child forbidden food that is too “heavy”²⁶ for his/her age, as well as stopping breastfeeding and simultaneously giving different types and flavors of foods potentially “activates” latent parasites within the human body and triggers symptoms of parasitic illness. The *Mbya* generally argue that “*tachó* is easily solved;” however, if a child has a great number of parasites or if the parasitic infection is allowed to proliferate over a long period of time, the child’s condition may worsen. In these cases, children become “weak”, “not lively,” “don’t want to grow,” and “they get fits, dizziness; they may faint, they fall.” That is, these children become vulnerable to other illnesses and suffer from weight loss and delay in their growth.

To sum up, there exist certain food taboos, established by “the ancients” (the *Mbya* ancestors), that regulate the consumption of some kinds of food considered to be harmful; the disregard of these taboos produces parasites that can damage health and cause death. The pathogenic action of the *tachó* is stimulated not only by the breaking of taboos, however, but also by the consumption of industrially processed sweets:

[You had also told me that your daughter had *tachó*?] “Yes, *tachó*, parasite, that was last week, she had, parasites.” [And how did you notice that she was ill?] “Because she cried, she almost didn’t stop ... we immediately knew it was that. [And why does that get to children?] “Well, I myself don’t know how this parasite comes, how it does to come, because I sometimes bring a little sweet cake and we give her, that’s how it comes”. [And the parasite is already in the body, or does it come in?] “No, it’s inside. When we are born, when one is born, it’s already there...” (B.D., 28-year-old man, Ka’aguy Poty, 2003)

Beyond the breaking of dietary taboos established through *Mbya reko* and the consumption of processed sweets, different types of parasites may also enter into the human body from the environment, particularly the water and the soil. The *Mbya* are aware of these problems as well.

[Do children and adults have it as well?] “Yes, they do, everybody ... when they start to walk they already have ... and children too ... they stand up, like this, they walk and drink water.” [And before they walk, they don’t drink water?] “No, water is not drunk yet, we don’t give them, they have milk, they drink milk, ... milk; when they drink milk they don’t have tachó... because they have water, with the water only it comes, sometimes they take it raw, like this, or first ... that kind, runoff water, as it is from a stream it shouldn’t be drunk, but we sometimes drink it, just like that, runoff, from the stream, ... an there they are, already.” (S.P, 46-year-old woman, Ka’aguy Poty, 2000)

“... there, in the (water) well is where they get everything, the children get ill, that well is too dirty ...” (A.R, 28-year-old woman, Yvy Pytã, 2003).

The problem of parasitic infection through water arises mainly in children who are weaned from breast milk; they start to walk and drink water (from the stream or runoff). The *Mbya* are advised to boil water before it is used, and are warned not to drink it “raw”. Parasites that enter the body through drinking water are considered to be pathogenic, unlike those which “are born” with the individual.

From the results of our research, the main approaches to the prevention of parasitoses in the *Mbya* communities include:

1. Keeping infants on breast milk for as long as possible
2. Observing *Mbya* dietary restrictions that date back to the times of the “ancients.”
3. Avoiding “heavy” foods, primarily of industrial origin, like sweets.
4. Boiling runoff or stream water before use or consumption.

The theory that parasite infection can be caused by contaminated water reflects the influence of modern biomedicine on traditional *Mbya* culture. Accounts provided by the *Mbya* show a correlation between this shift in *Mbyan* perceptions of the causes of parasites and the information coming

from health programs and from the activities of sanitary agents, who are trained in the scientific method, and who assert that the causes of intestinal parasitoses are contaminated soil, water, and food—all of which are external to the human body and odds with the traditional *tachó* of *Mbyan* culture.²⁷ In this sense, sanitary agents, who are a nexus between traditional and biomedical cultures, have a central role as intermediaries in the population's gradual access to scientific knowledge and practices. As an example, let us examine the following statement:

“...because I think that's true, ... because there is my little daughter, who has parasites, and my wife said that is because I ate coatí's and pig's meat too soon, and that's really true, because it has been proved, you see. For me it is, and I know something about cleanliness too.” (AD, 34-year-old man, Aboriginal Sanitary Agent, 1999)

This informant acknowledges the need for parents to respect food related taboos that have to be observed while the child is “new” (*mitã pyta*), and reinforces their validity (“that has been proved”) while at the same time incorporates another factor—lack of hygiene—which is prioritized by the biomedical sector as the main cause of enteroparasitosis.

Final Considerations

We have so far developed the most outstanding aspects of *Mbya* practices and representations about parasites and parasitoses, mainly stressing native considerations about the causes of the pathogenic activity of “worms,” mainly food taboo transgression. We also stated that this kind of explanation is strongly anchored in ancient, ancestor-transmitted “tradition,” which focuses on harmonic relationships between human beings and other organisms in their environment.²⁸ Our research has also revealed the recent incorporation of modern biomedical explanations for parasitoses and the health risks they entail into traditional *Mbya* culture, a phenomenon that can be attributed to ever-increasing interactions between public health agents and physicians—as well as the modern health systems they represent—and the *Mbya* people themselves.

Analysis of *Mbya* conceptions about the relationship of taboo infringement and sickness highlights the value ascribed by *Mbya reko* to the

harmonic relationships between human beings and the environment—as well as the continuity of ancestral practices as a guarantee of balance. The infringement of the various taboos that regulate the interactions between entities, such as worms and their hosts, appear as one of the main causes for the illness. Representations of parasitic illness and its consequences reflect an ecological approach to viewing human health—an approach that depends on maintaining a balance between different types of organisms. In this sense, the conceptualization of illness as a “time dis-adjustment to the environment” proposed by Jacques May²⁹ corresponds to the *Mbya* perspective about the appearance of the parasitical illness. From this relational perspective, the appearance of illness serves as a signal to an imbalance in the environment that is reflected in the body—one that can alert researchers and public health officials to what has to be done to repair the imbalance.³⁰ As Young (1976) points out, medical beliefs and practices have not only a practical or instrumental value but also a symbolic one that can communicate and reinforce concepts about the human body and the greater macrocosm of which it is a part.³¹ *Mbya* representations of parasitoses, therefore, provide us a path into traditional conceptions about the individual person, his or her social relationships, and the various interactions between the human and non-human entities in the primary *Mbya* environment: the Paranense Forest.

Dis-adjustments between the *Mbya* and their environment can be attributed to sedentary modalities in intensely exploited spaces, a decrease in traditional horticultural practices, the scarcity of wild animal resources, and the replacement of traditional food sources with those of industrial origin. All of these are contributing factors to the increased vulnerability of the *Mbya* population to intestinal parasitoses. *Mbyan* perceptions of biological and ecological changes agree with the findings of scientific research. Modern scientific studies have shown that in numerous South American indigenous communities, changes in the ecosystem, in traditional subsistence strategies and in dietary regimen are the main factors for the virulence and chronicity of intestinal parasitoses—particularly when combined with nutritional deficiency, an endemic problem in many of these traditional cultural groups. Numerous studies that focus on the co-evolution of parasites and their hosts point out that South American aboriginal populations show unique physical health and illness patterns, suggesting a high degree of human adaptation to parasitoses.³² This research indicates the presence of

high antibody levels in these populations, due to their exposure to numerous infectious agents, including intestinal parasitoses, protozoa, and bacteria.³³ Nevertheless, gradual changes in the traditional indigenous culture can have a negative influence on parasite-host relationships, increasingly making the presence of parasites dangerous to the body.³⁴ On the basis of these results, our researchers are now focusing on the impact of cultural change among indigenous populations with the intent of evaluating the relationships between rates and type of parasitic infection and shifts in settlement patterns, changes in diet, stress levels, and increased contact with modern cultures. We are also considering the influence of modern biomedicine, the extensive use of antihelmintics, as well as environmental modifications which supposedly influence parasite-host relationships, causing a higher susceptibility to infection.³⁵

The *Mbya* perspective on parasitoses has some points in contact with the perspective proposed by population ecology, which argues for a complex and multi-valent consideration of the conditions that make parasitoses possible. The *Mbya* ultimately rely on their belief systems to interpret and manage intestinal parasitoses. These views contrast sharply with those from classical epidemiological studies, which focus on broad identification of the issues and an "*a priori*" definition of over-generalized "risk factors" without considering the historical depth of the relationships existing between indigenous populations and their complex ecological environments or the unique experiences and factors relevant to each individual's daily life.³⁶ Such broad-based approaches as those espoused by classical epidemiology do not allow for hypotheses that consider the interaction of cultural and environmental factors in illness distribution in different groups within the same population.³⁷ We argue that the relationships between ecological, genetic, cultural, sanitary and economic factors that affect a particular population's health should be considered in greater depth, an approach that is by its very nature interdisciplinary and systemic.

Finally, some considerations about our interdisciplinary work experience with the *Mbya* population. Working with parasitologists and biological anthropologists allowed us to identify both shared and exclusive aspects in scientific vs. local explanations about the identification and categorization of parasites and the environmental conditions which make parasite development possible. The way parasitoses are perceived was explored in workshops where members of the indigenous population, scientists and sanitary staff

participated. Discussions about varying perspectives allowed for the identification of different recognition thresholds of the impact of parasitoses on human health. Moreover, the contributions of ethnobotanists regarding alternative treatments and prevention strategies led to a positive appraisal of traditional knowledge and handling of natural resources. Intercultural exchanges favored by the ethnographic approach opened a pathway for the positive exchange of ideas between biomedicine and traditional groups. From the first perspective, parasitologists and health staff acknowledge the *Mbya* community's limited knowledge of parasites and their environmental causes—an information gap that has allowed environmental “risk factors” to proliferate. As a prevention strategy, modern scientists argue that the environment must be regulated and that the *Mbya* must change many of their traditional habits in order to avoid parasitic transmission and infection. The *Mbya* people, on the other hand, claim that parasitic infection has nothing to do with these issues, but instead with the breaking of dietary taboos. In this sense, they emphasize the need for respecting traditional guidelines which, ultimately, will prevent parasites from becoming pathogenic. Consequently, both sectors diverge on their opinions about prevention. Native sanitary agents, as members of both the biomedical and traditional *Mbya* worlds, integrate both explanations into their view of parasitic infection and prevention.

Most workshop participants, including local people and sanitary-medical staff, at first believed that parasites were not an issue of great concern, that worms were not only tolerated, but a normal part of the human life-cycle. Through the workshops hosted by our group, the *Mbya* population was educated about the biological aspects of parasitic infection and reproduction and their consequences for the human host. From this point forward, while we were performing fieldwork we began to notice a greater concern on the part of the *Mbya* population about lack of hygiene and parasitic illness. Local sanitary medical staff, in turn, became more receptive to *Mbyan* perspectives on parasites, allowing them to find medical approaches to parasitic control that would mesh more closely with *Mbya reko*. Taking into account the impact of parasitic pathologies on the overall health of the region, it seems relevant to us that the workshops, through dialogue, allowed for discourse between two divergent communities and widened the each sector's knowledge about parasites and associated illnesses.

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14. We included in this category those illnesses that were recognized and diagnosed by the local population whose symptoms correspond to the pathologies classified by biomedicine under this name.
15. Anahí Sy, *Estrategias frente a la enfermedad en dos comunidades Mbya Guaraní (Ka'aguy Poty e Yvy Pytã, Provincia de Misiones). Aporte del estudio de casos a la investigación Etnográfica de los procesos de Salud-enfermedad*. (Tesis de Doctorado). Facultad de Ciencias Naturales y Museo. Universidad Nacional de La Plata, 25 de abril de 2008.
16. Crivos et al., "Ethnobiology of the parasitoses," 2002; Crivos, Marta, M. Rosa Martínez, Graciela Navone, M. Lelia Pochettino, Patricia M. Arenas, Carolina Remorini, Anahí Sy, Laura Teves, M.Inés Gamboa y Lorena Zonta, "Puesta en común de saberes y prácticas sobre las enteroparasitosis (Valle del Cuña Piru, Misiones)," Equipo de

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 19. *Ibid.*
 20. This expression's meaning comes from mba'e (thing, entity; what causes pain) and achy (imperfect, pain) (Cadogan, 1992: 103).
 21. Informants' names are only given by their initials to preserve their anonymity.
 22. *Maytenus ilicifolia* Mart. ex Reissek (Celastraceae)
 23. *Chenopodium ambrosioides* L. (Chenopodiaceae)
 24. *Piper mikanianum* (Kunth,.) Steud (Piperaceae)
 25. By baptism we mean the ceremony of giving the child a sacred name (Ñemongarai). It is made once the child acquires two skills: talking and walking straight. For the Mbya, the soul is identified by the name, and the ability to speak constitutes the subject's vital principle and it will accompany him to his/her death. The importance of this ceremony in relation with the vital cycle is shown in the fact that only after it is the child recognized as a full member of the teko'a (the community). See Remorini *Aporte a la caracterización etnográfica de los procesos de salud-enfermedad en las primeras etapas del ciclo vital, en comunidades mbya-guaraní de Misiones, República Argentina*. -1a ed. – (Tesis de Doctorado). 11 de abril de 2008. La Plata: Universidad Nacional de La Plata. Available in: www.unlp.edu.ar/editorial.
 26. Based on their effect on the body, food is classified as "heavy" or "light". This is not a fixed classification, since there are some kinds of food that are considered to be "heavy" only if they are consumed when the body is vulnerable, for example during the transition between different stages of the life cycle (baptism, first menstruation, puerperium) or when the individual is ill. For example, while children over one year of age who have been baptized are allowed to eat meat, mix some kinds of food and/or eat "heavy" food on some occasions, the Mbya perception of vulnerability of children who have not gone through this ritual justifies their stressing on unweaned babies protection against the multiple risks related with feeding. "Light" food is generally vegetable in origin, while "heavy" food is that of animal origin and /or coming from the "juria" (white people). Among the later are those kinds of food belonging to the Mbya, when they are consumed in wrong instances, and also industrialized food (Remorini, 2009).
 27. Crivos, et. al., "Ethnobiology of the parasitoses," 2002; Sy, *Estrategias*, 2008.
 28. Mbya reko is characterized by the harmonic relationship between the natural and supernatural orders. This is based in the observance of the principles stated by Ñamandu Ru Ete (Our Father, the Sun) at the beginning of times. In contemporary Mbya's speech there is always a reference to ideal rules of life, established in times of "the ancients", which is idealized in their accounts as those times when there were not so many illnesses, when one could "live peacefully" as there were better lands for cultivating, which made reciprocity possible as production could be shared. Imbalance is expressed in their

- present accounts by making reference to several factors like having lost the forest, the scarcity of land, social tension and conflicts, worsening and/or appearance of new illnesses, among others of which they blame on the contact with the white people. Therefore, the changes in the way of living of “the new ones” (younger generations) as opposed to “the ancient ones” (elderly people, their ancestors) would account for the higher prevalence of illnesses in these communities.
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