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Notes on an Expedition to the Headwaters of the

Maú (Ireng) River, Roraima, Brazil

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Abstract

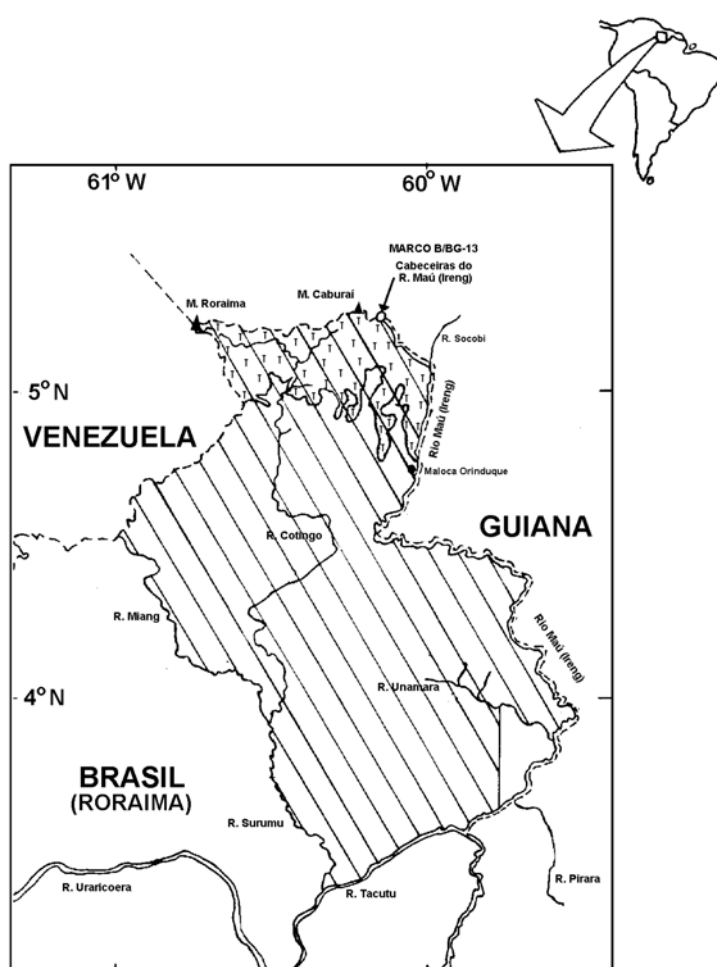
Between the 21st and 28th of January 1996, we undertook a scientific expedition to the headwaters of the Maú (or Ireng) River, which marks the natural frontier between Brazil and Guyana in the north of South America. Our aim was to observe physical geography, human populations, climate, soils, fauna and flora, checking informations and collecting biological material from this Amazon frontier region which embraces a overlap between the Monte Roraima National Park and Raposa/Serra do Sol Indian Land, in the State of Roraima, Brazil. The accumulation of information, can offer a basis for future scientific activities, in preservation/conservation in this part of the Amazonia.

The Area Under Study

The Maú/Ireng River basin drains a great part of the frontier between Brazil and Guyana (FIGURE 1). Its main tributaries are the Uialan and Canã rivers on the Brazilian side and the Cacó, Dacã and Socobi rivers on the Guyanese side. All of these drain into the upper and middle reaches of the Maú and flow over very ancient terrain formed by tectonic structures and protozoic sedimentary rocks belonging to the Roraima Supergroup (Guyana Shield). The waters of the Maú have a dark coloration which reminds one of the Rio Negro near Manaus, in the State of Amazonas (Brazil). In the region under observation, the river runs through valleys between mountain ranges which vary in altitude from 600 to 1,200 meters.




The starting point for our expedition was the Indian Village of Orinduik (04°45'31"N and 60°01'59"W). Inhabited by Macuxi Indians, it is situated on the banks of the river within the indigenous area Raposa/Serra do Sol which is at present being delimited. This spot is near the Orinduik Falls (altitude 580 m) which we considered as marking the beginning of the upper course of the Maú. From here on it was necessary to go upstream by boat for a day and a half passing over 18 rapids. This stage ended at the frontier mark Brazil-5 (B-5: 05°04'11"N and 59°58'47"W), at the confluence of the Maú and the Socobi at an altitude of about 650 meters. The B-5 mark is near the Cachoeira do Grande Caracol or Great Snail Falls (Kurutuwu Mehru), a waterfall in two

stages with a total drop of about 100 meters. From here on it was two days' walk through dense mountain forest as far as the frontier mark Brazil/Guyana 13 (B/BG-13: 05°14'30"N and 60°07'31"W) in the Pacaraima Range near the northernmost point of the Uialan Mountain, at an altitude of 1,120 meters. This mark is the third most northerly geographical mark in Brazil and identifies the source of the Maú/Ireng. It is about 10 km from Mount Caburá, Brazil's northernmost point.



FONTE: BRASIL (1975); CIR (1993); IBGE (1995) e obs. pessoal.

FIGURA 1 - Região da Bacia do Rio Maú (Ireng); fronteira Brasil/Guiana.

-  Área Indígena Raposa/Serra do Sol
-  Limite Internacional
-  Parque Nacional do Monte Roraima (Floresta Densa Montana)

Historical Background

Up until the beginning of the 20th century, the whole of the Maú Basin was the subject of an ancient territorial dispute between Brazil and England in the form of its colony British Guiana (BARBOSA, 1994:132 and FARAGE, 1991:16).

The great expansionist projects of the older European powers and difficult access to the region resulted in constant alteration of the international boundaries in accordance with alterations in European historical and political scenarios. This background resulted in two distinct moments for excursions producing information on the Maú River. In the first of them, the incursions aimed at producing descriptions of the physical geography of the area so as to provide a basis for the definition of land tenure and limits. Thus, up until the 1930s, the expeditions were formed from a hotchpotch of explorers, naturalists and boundary commissions. In the second moment, with the frontiers having finally been delimited, particular attention was paid to economic aspects of the geology of the area as a consequence of the discovery of large mineral deposits nearby. In this phase, aerial and satellite surveys were of outstanding importance. In neither of these two phases could we detect evidence of any collecting of biological material in the region of the Maú's headwaters.

Given the above mentioned parameters, we understand that the first people to travel on the Maú, were the Dutch around the end of the 19th century and the beginning of the 18th. Their interest was in commerce and it is probable that the routes that they used were: a) Rupununi/Tacutú or b) Rupununi/Pirara/Maú/Tacutú, both involving the lower reaches of the Maú. Although there has been speculation about earlier journeys, the only firmly credited one is of Nicholas Horstman, a Dutch explorer specializing in mineralogy. The information he produced enabled Charles de La Condamine to organize one of the best maps of the time of the hinterlands of the Americas (BANCROFT, 1769:14-15; HEMMING, 1990:305).

However, the first expedition to the Maú for which we have historical records was one carried out by Ricardo Serra and Antonio Pontes in 1781. They were emissaries of the Portuguese Court to the region trying to examine what type of communication existed with Surinam, at that time a dutch colony which bordered on the Portuguese

Domains (SERRA & PONTES, 1781:86). They went up the Maú as far as Cachoeira do Papagaio or Parrot Falls (Urue Buru or Urue Mehru), a little above 4°N, near the limit between the middle and lower courses of the river. In 1786, the Brazilian naturalist Alexandre Rodrigues Ferreira arrived at the mouth of the river and went up as far as Pirara Creek (lower Maú). Ferreira's aim was to report on the situation on the frontiers with colonies of other European powers (England and Holland) and to appraise the economic potential of the Rio Branco basin (AMOROSO & FARAGE, 1994:75). In 1787, Colonel Manuel da Gama Lobo D'Almada described the valley of the Rio Branco and touched briefly on the lower Maú region (D'ALMADA, 1787:629). In 1798, the standard bearer Francisco Barata, Portuguese emissary to Surinam, commented on the connection between the Maú and Rupununi basins by way of the Pirara Creek (BARATA, 1798:27) reaching the same conclusion that Serra & Pontes and D'Almada had come to some years before. In 1838 and 1839, Robert Schomburgk, a German in the service of the British Crown, detailed geographical and botanical aspects of the lower Maú around the mouth of the Pirara Creek and of the Unamara Creek, this last being near the town of Normandia in the State of Roraima today (SCHOMBURGK, 1840:196). Koch-Grünberg made ethnological studies near the confluence of the Maú and the Tacutú in 1911 (VGB, 1943). In 1915, an English couple, the Clementis, interested in getting to Mount Roraima, left Georgetown, reached the Potaro River and crossed the middle course of the Maú near Maturuca Mountain (CLEMENTI, 1916:462). They made no relevant observations.

In conclusion, we must acknowledge that the Frontier Inspection Committee led by General Rondon, in its 1927/28 campaign, was the first to explore on foot the whole length of the Maú (from the mouth to the source). This was carried out by a team led by Lieutenant Tales Facó, which reached the headwaters and travelled the whole of the northern boundary until they met up with Rondon on Mount Roraima (VIVEIROS, 1957). During this same period, G.H.H. Tate of the American Museum of Natural History, made his way back from Mount Roraima to British Guiana through the upper valley of the Maú (TATE, 1930). The Mixed Boundary Commission Brazil/British Guiana which undertook the setting up of the pillars that mark the frontier (1932/33), travelled the same route as Facó. Years before, the English explorer Anderson had erroneously identified the

source of the Maú to the east of the present marks (AGUIAR, 1940:224).

From that time on, even though some refer specifically to the Maú Basin, most records are characterized by the global treatment given to geological aspects of the entire frontier region. A great part of the recorded information is to be found in short articles, principally in the annals of the Brazilian Congress on Geology, the Inter-Guianas Geological Conference and the Guiana Geological Conference. As regards this phase, we would call attention to the following Brazilian papers: a) Projeto RADAMBRASIL (BRASIL, 1975) which examined several profiles throughout the Roraima region including the head of the Maú and b) Programa de Levantamentos Básicos do Brasil (DNPM, 1990). This last promoted a survey entitled "Projeto Caburaí" whose eventual aim was to form conclusions about economic aspects of the geology of the whole of the northern region of Roraima to which the Maú also belongs.

People

The indigenous ethnic groups that inhabit the upper course of the Maú/Ireng belong to the Carib linguistic trunk. They are to be found in three villages. The first, Orinduik, is situated on the Brazilian side and inhabited by Macuxi Indians (FIGURE 2). We estimate a population of around 30 individuals occupying a little over 20 dwellings in a highland savanna (550 to 650 meters). Part of the population is itinerant and participates in the life of other indigenous villages. The houses are made of the trunks of saplings plastered with a mixture of clay and sand. Most of them are thatched with palm leaves Mauritia flexuosa L. (Moriche palm). The main activity is subsistence farming carried out on forested hillsides or in the small patches of gallery forest that accompany the Maú. The community makes use of game and fish as alternative sources of animal protein. The religion practiced is strongly influenced by the Catholic Church but still retains traces of original cultural rites.



Figure 2 – Orinduik - Macuxi Indian Village.

A little above Orinduik and as far as the boundary mark B-5, the banks are inhabited by small groups of Patamona Indians belonging to the villages of Waipa and Kaibarapai (or Canauapai). The center of these villages are on the Guyana side, set among low forested mountains (600 to 900 meters). The economy of the two villages is based on subsistence farming carried out in clearings along the river's edge and in dry-land (or terra-firme) areas nearer to the village. As a complementary source of animal protein, game seems to be more important than fish due to the small quantity of fish to be found in the Maú. Waipa is Catholic and is situated about three hours north of the Macuxi in Orinduik. They have a state-run educational system and most of the houses are made of boards produced by the community itself. Kaibarapai is five hours upstream from Waipa and is very similar to its neighbors as far as survival strategy is concerned. However, their religious practices are classified as "Halleluiah", a spiritualist sect that mixes English Protestantism with indigenous ritual (ANDRELLO, 1993:106-112). IM THURN (1885) identified this religious manifestation among Macuxi and Patamona Indians on the Potaro and Mazaruni rivers (British Guiana) north of the head of the Maú, in 1884. Lieutenant Facó recorded the existence of this ritual among the Maú's

inhabitants in 1927/28 (ANDRELLO, 1993:107).

In 1988, this region was the subject of study of an interministerial work group set up by the Brazilian Government. The aim of this group was to define the Raposa/Serra do Sol Indigenous Area. On this occasion, the Kaibarapai village was recorded as being established on the Brazilian side and composed of about 50 individuals. This number agrees with that registered by RICARDO (1995:42) as the population of Patamona in Roraima. According to the same source, there are about 5,500 individuals in Guyana. The Indians told us that the village center was transferred to the Guyanese side in 1989 and that the number of people living on the Brazilian side continues to be about the same. The Tuchaua (chief) himself, leader of this village, lives on the Brazilian side. Difficulty of access and transport continues to keep them relatively isolated from other social groups.

The Environment

In the stretch that was visited, there are several falls. However, the only one that can really be considered as a true waterfall is the Grande Caracol Falls (Great Snail Falls). The others are typically strong rapids formed by alterations in the level of the land. When the water level is low, it is possible to identify a kind of rosy sandstone very difficult to break manually. This is a notable feature of the Maú as far as a few kilometers above the Grande Caracol Falls from whence, up as far as the headwaters, the stony bed of the river is covered by a thick layer of settled sand. According to the DNPM (1990:32), this subregion of the Roraima Super-group is classified as the Uailan Formation and the terrain is chiefly rock.

The vegetation in the proximity of Orinduik and going towards the upper Maú, is a transition between savanna and dense mountain forest. The savanna or lavrado as it is called locally, is a continuation of the Surumu Volcanic Formation which stretches along an east-west line separating the Boa Vista Formation (low-lying savanna) from the Roraima Super-group. It is characterized as occupying very uneven terrain with several quartz and laterite incrustations and colonized by arboreal species such as the sandpaper tree (Curatela americana L.) and the mirixi (Byrsonima crassifolia L.)

Kunth.). It is also colonized by creeping species like Bulbostyles spp (Cyperaceae) and the grasses Andropogon spp and Trachypogon spp. The latter occupy most of the extent of the savanna. Another notable aspect is the constant presence of fire in the vegetation. Fire is a cultural tradition of the local Indians who believe that it is a technique which improves the pasture for the cattle herds and chases off noxious animals.

The forest becomes continuous about 10 km upstream from Orinduik, a little before the village of Waipa. From this point, passing through Kaibarapai village and as far the Grande Caracol Falls, the forest reminds one of those to be found in igapós. However, the water level marks to be seen on the trees suggest rapid flooding and not the accumulation of water for months on end. In this stretch, leaving out the area subject to flooding, the dominant forest type can be described as a sub-type of dense mountain forest with altitudes of 600-900 meters. Arboreal species of the families Lecithydaceae (Courupita guianensis Aubl.), Sapotaceae (Pouteria sp) and Vochysiaceae (Vochysia sp and Qualea sp) are common in this region of the river and reach heights of 25-30 meters. Legume species are also of frequent occurrence in this area.

Once beyond the Grande Caracol Falls, the landscape of the river basin is one of a chain of high profiles covered by continuous forest right up to the headwaters. In this stretch, the main species observed was Micandra sp (Euphorbiaceae), visibly dominant in the forest. Other common species were Clusia grandiflora Splitz. (Clusiaceae), Qualea sp (Vochysiaceae), Pouteria sp (Sapotaceae), and Heterostemon sp (Caesalpinaceae). In the undergrowth the main species observed were Psychotria poeppigiana (Rubiaceae) and Syphocampylus sp (Campanulaceae). Another specie of Psychotria with yellow-colored flowers was also widely distributed. Similarly, Araceae and Bromeliaceae were much in evidence in the undergrowth.

Above the Grande Caracol Falls, the soil is predominantly formed by a mosaic of patches of sandstone and podzols (quartz sands). Being extremely porous, it forces the roots of the plants themselves to be responsible for the rapid recycling of nutrients within this system. They carry out the mechanical fragmentation and direct absorption of organic material deposited on the ground. The roots form a great matwork over the soil

and for most of their length are serial and tabular. The exception to this pattern is to be found near the falls in the vicinity of the headwaters, where a mosaic of rocky outcrops and yellow podzols can be seen.

The dark waters of the Maú hydrographic system show great similarity to those of the drainage system of the upper Rio Negro. Both spring from very ancient geological formations and drain soils that are very porous and covered by forest. This characteristic together with the frequency and intensity of rainfall, causes part of the organic material not yet totally decomposed (humic and fulvic acids) to run out of the fluvial micro-systems and into the more voluminous river courses making their waters take on a dark colour.

We did not make meteorological records but throughout almost the whole period of the excursion, the rain was incessant especially as we neared the headwaters. The inhabitants of the forest region told us that the weather is normally humid but that there is a dry phase between December and March. The period of heaviest rainfall is between May and July. As far as we could find out, in the savannah region (Orinduik) the months that mark the peaks of the rainy and dry seasons are similar to those of the forest zone. The difference lies in the total annual rainfall. The only meteorological records we found were those of the Mixed Boundary Commission for the year 1932 (AGUIAR, op.cit.:231). Its notes were as follows : a) Forest Zone - Hot humid climate with temperatures varying between 17°C and 25°C during the day and between 11°C and 17°C during the night; b) Savannah Region - Hot dry climate during the day with temperatures varying between 20°C and 28°C and cool at night due to the strong winds which make the temperature fall to between 14°C and 20°C.

Fauna

The ANNEX shows some of the groups of animals observed and/or collected in the upper Maú region. As we were not making a systematic survey of any specific group of regional fauna, the idea was to include the greatest possible number of specimens within the limits of time and transport we had determined for the trip. Reptiles and amphibians formed the largest group collected with 23 specimens (8 species). The

former proved to be representative as regards species diversity and density. Special attention was dedicated to the collecting of two species of Dendrobatidae (Atelopus sp). These anura are of great scientific interest due to the alkaloids they have in their skin.

We were unable to observe any lizards in the forest areas. However, in the open country near Orinduik, it was possible to collect a specimen of Hemidactylus palaichthus and to observe Tropidurus hispidus and Cnemidophorus lemniscatus. Snakes were also found infrequently. Only two specimens of Bothrops sp (jararaca) in the forest region above the Grande Caracol Falls were found. Among the Chelonia, we found only one aquatic form (cf. Podocnemis sp) between Orinduik and Socobi. The ichthyofauna is very poor. There are only five or six species in the whole of the upper Maú. We managed to identify a type of electric eel (Gymnotus caropo) and observed a Mandí (Pimelodidae) and also a Jijú or Yarrow (Characidae). All three form part of the local indigenous diet (personal observation).

The number of birds seen was certainly laughable when compared to the region's apparent potential. Apart from the constant rain which kept many birds away, the lack of a bird specialist in the group hindered better identification. We were only able to describe 18 species with certainty and these chiefly along the course of the river. Others were considered dubious. As for large mammals, we collected five parts of skulls (3 species) in Indians' homes on the edge of the Maú all of which have been deposited in the INPA collection. Apart from these examples, we correlated information on other mammals given by the inhabitants of the region.

The entomofauna of the forest region was represented mainly by: a) ant species - Camponotus gr. abdominalis (solitary), Odentomachus gr. hastatus (solitary) and Eciton depanophorum (army ants); b) arboreal termites - Nasutitermes cf. corniger and c) beetles - Nilio sp (Erotylidae) and Agra sp (Carabidae). That of the transition region (savannah/forest) was represented mainly by: a) flies - Simulium sp (pium or kaboura fly); b) soil termites - Syntermes sp and Nasutitermes spp and c) ants - Atta spp. The flea Sarcopsyla penetrans (bicho-de-pé or chigger flea) and diptera of the Lutzomuia genus (leishmania) were observed in both systems.

Fauna material collected was deposited in the Instituto Nacional de Pesquisas da Amazônia - INPA (National Institute for Research on the Amazon) in Manaus

(herpetofauna, fish, insects and mammals), Museu Integrado de Roraima (Integrated Museum of Roraima) in Boa Vista (herpetofauna) and Museu de Zoologia of the University of São Paulo, Sao Paulo (herpetofauna).

Final Consideration

The headwater of the Maú/Ireng River is part of a Amazon region still extremely unknown because difficulty of access at that area. Description of the indians activities plus survey of landscape potentialities should permit a better understanding of the relationships between environment and man. In order, it help to shorten the way of a quick decision-made on property and land use of that region in Brazilian side, in a effort of avoid conflicts.

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The Macuxi Indians from Orinduik village and the Patamona from Waipa and Kaibarapai received us and permitted our stayed in their land. C. Morato and G. Moreira (herpetofauna), I. P. Miranda and M. T. Campos (botanic), S. Wilson (birds), A. Harada (ants), C. Martius (termites), J. Alves-Gomes (gymnotiformes), M. Silva (mammals) and M. Graça (beetles), all working at INPA/Manaus, helped in the identification of the material collected.

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ANNEX

Groups of fauna identified in the Maú's headwaters region, Roraima, Brazil

a) *Herpetofauna*

a.1) Lizards

- . Hemidactylus palaichthus (1 specimen collected);
- . Tropidurus hispidus (observed);
- . Cnemidophorus lemniscatus (observed).

a.2) Snakes

- . Bothrops sp or jararaca (2 specimens collected).

a.3) Chelonia

- . cf Podocnemis sp or tracajá (several specimens observed).

a.4) Amphibians (collected)

- . Atelopus sp (2 specimens);
- . Bufo gutattus (6 specimens);
- . Bufo gr. typhonius (8 specimens);
- . Colestethus cf. stpheni (2 specimens);
- . Leptodactylus bolivianus (1 specimen);
- . Leptodactylus sp (1 specimen)

b) *Avifauna*

	CSF	FO (1)
. cormorant (<u>Phalacrocorax brasiliensis</u>)		x
. duck (<u>Cairina moschata</u>)	x	
. vulture (<u>Cathartes</u> sp)	x	

. vulture (<u>Coragyps atratus</u>)	x	x
. caracara (<u>Caracara plancus</u>)	x	x
. guan (<u>Penelope sp</u>)	x	
. curassow (<u>Crax alector</u>)	x	
. thick-knee (<u>Burhinus bistriatus</u>)	x	
. macaw (<u>Ara ararauana</u>)	x	
. ani (<u>Crotophaga ani</u>)	x	x
. swift (<u>Streptoprocne zonaris</u>)		x
. kingfisher (<u>Ceryle torquata</u>)	x	x
. piha (<u>Lipaugus vociferans</u>)		x
. bellbird (<u>Procnias alba</u>)	x	
. kiskadee (<u>Pitangus sulphuratus</u>)		x
. swallow (<u>Atticora melanoleuca</u>)	x	x
. pileated-finch (<u>Coryphospingus pileatus</u>)		x
. seed-finch (<u>Oryzoborus sp</u>)	x	x
. other (2)		

(1) CSF = contact zone savanna-forest e FO = forest;

(2) Other specimens of the families Picidae (woodpeckers), Falconnidae (falcons), Fringilidae (finches), Tyrannidae (tyrant flycatcheus), Ramphastidae (toucans), Psitacidae (macaws and parakeets) and Accipitridae (hawks) also were observed.

c) *Mammals* (forest region)

c.1) Deposited in INPA's collection:

- . tapir (Tapirus terrestris): 1 jaw;
- . forest deer (Mazama sp): 1 cranium;
- . peccary (Tayassu spp): 2 jaws and 1 cranium.

c.2) Information of the Indians living in Maú River:

- . cougar (Felis concolor);

- . jaguar (Panthera onca);
- . paca (Coelogenys paca);
- . agouti (Dasyprocta aguti);
- . armadillo (three species of the family Dasipodidae).