

# Vegetação no tepui da Serra do Araça- Amazônia brasileira

## VEGETATION IN THE TEPUI ARAÇA MOUNTAIN RANGE - BRAZILIAN AMAZON

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### RESUMO

As fitoformações da Serra do Araça foram mapeadas e descritas com base na lista de espécimes mais comuns. A coleta de material botânica no topo da serra foi feita pela primeira vez, e revelou uma típica vegetação de Tepui, chapadas elevadas relativamente isoladas com alto endemismo nas cotas mais altas. No tepui da Serra do Araça foi encontrada vegetação herbáceo-arbustiva e no pé da mesma vegetação herbácea e florestal arbórea no rio Araça (rever este trecho em inglês que aparece invertido). As espécies da família Theaceae com poucos representantes nas florestas de terras baixas da Amazônia estiveram entre as dominantes nas fitofisionomias descritas. A lista das espécies dominantes em cada fitofisionomia e os mapas de distribuição de algumas destas mostra a afinidade florística com a flora da Província Biogeográfica das Terras Altas do Plateau das Guianas, tão rica em endemismos e ainda tão pouco conhecida.

### PALAVRAS-CHAVE

Brazilian Amazon. Guayana highlands. Pantepuis vegetation. Araça mountain. Phytogeography.

### ABSTRACT

The Araça Mountain range phytoformations were mapped out and described based on the list of the most common sorts. Collections of botanical material at the top of the Mountain range were made for the first time, and they showed typical *tepui* vegetation, plateau-shaped mountains relatively isolated and holding high plant species endemism at the highest quotas. In the *tepui* of the Araça Mountain range herbaceous-shrubby vegetation was found and at the foot of the Mountain range and the Araça river respectively alluvial arboreal and gramineous vegetation. Species of the *Theaceae* families with few representatives in the Amazonian lowland forests were among the dominant

ones in the three physiognomies described. The floristic listing of the dominant species in each physiognomy and the distribution maps of some of those show the area's floristic affinity with the flora of the Guianas Biogeographic Province High Lands, so rich in endemism and still little known.

### KEY-WORDS

Brazilian Amazon. Guayana highlands. Pantepuis vegetation. Araça mountain. Phytogeography.

### INTRODUCTION

Despite the great diversity and having the largest Forest coverage in the world, several areas in the Amazon remain little known and the origin, the patterns and the mechanisms that determine so rich a diversity are still controversial. (GENTRY, 1988, 1990, 1992; TERBORGH and ANDERSON, 1998; TER STEGE et al., 2000; OLIVEIRA and NELSON, 2001; PITMAN et al., 2001).

The places in the Amazon that are closer to the large urban centres have historically been better described and characterized both floristically and physically (NELSON et al., 1990; WILLIAMS et al., 1996), and more surveys on many Amazon regions are required. In the Guiana shield the floristic data on the formations of the interior are scarce, and there is a good set of plots and floristic surveys on the Guianas' forests that stand closer to the research centers (COMISKEY et al., 1994; JOHNSTON and GILLMAN, 1995; TER STEGE, 1998). In the Brazilian portion of the Guianas phytogeographic province, there are also more floristic surveys on the forests. (BRAZIL, 1976).

Amongst the poorly described plant phytoformations are the ones located in the *tepuis*, as are called the 400 to 2000 meter-high plateaus, relatively well isolated by steep slopes (MICHELANGELI, 2000). The flora

specialization contributed for the formation of an uncommon biogeographic domain, in which between 2,000 and 2,500 plant species are found, with high endemism, as well as the occurrence of extra-Amazonian species such as the *cerrados* (savannas) and the rupestrian fields. The *tepus* flora is connected with the surrounding lowlands flora, however, families and sorts hold a different relative importance within each one of those formations (GENTRY, 1990).

The floristic listings presented prioritized the forests, and no floristic survey has been conducted on the *tepu* at the top of that mountain range. The official maps of the Araçá Mountain range bear an over 700 meter inaccuracy in regard to the maximum height quotas, giving evidence of the lack of knowledge of the study area and the importance of surveys in a place that although little inhabited has been put pressure on for the occupation and exploration of its resources.

This study aimed to characterize the major vegetation units in the Araçá Mountain range, complemented by the floristic listing of the most common species in each one of those units. The units were characterized through techniques that were not available at the time the RadamBrasil project was carried out.

## MATERIAL AND METHODS

**Study Area** - The Araçá Mountain range, state of Amazonas 01o30' N and 64o30'W (Figure 1), corresponds to the northernmost portion of the Craton Guianês in the Brazilian territory (BRAZIL, 1976) as part of the Roraima Group (sedimentary sequence whose typical locality is located in the Roraima Hill) in the southern part of one of the sets of tabular sandstone plateaus found on the border with Venezuela. This Mountain range typically forms synclinals with approximately E-W axes and its typical appearance is that of a table, of smoothed relief, with ravine clippings and three blocks separated by Southeast-bound faults. The maximum altitude shown in the official maps comes to 300 meters, however during the conduction of this work the mountain range plateau's maximum altitude was found to exceed 1,000m.

This region is known for the occurrence of diamond and gold, which justifies the presence of the prospecting activity found at the top of the mountain range. The fauna resources are relatively abundant and well preserved, despite the strong pressure exerted by the extraction of ornamental fish. Under the agricultural

aptitude point of view, the area is considered of almost null potentiality, with ground developed on material of the Cenomezoica (Tertiary to Pleistocene) sedimentary cover made up of sandy-clay sediments. The poor ground, almost always sandy causing the existence of a predominantly herbaceous and little dense vegetation, coupled with the isolation of those plateaus due to the cliffs, have guaranteed to date the almost total integrity of those areas (ECOFORÇA, 1994).

**Field procedure and data analysis** - The major vegetation units were delimited from the colorful composition of the 3, 4 and 5 (RGB) bands of the LANDSAT-TM satellite as matched against the IBGE maps at 1:50,000 and maps of the RADAMBRASIL project (BRAZIL, 1976). The cartographic product obtained was checked out by over flying the Demene and Xereuini rivers interfluve (Figure 1).



Fig. 1 - Location of the Araçá Mountain Range (Serra do Araçá).

Five expeditions to the basin of the Demene River were organized by AGÊNCIA ESTADO, ECOFORÇA, EMBRAPA/CNPM, PRIFAS-CIRAD and UNIP-OBJETIVO. The last of such expeditions, in October 1995, focused on the Araçá Mountain Range (Figure 1), and its key objective was to both recognize the different patterns identified in the satellite images and collect material to characterize the detected vegetation units. On the Araçá Mountain range plateau the mosaic of plant formations was covered, collecting reproductive and/or vegetative material of the dominant plant species, grade 2 to 5 in BRAUN-BLANQUET'S cover/abundance scale (1979). The difficult access to the study site was a leading criterion for the selection of this coverage visual estimation method. The method showed to be accurate in relation to other methods that demand more equipment and field time (MEESE and TOMICH, 1992).

In the sandy area, second and third sampled areas, located respectively at the foot of the Araçá Mountain

range and in the Branco – Negro rivers pediplain, samples of the vegetation were also collected, the herbaceous stratum prevailing. The areas are characterized by the presence of sediments which can be associated with the flattening of the Mountain range, serving as zones of deposition of that *tepui* (Figure 1).

The species distribution area was attained from data found in the specialty taxonomic literature.

## RESULTS

Three types of phytoformations were identified (Table 1), each one of which holding between 5 and 13 dominant species. The scarce collection time, limited by the difficult access to the site did not allow for the

field campaigns to be extended so as more samples with reproductive material could be collected. Nevertheless, 21 of the 29 species could be identified at the species level.

Michelangeli (2000) classifies *Bonnetia sessilis* within the *Bonnetiaceae* family. In this study we kept *Bonnetia* classified within the *Theaceae* family, in compliance with the Missouri Botanical Garden's data base.

The distribution maps for 10 of the 21 species (figures 2 and 3) clearly show the prevailing distribution within the Guianas biogeographic province (CABRERA and WILLINK, 1980), with *Blepharandra cachimbensis* being the only exception.

Table 1- List of flora species collected at the sampling 1 points (Plateau of the Araçá Mountain Range), 2 (Sandy area at the foot of the Araçá Mountain Range) and 3 (Sandy area of the Araçá river).

1. Campestrian vegetation at the Plateau of the Araçá Mountain range	
Botanical family	Species
Chrysobalanaceae	<i>Licania dealbata</i> Hook F.
Cyperaceae	Cyperaceae 1
Eriocaulaceae	<i>Cyrilla racemosa</i> L.
Leguminosae (Caesalpinioideae)	<i>Paepalanthus</i> sp.
Malpighiaceae	<i>Macrolobium rubrum</i> R.S.Cowan
Melastomataceae	<i>Blepharandra cachimbensis</i> W. R.Anderson
	<i>Byrsonima</i> sp.
	<i>Pachyloma huberioides</i> Triana
	<i>Macairea radula</i> Bonp. PC
Theaceae	<i>Ternstroemia alnifolia</i> Wawra
Xyridaceae	<i>Xyris stenocephala</i> Malme
	<i>Abolboda macrostachya</i> Spruce ex Malme
2. Wooded White Sand Open Vegetation in the Sandy area at the foot of the Araçá Mountain Range	
Apocynaceae	<i>Tabernamontana</i> sp.
Boraginaceae	<i>Cordia</i> sp.
Loranthaceae	Loranthaceae 1
Malpighiaceae	<i>Byrsonima</i> sp.
Theaceae	<i>Bonnetia sessilis</i> Benth.
3. Periodically floodable depressions (sandy area of the Araçá river)	
Bromeliaceae	Bromeliaceae 1
Bombacaceae	<i>Rhodognaphalopsis coriaceae</i> (Mart.) A. Robyns
Clusiaceae	<i>Caraipa richardiana</i> Cambess
Leguminosae (Faboideae)	<i>Dipteryx oppositifolia</i> (Aubl.) Willd.
Linaceae	<i>Hebepetalum humiriifolium</i> (Planch.) Benth.
Malpighiaceae	<i>Diacidia aracaensis</i> W. R. Anderson
Melastomataceae	<i>Verrucularia piresii</i> W. R. Anderson
	<i>Pachyloma huberioides</i> (Naudin) Triana
	<i>Macairea thyrsoflora</i> DC.
Ochnaceae	<i>Elvasia quinqueloba</i> Spruce ex Engl.
Rubiaceae	<i>Staelia</i> aff. <i>capitata</i> K. Schum
	<i>Borreria virgata</i> Cham.& Schtdl.
Theaceae	<i>Bonnetia sessilis</i> Benth

Note: Cronquist taxonomic system.

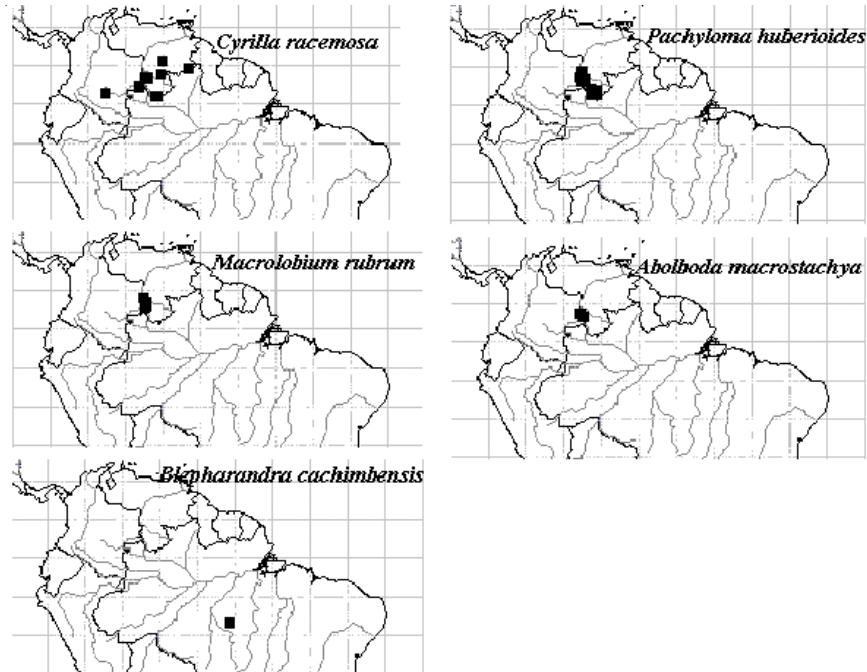


Fig. 2 - Recorded distribution of the major species found in the plateau of the Araçá Mountain Range and in the Araçá river plain.

### DISCUSSION

The sampled areas bear a non-forested area composition typical of the northern Amazon. The top of the Araçá Mountain range holds *Tepui* vegetation with several species typical of this type of formation. The only species showing no preferential distribution in the Guyana biogeographic province, *Blephandra guianensis*,

occurs in the highlands of the Cachimbo Mountain range at altitudes of up to 900m.

Although the collection was carried out in a single field campaign the number of identified species, 29, was only slightly below the 35 angiosperm species identified and collected by Michelangeli (2000) in three visits to the Tepui Roraima.

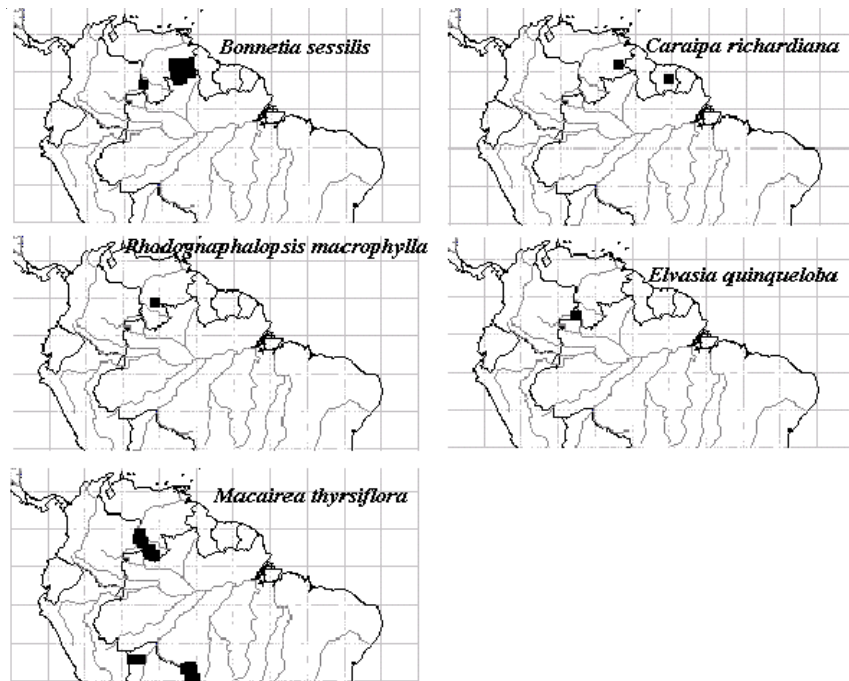


Fig. 3 - Recorded distribution of the major species found in floodable depressions (sandy area of the Araçá river) at the foothill of the Araçá Mountain Range.

Families rich in species in the lowland forests such as *Lecythidaceae*, *Moraceae*, *Annonaceae*, *Lauraceae*, *Myristicaceae* and *Leguminosae* (GENTRY, 1990), do not stand out as rich in species on the *tepuis* plateaus. The *Licania* sort (*Chrysobalanaceae*), for example, has 152 species from the south of U.S.A in the south of Brazil, with 38 species in the Amazonian Basin and 24 in the Guianas, however, only one, *Licania dealbata*, occurs above the 1,000 meters of altitude, particularly in the *cerrado* region of the Brazilian central plateau (PRANCE, 1972). On the other hand, the botanical families *Boraginaceae* and *Melastomataceae* are rich in species in the lowlands and have common members in the *tepuis*. Amongst those stand out the *Cordia* (*Boraginaceae*) and the *Pachyloma* (*Melastomataceae*) sorts, in particular the *huberioides Pachyloma* species (COWAN, 1949; PRANCE, 1972; WURDACK, 1973; MACEDO and PRANCE, 1978). These differences are, in part, due to the prevailing forms of growth in each of the formations. Thus, in the *tepuis* herbaceous and shrubby physiognomies *Xyridaceae*, *Theaceae*, *Cyrillaceae*, *Cyperaceae*, *Bromellaceae* and *Guttiferae* are common sorts, as families that, when found in the Amazonian lowlands, occur with the *White Sand Open Vegetations* species (HUBER and FRAME, 1989; VELOSO et al., 1991), with the *Clusia* (*Clusiaceae*) and *Caraipa* (*Guttiferae*) sorts standing out in the forested *White Sand Open Vegetations* while the further families' sorts are cited in the gramineous-woody *White Sand Open Vegetations* (VELOSO, 1992). In addition to those families, in those plateaus herbaceous formations, members of the *Rapateaceae* and *Eriocaulaceae* families are commonly found (HUBER and FRAME, 1989), prevailing only in those environments.

The Araça Mountain range phytoformations are described floristically and physiognomically for the first time. The vegetal cover of this area is comprised, physiognomically, of pioneering formations (gramineous-woody, shrubby and arboreal) in sedimentary lands dominated by hydromorphic quartzous sands. In the information available from the IBGE cartography, the subject area's vegetation is characterized by the following formations: *White Sand Open Vegetation/Ombrophilous Forest* (LO); wooded *White Sand Open Vegetation* (La) and gramineous-woody *White Sand Open Vegetation*. Whereas in the RADAM project, those formations correspond to: *Enclave* area, i.e., pioneer formations of periodically flooded

depressions and dense tropical forest with uniform submontane coverage, also called areas of ecological tension, with contact of pioneer formations and forest; Periodically flooded depressions with and without palm trees, and areas of ecological tropical altitude shelter with herbaceous and shrubby stratus.

The heterogeneity of the landscape, found in this part of the Amazon, and the lack of basic information on it, depicts the complexity of its ecological systems and the relevance of the awareness of each one of those systems for the definition of policies and strategies of occupation, development and preservation.

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