

# FLORISTIC COMPOSITION AND DIVERSITY OF AMAZONIAN RAINFOREST BRYOPHYTES IN THE STATE OF ACRE, BRAZIL.

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**ABSTRACT** - Bryophyte diversity in Amazonian Brazil is high, presently recorded at 514 species distributed among 36 families and 89 genera. Comparisons of species richness among the Amazonian states of Brazil suggests that the bryoflora of Acre is still underestimated, presently recorded at 106 species distributed among 33 families and 63 genera. After two field trips, the diversity increased 50% showing that the bryoflora is still poorly known. Collection data and comments on morphology, ecology and distribution are given for sixty-two species of bryophytes collected in the state of Acre, Brazil, which are new (fifty-two species) or interesting floristic records (ten species). *Microlejeunea crenulifolia* (Gottsche) Steph. and *Stictolejeunea balfourii* Mitt. are new records for Brazil and fifty species are new records for Acre.

**Key-words:** diversity, bryophyte, Acre, Brazil.

## Composição florística e diversidade de briófitas em floresta no Estado do Acre, Brasil

**RESUMO** - A diversidade de briófitas na região Amazônica brasileira é alta, sendo citado atualmente, 514 espécies, em 36 famílias e 89 gêneros. Comparações entre a riqueza de espécies dos estados da Amazônia brasileira sugerem que a brioflora do Acre ainda é subestimada, contando atualmente com 106 espécies, distribuídas em 33 famílias e 63 gêneros. Após duas excursões científicas, a diversidade para o estado aumentou em 50 %, demonstrando que a brioflora ainda é pouco conhecida. Dados sobre a morfologia, ecologia e distribuição geográfica são apresentados para sessenta e duas espécies de briófitas coletadas no estado do Acre, Brasil, as quais são registros florísticos novos (cinquenta e duas espécies) ou interessantes (dez espécies). *Microlejeunea crenulifolia* (Gottsche) Steph. e *Stictolejeunea balfourii* Mitt. são citadas pela primeira vez para o Brasil e cinquenta espécies são novas ocorrências para o estado do Acre.

**Palavras-chave:** diversidade, briófitas, Acre, Brasil.

## INTRODUCTION

A total of 500 species of bryophytes are estimated to occur in the Amazonian region in Brazil (Table 1). Although considerable parts of the Brazilian Amazon (states of Amazonas and Pará) have been studied, little information has been available for the state of Acre (106 species of bryophytes are records published). There are only four papers pertaining to the bryophytes of Acre: new occurrences of bryophytes in the Brazilian Amazon (Lisboa & Yano, 1987); a list of bryophytes from Rio Branco (Vital & Visnadi,

1994); a catalog of Amazonian mosses including Brazilian states (Churchill, 1998); and the liverworts and hornworts of Brazil (Gradstein & Costa, 2003). In this work 62 species of bryophytes are listed as new records for Acre (52 species), and 10 are considered to be interesting floristic record. Trees, shrubs, lianas, herbs, and soils were sampled randomly for bryophytes in primary lowland rainforests of the Tarauacá and Juruá rivers on two field trips (1995 and 2000 – for bryophytes). The present paper increases the known bryophyte diversity of Acre by 50%. These results show that the bryoflora of Acre is still poorly known, and

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more efforts are needed to better document the region bryophyte diversity in spite of the records published. Collection data and com-

ments on morphology, ecology and distribution (the world and Brazil) are given for sixty-two species of bryophytes.

**Table 1** – Bryophyte species in the Amazonian states of Brazil (*sensu lato*).

\* = Data from Churchill (1998) and \*\* = Data from Gradstein & Costa (2003).

STATES	SPECIES OF MOSSES *	SPECIES OF HEPATICS **	NUMBER OF SPECIES
Roraima	59	53	112
Rondônia	108	19	117
Amapá	24	21	45
Acre	60 (+16)	46 (+36)	106 (+54)
Amazonas	205	232	437
Pará	133	132	265
Maranhão	11	7	18
Goiás	6	48	54
Mato Grosso	51	65	611
TOTAL	264 spp.	ca. 250 spp.	ca. 514

## MATERIAL AND METHODS

In 1995 the present author began a collaboration with the Universidade Federal do Acre (UFAC), and to date, two field trips (Taruacá and Juruá rivers) have yielded a total of 600 specimens and 130 species of bryophytes, including several new records for the state of Acre and two for Brazil. Samples were collected in the vegetation of terra firme, várzea (floodplain), igarapé (streams), and salão (walls of the rivers and streams presenting canalized stretches are called salãoes). All the samples collected are deposited at the herbarium of the Jardim Botânico do Rio de Janeiro (RB), with duplicates sent to the herbarium of the Universidade Federal do Acre (UFAC).

The taxa are listed alphabetically by family, genus, and species separated in two groups, hepaticae and mosses. Taxonomic and bryogeographical comments are given. The Brazilian states are presented by the main geographical regions and the names of the states are abbreviated as follows:

North: Roraima (RR), Rondônia (RO), Amapá (AP), Acre (AC), Amazonas (AM), Pará (PA), Tocantins (TO).

Northeast: Maranhão (MA), Piauí (PI), Ceará (CE), Rio Grande do Norte (RN), Paraíba (PB), Pernambuco (PE), Ilha Fernando de

Noronha (FN), Alagoas (AL), Sergipe (SE), Bahia (BA).

Middle-West: Goiás (GO), Mato Grosso (MT), Mato Grosso do Sul (MS).

Southeast: Minas Gerais (MG), Espírito Santo (ES), Rio de Janeiro (RJ), São Paulo (SP).

South: Paraná (PR), Santa Catarina (SC), Rio Grande do Sul (RS).

The symbols preceding the taxa mean: \* = new record to Acre (52 species: 36 hepatics and 16 mosses); \*\* = new record to Brazil (2 hepatics).

## RESULTS

A total of 130 bryophytes species were identified during two field trips carried out in 1995 and 2000 (130 species in 65 genera and 27 families) to Acre, of which fifty-two species are new records for Acre (36 hepatic and 16 mosses) and two are new records for Brazil.

In total, sixty-two taxa are listed by family, genus and species separated in hepatics and mosses, with taxonomical comments, geographical distribution (world and Brazil), references, and specimens examined.

The interesting records were selected, based mostly on the range extensions and, in general, the comments were included in the species distribution.

## Hepaticae

### Aneuraceae

\* *Riccardia amazonica* (Spruce) S. W. Arnell

Similar to *R. tenuicula*, differing in the main axis being 4-7 cells thick, while *R. tenuicula* is only 3 cells thick. General distribution: Afro-American, widely distributed in Tropical America (Moenks, 1987). Brazil: AP, AM, PA, PE, ES, RJ, SP.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, Colocação do Seringal do Sumaré, 8°30'84"-71°27'83", on decaying wood, 19-XI-1995, *Costa 2652* (RB); Colocação Samauma, 8°23'03"-71°17'27", on rotten wood, 24-XI-1995, *Costa 2831* (RB), on the base of tree trunk, *Costa 2851 p.p.* (RB); Colocação Bom Jardim, 8°17'80"-71°08'60", on rotten wood, 26-XI-1995, *Costa 2898* (RB); Reserva Extrativista do Alto Juruá, Rio Tejo, Vila da Restauração, Base de Pesquisa da Restauração, 9°02'52"-72°16'22", on decaying wood, 30-XI-2000, *Costa 3930* (RB); on decaying wood, 1-XII-2000, *Costa 3959* (RB).

\* *Riccardia digitiloba* (Spruce ex Steph.) Pagán

Easily recognized by the tiny thallus with gemmiferous branches like fingers. General distribution: Tropical America (Hell, 1969). Brazil: AM, PE, ES, MG, RJ, SP.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, Colocação Bom Jardim, 8°17'80"-71°08'60", on bark, 26-XI-1995, *Costa 2906* (RB); Reserva Extrativista do Alto Juruá, Rio Tejo, Vila da Restauração, Base de Pesquisa da Restauração, 9°02'52"-72°16'22", on decaying wood, 30-XI-2000, *Costa 3943 p.p.* (RB); on decaying wood, 1-XII-2000, *Costa 3958 p.p.* (RB).

### Frullaniaceae

\* *Frullania ericoides* (Nees) Mont.

Leaves squarrose when moist, lobules saccate close to the stem, stylus uniseriate (4-7 cells long), and surface of perianth rough. General distribution: Pantropical (Schuster,

1992). Brazil: PA, PB, PE, FN, SE, BA, GO, MT, MG, ES, RJ, SP, PR, RS.

Acre: Reserva Extrativista do Alto Juruá, Rio Tejo, Vila da Restauração, Base de Pesquisa da Restauração, 9°02'52"-72°16'22", on fallen branch, 4-XII-2000, *Costa 4003 p.p.* (RB).

\* *Frullania nodulosa* (Reinw., Blume & Nees) Nees

Recognized by the pendent lobules. General distribution: Tropical and subtropical regions of Asia, Africa, and America (Schuster, 1992). Brazil: RR, AM, PA, PE, BA.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, Fazenda do Barro, 8°20'71-80"-71°11'97-91", on fallen branch, 16-XI-1995, *Costa 2571* (RB); Colocação Bom Jardim, 8°17'80"-71°08'60", on soil, 26-XI-1995, *Costa 2904* (RB).

### Lejeuneaceae

\* *Acrolejeunea emergens* (Mitt.) Steph.

Recognized by the lobule with 2-4 teeth. General distribution: Tropical America, Africa, and India (Gradstein, 1994). Brazil: RR, RO, AM, PA, MA, BA, GO, MS, MT, MG, RJ, SP.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, after Erundina's house, 8°32'85"-71°28'65", on bark, 17-XI-1995, *Costa 2601* (RB).

\* *Amphilejeunea reflexistipula* (Lehm. & Lindenb.) Gradst.

Underleaves entire, orbicular to reniform (1-1,5 x wider than long), more than 3 x stem width. General distribution: Tropical South America, reaching Argentina (Schäfer-Verwimp, 1991). Brazil: AM, MT, ES, RJ, SP.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, Colocação do Seringal de Tamandaré, 8°32'85"-71°28'65", on bark, 18-XI-1995, *Costa 2614* (RB); on palm trunk, 18-XI-1995, *Costa 2635 p.p.* (RB).

\* *Cephalantolejeunea temnanthoides* (Steph.) R.M. Schust.

Underleaves entire, perianth keels denticulate, female branches arise from the axils of male bracts. General distribution: a rare Amazonian rheophyte species (Reiner-Drehwald & Weiss, in press). Brazil: AM (Rio Juruá), this is the second report to Brazil.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, Colocação do Seringal do Sumaré, 8°30'84"-71°27'83", on banks along the rivulet, 19-XI-1995, *Costa 2683 p.p.* (RB); Colocação Vai quem quer, 8°24'39"-71°17'90", on root, 23-XI-1995, *Costa 2783* (RB); Colocação Samauma, 8°23'03"-71°17'27", on rotten wood, 24-XI-1995, *Costa 2823 p.p.* (RB); Reserva Extrativista do Alto Juruá, Rio Tejo, Cachoeira da Boa Vista em direção a Restauração, on banks along the river, 3-XII-2000, *Costa 3991 p.p.* (RB).

\* *Ceratolejeunea cornuta* (Lindenb.) Schiffn.

Leaves with ocelli not in a row, underleaves ovate, more than 2 x the stem width, perianth with four terete horns. General distribution: Tropical America. Brazil: RR, RO, AP, AM, PA, PE, MG, RJ, SP, PR, SC.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, Seringal do Pacujá, 8°17'38"-71°06'40", on decaying wood, 15-XI-1995, *Costa 2533 p.p.* (RB); Fazenda do Barro, 8°20'71"-80°71'11"-97-91", on bark, 16-XI-1995, *Costa 2560* (RB); Colocação do Seringal do Sumaré, 8°30'84"-71°27'83", on bark, 19-XI-1995, *Costa 2668* (RB); Colocação Samauma, 8°23'03"-71°17'27", on decaying wood, 24-XI-1995, *Costa 2842 p.p.*, 2859 p.p. (RB); on bark, *Costa 2883* (RB).

\* *Cheilolejeunea adnata* (Kunze) Grolle

Recognized by the caducous leaves with marginal rhizoids. General distribution: Tropical America (Grolle, 1977). Brazil: RR, AM, PA, PE, MG, ES, SP, PR.

Acre: Reserva Extrativista do Alto Juruá, Rio Bagé, 8°56'11"-72°33'41", on the base of tree trunk, 28-XI-2000, *Costa 3904 p.p.* (RB); Rio Tejo, Vila da Restauração, Base de

Pesquisa da Restauração, 9°02'52"-72°16'22", on decaying wood, 1-XII-2000, *Costa 3951 p.p.* (RB).

\* *Cheilolejeunea clausa* (Nees & Mont.) R.M. Schust.

Recognized by the leaves not caducous, underleaves orbicular, bifid to 1/3 or more, base rounded. General distribution: Tropical America (Schuster, 1980). Brazil: AM, PA, PE, BA, GO, MS, MG, RJ, SP, PR.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, Colocação do Seringal do Sumaré, 8°30'84"-71°27'83", on fallen trunk, 19-XI-1995, *Costa 2654 p.p.* (RB); Colocação Vai quem quer, 8°20'72"-71°11'95", on rotten wood, 23-XI-1995, *Costa 2812* (RB); Reserva Extrativista do Alto Juruá, Rio Tejo, Vila da Restauração, Base de Pesquisa da Restauração, 9°02'52"-72°16'22", on fallen branch, 30-XI-2000, *Costa 3927 p.p.* (RB); on fallen branch, 1-XII-2000, *Costa 3951 p.p.* (RB).

\* *Cololejeunea obliqua* (Nees & Mont.) Schiffn.

Leaves more or less symmetric, ovate or rounded, lobe cells papillose, lobules bidentate, perianth cells papillose. General distribution: Tropical America (Pôrto, 1989, 1990). Brazil: AM, PA, PE, RJ, SP, PR, SC.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, Colocação Morada Nova, 8°20'72"-71°11'95", on living leaves, 25-XI-1995, *Costa 2888 p.p.* (RB); Reserva Extrativista do Alto Juruá, Rio Bagé, 8°56'11"-72°33'41", on living leaves, 28-XI-2000, *Costa 3903 p.p.* (RB); Rio Tejo, Vila da Restauração, Base de Pesquisa da Restauração, 9°02'52"-72°16'22", on living leaf of palm, 30-XI-2000, *Costa 3937* (RB); on living leaf of bromelia, *Costa 3938 p.p.* (RB); on fallen branch, *Costa 3950 p.p.* (RB); on living leaf of palm, 1-XII-2000, *Costa 3955 p.p.* (RB).

\* *Cololejeunea subcardiocalpa* Tixier

Leaves with hyaline border extending to the dorsal lobe margin, cells smooth, lobules well developed. General distribution: Tropical America (Tixier, 1980). Brazil: AM, PE, MG, ES, SP, PR, SC.

Acre: Reserva Extrativista do Alto Juruá, Rio Bagé, 8°56'11"-72°33'41", on living leaves, 28-XI-2000, *Costa 3901 p.p.* (RB).

\* *Lejeunea boryana* Mont.

Easily recognized by the underleaves with a tooth on the lateral margin and cuticle strongly papillose. General distribution: West Indies, Venezuela, Guianas, and Brazil. (Reiner-Drehwald & Goda, 2000). Brazil: AM, PA, RJ.

Acre: Reserva Extrativista do Alto Juruá, Rio Tejo, Vila da Restauração, Base de Pesquisa da Restauração, 9°02'52"-72°16'22", on bark, 1-XII-2000, *Costa 3960 p.p.* (RB).

*Lejeunea phyllobola* (Nees) Mont.

Plants with caducous leaves, and androecium with bracteoles throughout the antheridial spike. General distribution: Tropical America (Schuster, 1980). Brazil: AC, AM, PA, BA, ES, RJ, SP, RS.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, Fazenda do Barro, 8°20'71-80"-71°11'97-91", on branches of canopy, 16-XI-1995, *Costa 2562* (RB); Reserva Extrativista do Alto Juruá, Rio Bagé, 8°56'11"-72°33'41", on bark, 28-XI-2000, *Costa 3905 p.p.* (RB); Rio Tejo, Vila da Restauração, Base de Pesquisa da Restauração, 9°02'52"-72°16'22", on bark, 30-XI-2000, *Costa 3944* (RB); on decaying wood, 2-XII-2000, *Costa 3970 p.p.* (RB); Cachoeira da Boa Vista em direção a Restauração, on tree trunk, 3-XII-2000, *Costa 3995* (RB); Foz do Rio Tejo, Hospedaria, 8°57'7"-72°33'34", on bark, 6-XII-2000, *Costa 4014* (RB).

\* *Lejeunea laetevirens* Nees & Mont.

Plants with caducous branches, with normal or reduced lobules, or both in the same plant, and underleaves with a conspicuous lateral tooth. General distribution: Tropical America, Southeastern USA, Paraguay, and Northern Argentina (Reiner-Drehwald, 2000). Brazil: RR, PA, PE, FN, BA, ES, RJ, SP.

Acre: Reserva Extrativista do Alto Juruá, Rio Tejo, Vila da Restauração, Base de Pesquisa da Restauração, 9°02'52"-72°16'22", on decaying wood, 30-XI-2000, *Costa 3935* (RB).

\* *Lopholejeunea eulopha* (Taylor)

Schiffn.

Recognized by the underleaves of main stems wider than long and female bracteole strongly toothed. General distribu-

tion: Pantropical. According to Gradstein (1994), a rare species in the Neotropics. Brazil: AM, this is the second record for Brazil.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, Fazenda do Barro, 8°14'-70°57", on bark, 15-XI-1995, *Costa 2553* (RB).

\* *Lopholejeunea nigricans* (Lindenb.)

Schiffn.

Leaf apex apiculate or rounded, developed lobule partially flattened with free margin acute, perianth emergent. General distribution: Pantropical (Gradstein, 1994). Brazil: AM, PA, PE, GO, MT, MG, ES, RJ, SP, PR, SC.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, Colocação do Seringal do Sumaré, 8°30'84"-71°27'83", on the canopy branch, 19-XI-1995, *Costa 2671 p.p.* (RB); Reserva Extrativista do Alto Juruá, Rio Bagé, 8°56'11"-72°33'41", on bark, 28-XI-2000, *Costa 3906 p.p.* (RB); Rio Tejo, Vila da Restauração, Base de Pesquisa da Restauração, 9°02'52"-72°16'22", on bark, 30-XI-2000, *Costa 3922 p.p.* (RB); on decaying wood, 30-XI-2000, *Costa 3942 p.p.* (RB); Foz do Rio Tejo, Hospedaria, 8°57'7"-72°33'34", on rotten wood, 6-XII-2000, *Costa 4010 p.p.* (RB).

\*\* *Microlejeunea crenulifolia* (Gottsche) Steph.

Easily recognized by the distant leaves, apex rounded, margin distinctly crenate-serrate. General distribution: Trinidad and French Guiana (Bischler *et al.*, 1963). According to Bischler *et al.* (1963), rare and probably confined to the Antilles and Guiana, this is the first record for Brazil.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, Colocação do Seringal de Tamandaré, 8°32'85"-71°28'65", on palm trunk, 18-XI-1995, *Costa 2635 p.p.* (RB); Colocação Bom Jardim, 8°17'80"-71°08'60", on palm root, 26-XI-1995, *Costa 2899* (RB).

\*\* *Stictolejeunea balfourii* Mitt.

According to Gradstein (1994), this species has been little collected and probably has been overlooked. It is recognized by the *Lejeunea*-type vegetative branches, underleaves suborbicular with two or three times stem width. General distribution: Tropical America

and Africa, Malesia, Australia, New Caledonia, Caroline Islands, and Hawaii (Gradstein, 1994). This is the first record for Brazil.

Acre: Reserva Extrativista do Alto Juruá, Foz do Rio Tejo, Hospedaria, 8°57'7"-72°33'34", on tree root, 6-XII-2000, *Costa 4012* (RB).

\* *Symbiezidium barbiflorum* (Lindenb. & Gottsche) A. Evans

Recognized by the perianth with short spines, cilia or lacinia in the ventral surface. General distribution: Tropical America (Gradstein, 1994). Brazil: AM, PA, PE, BA, ES, RJ, SP, SC.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, Colocação Morada Nova, 8°20'71"-80°-71°11'97"-91", on bark, 16-XI-1995, *Costa 2580* (RB); Colocação do Seringal do Sumaré, 8°30'84"-71°27'83", on rotten wood, 19-XI-1995, *Costa 2681 p.p.* (RB); Colocação do Macuripe, 8°27'64"-71°22'31", on rotten wood, 20-XI-1995, *Costa 2681 p.p.* (RB); 8°26'96"-71°20'95", on bark, 21-XI-1995, *Costa 2734, 2742* (RB); Colocação Vai quem quer, 8°24'39"-71°17'90", on bark, 23-XI-1995, *Costa 2784, 2792, 2800 p.p.* (RB); Colocação Samauma, 8°23'03"-71°17'27", on bark, 24-XI-1995, *Costa 2847, 2850, 2853* (RB); Colocação Morada Nova, 8°20'72"-71°11'95", on liana, 25-XI-1995, *Costa 2866* (RB); on bark, *Costa 2877 p.p., 2886 p.p.* (RB); Colocação Bom Jardim, 8°17'80"-71°08'60", on bark, 26-XI-1995, *Costa 2896* (RB).

\* *Symbiezidium transversale* (Sw.)

**Trevis.**

Ventral surface of the perianth smooth or with cilia or lacinia in 1-2 rows. General distribution: Tropical America (Gradstein, 1994). Brazil: AP, AM, PA, MG, ES, RJ.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, Colocação Morada Nova, 8°20'72"-71°11'95", on bark, 25-XI-1995, *Costa 2892* (RB); Reserva Extrativista do Alto Juruá, Rio Bagé, 8°56'11"-72°33'41", on bambu, 28-XI-2000, *Costa 3908 p.p.* (RB); Rio Tejo, Vila da Restauração, Base de Pesquisa da Restauração, 9°02'52"-72°16'22", on decay-

ing wood, 30-XI-2000, *Costa 3924 p.p.* (RB); on liana, 30-XI-2000, *Costa 3929 p.p.* (RB).

## Marchantiaceae

\* *Marchantia chenopoda* L.

Recognized by the ventral scales along thallus midline, appendages with acuminate apex, and margins of gemmae cups strongly ciliate. General distribution: Tropical America (Bischler, 1984; Hell, 1969; Vianna, 1985). Brazil: AM, MT, DF, MG, ES, RJ, SP, PR, RS.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, Fazenda do Barro, 8°14'-70°57", on bank soil, 15-XI-1995, *Costa 2554* (RB); Reserva Extrativista do Alto Juruá, Rio Tejo, on bank soil along river, 27-XI-2000, *Costa 3898 p.p.* (RB); Cachoeira da Boa Vista forward to Restauração, on bank soil along the river, 3-XII-2000, *Costa 3989 p.p.* (RB).

## Monocleaceae

\* *Monoclea gottschei* Lindb.

Frequently confused with *Dumortiera hirsuta* (Sw.) Nees, differing in the thallus margin undulate-crispate, without a midrib, and with oil bodies on the surface. General distribution: Tropical and subtropical America (Gradstein *et al.*, 1992). Brazil: AM, PE, RJ, SP, RS. This is the second record for the Amazonian region.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, 8°26'96"-71°20'95", on bank soil along rivulet (igarapé), 21-XI-1995, *Costa 2753* (RB); Colocação Samauma, 8°23'03"-71°17'27", on rotten wood, 24-XI-1995, *Costa 2843, 2857, 2884* (RB); Reserva Extrativista do Alto Juruá, Rio Tejo, Vila da Restauração, Base de Pesquisa da Restauração, 9°02'52"-72°16'22", on bank soil along rivulet (igarapé), 30-XI-2000, *Costa 3928 p.p.* (RB).

## Pallaviciniaceae

\* *Pallavicinia lyelii* (Hook.) Gray

Similar to *Symphyogyna brasiliensis* (Nees) Nees & Mont., differing in the pres-

ence of slime hairs along the margins. General distribution: Widespread (Hässel de Menéndez, 1961; Hell, 1969). Brazil: AM, PA, RJ, SP, SC, RS.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, 8°26'96"-71°20'95", on soil, 21-XI-1995, *Costa 2733* (RB).

\* *Symphyogyna brongniartii* Mont.

Thallus deeply lobate to the midrib, lobes with distinct tooth. General distribution: Tropical America. Brazil: AM, MG, RJ, SP, SC.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, 8°26'96"-71°20'95", on termite nests, 21-XI-1995, *Costa 2738 p.p.* (RB).

## Plagiochilaceae

\* *Plagiochila aerea* Taylor

Recognized by the leaves narrow elongate with one or two large teeth at the apex, cells elongate. General distribution: Tropical America (Grolle & Heinrichs, 1999). Brazil: reported without locality.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, Colocação do Seringal de Macuripe, 8°27'64"-71°22'31", on bark, 20-XI-1995, *Costa 2689 p.p.* (RB).

\* *Plagiochila corrugata* (Nees) Nees & Mont.

Recognized by the leaves with the ventral margins strongly crispate-undulate. General distribution: Tropical America (Lemos-Michel, 1999). Brazil: PE, BA, MG, ES, RJ, SP, PR, SC, RS.

Acre: Reserva Extrativista do Alto Juruá, Rio Tejo, Vila da Restauração, Base de Pesquisa da Restauração, 9°02'52"-72°16'22", on tree branches, 2-XII-2000, *Costa 3978 p.p.* (RB).

\* *Plagiochila cristata* (Sw.) Lindenb.

Plants with leaves longer than wider, narrow-triangular to rectangular, with two teeth at the apex. General distribution: Tropical America (Heinrichs et al., 1998). Brazil: AM, PA, MG, RJ, SP.

Acre: Reserva Extrativista do Alto Juruá, Rio Tejo, Vila da Restauração, Base de Pesquisa da Restauração, 9°02'52"-72°16'22", on canopy branches, 1-XII-2000, *Costa 3964 p.p.* (RB).

\* *Plagiochila gymnocalycina* (Lehm. & Lindenb.) Lindenb.

Plants with intercalary branches, leaves very fragile and caduceous, and apex bifid with two teeth, margin toothed or entire (upper half), and perianth naked, not surrounded by large bracts. General distribution: Tropical America (Heinrichs et al., 1998). Brazil: PE, MG, RJ, SP, SC; this is the first record for Amazonian region.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, Colocação do Seringal de Tamandaré, 8°32'85"-71°28'65", on bark, 18-XI-1995, *Costa 2633 p. p.* (RB); Colocação Samauma, 8°23'03"-71°17'27", on rotten wood, 24-XI-1995, *Costa 2844, 2849* (RB).

\* *Plagiochila martiana* (Nees) Lindenb.

Leaves imbricate, flattened, large on the base, decurrent, ventral base entire, apex truncate with few teeth. General distribution: Tropical America. Brazil: PE, MS, MG, ES, RJ, SP, SC, RS (Costa & Yano, 1998); this is the first record for Amazonian region.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, após a casa da Sra. Erundina, 8°32'85"-71°28'65", on bark, 17-XI-1995, *Costa 2605 p.p.* (RB); Colocação do Seringal de Tamandaré, 8°32'85"-71°28'65", on decaying wood, 18-XI-1995, *Costa 2612* (RB); Colocação Morada Nova, 8°20'72"-71°11'95", on bark, 22-XI-1995, *Costa 2777* (RB); Colocação Vai quem quer, 8°20'72"-71°11'95", on rotten wood, 23-XI-1995, *Costa 2805* (RB); Colocação Samauma, 8°23'03"-71°17'27", on decaying wood, 24-XI-1995, *Costa 2842 p.p.* (RB); Colocação Morada Nova, 8°20'72"-71°11'95", on bark, 25-XI-1995, *Costa 2885* (RB); Reserva Extrativista do Alto Juruá, Rio Bagé, 8°56'11"-72°33'41", on bambu, 28-XI-2000, *Costa 3915* (RB); Rio Tejo, Vila da Restauração, Base de Pesquisa da Restauração, 9°02'52"-72°16'22", on tree trunk, 2-XII-2000, *Costa 3973 p.p.* (RB);

Cachoeira da Boa Vista em direção a Restauração, on "salão" soil with ferns, 3-XII-2000, *Costa 3987* (RB).

\* *Plagiochila micropteryx* **Gottsche**

Ordinary branches of the terminal-type, leaves rectangular, not imbricate, with dentate apex and ventral margins strongly recurved. General distribution: Tropical America (Inoue, 1989). Brazil: PA, BA, RJ, SP, RS; this is the first record for Amazonian region.

Acre: Reserva Extrativista do Alto Juruá, Rio Tejo, Vila da Restauração, Base de Pesquisa da Restauração, 9°02'52"-72°16'22", on bark, 30-XI-2000, *Costa 3922 p.p.* (RB).

\* *Plagiochila patula* (Sw.) **Lindenb.**

Ordinary branches of the terminal-type, dorsal and ventral leaf base long-decurrent. General distribution: Tropical America (Heinrichs *et al.*, 1998). Brazil: BA, RJ.

Acre: Reserva Extrativista do Alto Juruá, Rio Tejo, Vila da Restauração, Base de Pesquisa da Restauração, 9°02'52"-72°16'22", on fallen branch, 30-XI-2000, *Costa 3927 p.p.* (RB).

\* *Plagiochila raddiana* **Lindenb.**

Ordinary branches of the terminal-type, ventral leaf base extending beyond the stem forming a keel, long-decurrent, entire or toothed. General distribution: Tropical America (Heinrichs & Gradstein, 2000). Brazil: AM, PA, PE, MT, MG, ES, RJ, SP, PR, SC, RS.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, Seringal do Pacujá, 8°17'38"-71°06'40", on decaying wood, 15-XI-1995, *Costa 2547* (RB); após a casa da Sra. Erundina, 8°32'85"-71°28'65", on bark, 17-XI-1995, *Costa 2596* (RB); Colocação do Seringal do Sumaré, 8°30'84"-71°27'83", on the canopy branch, 19-XI-1995, *Costa 2659* (RB); 8°26'96"-71°20'95", on rotten wood of palm, 21-XI-1995, *Costa 2732* (RB); Colocação Vai quem quer, 8°20'72"-71°11'95", on bark, 23-XI-1995, *Costa 2811* (RB); Colocação Bom Jardim, 8°17'80"-71°08'60", on fallen branch, 26-XI-1995, *Costa 2912* (RB); Reserva Extrativista do Alto Juruá, Rio Tejo, Vila da Restauração, Base de Pesquisa da Restauração, 9°02'52"-72°16'22", on bark, 30-XI-2000, *Costa 3925 p.p.* (RB); on decaying wood, 1-XII-2000, *Costa 3947 p.p.* (RB); on tree trunk,

2-XII-2000, *Costa 3973 p.p.* (RB); Foz do Rio Tejo, Hospedaria, 8°57'7"-72°33'34", fallen on the soil, 6-XII-2000, *Costa 4011* (RB).

\* *Plagiochila rutilans* **Lindenb.**

Recognized by the leaves elongate with rounded apex, with small teeth, perianth with bracts. General distribution: Tropical America. Brazil: RR, AP, AM, PA, PE, BA, MG, ES, RJ, SP, SC, RS.

Acre: Reserva Extrativista do Alto Juruá, Rio Tejo, Vila da Restauração, Base de Pesquisa da Restauração, 9°02'52"-72°16'22", on shrub along "igarapé", 30-XI-2000, 1-XII-2000, *Costa 3960 p.p.* (RB).

\* *Plagiochila vicentina* **Lindenb.**

Dorsal leaf base with ciliate teeth. General distribution: Tropical America (Herzog, 1931). Brazil: AM; this is the second record for Brazil.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, Fazenda do Barro, 8°20'71-80"-71°11'97-91", on canopy branch, 16-XI-1995, *Costa 2584* (RB); Colocação Samauma, 8°23'03"-71°17'27", on rotten wood, 24-XI-1995, *Costa 2825* (RB); Colocação Morada Nova, 8°20'72"-71°11'95", on branch, 25-XI-1995, *Costa 2895* (RB); Reserva Extrativista do Alto Juruá, Rio Tejo, Vila da Restauração, Base de Pesquisa da Restauração, 9°02'52"-72°16'22", on bark, 30-XI-2000, *Costa 3934* (RB).

## Radulaceae

\* *Radula flaccida* **Lindenb. & Gottsche**

Recognized by the funnel-shaped gemmae occurring on the dorsal leaf margin. General distribution: Tropical America, Africa and adjacent islands (Yamada, 1988). Brazil: RR, AM, PA, MG, SP.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, Colocação do Seringal de Tamararé, 8°32'85"-71°28'65", on liana, 18-XI-1995, *Costa 2610 p.p.* (RB); on living leaves, 18-XI-1995, *Costa 2636 p.p.* (RB); Colocação do Seringal do Sumaré, 8°30'84"-71°27'83", on living leaves, 19-XI-1995, *Costa 2663 p.p.* (RB); Colocação do Seringal de



Macuripe, 8°27'64"-71°22'31", on living leaf, 20-XI-1995, *Costa 2698 p.p.* (RB); Colocação Samauma, 8°23'03"-71°17'27", on living leaves, 24-XI-1995, *Costa 2838 p.p.* (RB); Reserva Extrativista do Alto Juruá, Rio Tejo, Vila da Restauração, Base de Pesquisa da Restauração, 9°02'52"-72°16'22", on living leaves, 30-XI-2000, *Costa 3933* (RB); on living leaves, 2-XII-2000, *Costa 3977* (RB).

\* *Radula javanica* Gottsche

Leaf-lobe falcate-ovate with apex rounded to obtuse, lobule subquadrate with apex obtuse, and keel slightly sinuate to straight, covering 1/3-1/2 of stem. General distribution: Pantropical (Castle, 1966, 1968). Brazil: AM, AP, PA, PE, MG, RJ, SP, RS.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, Fazenda do Barro, 8°26'96"-71°20'95", on bark, 21-XI-1995, *Costa 2760* (RB).

\* *Radula recubans* Taylor

Leaf-lobe is broadly-ovate with rounded apex, lobule quadrate, slightly auriculate, apex narrowly rounded, and keel incurved covering the stem. General distribution: Tropical and subtropical America (Castle, 1966). Brazil: PA, RJ, SP, RS.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, Fazenda do Barro, 8°20'71"-80"-71°11'97"-91", on canopy branch, 16-XI-1995, *Costa 2564 p. p.* (RB).

## Mosses

### Bartramiaceae

*Philonotis uncinata* (Schwaegr.) Brid.

Leaf with a strong-excurrent midrib, cells elongated to rectangular with a papilla in the upper angles, and in the margin projected. General distribution: Southern USA, Tropical America, Africa, and Oceania (Sharp *et al.*, 1994). Brazil: RO, AC, AM, PA, PI, PB, PE, BA, MT, MG, ES, RJ, SP, SC. In Acre sampled twice times on the stream banks, sometimes mixed with *Splachnobryum obtusum*.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da

Praia do Carapanã, Fazenda do Barro, 8°14'-70°57", on bank soil along the river, 15-XI-1995, *Costa 2550* (RB); on bank soil along the river, 15-XI-1995, *Costa 2551 p.p.* (RB).

### Brachytheciaceae

\* *Platyhypnidium aquaticum* (A. Jaeg.)

**M. Fleisch.**

Aquatic plant, presenting leaves large-ovate, with alar cells forming a distinct group. General distribution: Tropical America (Buck, 1998). Brazil: SP (Visnadi & Vital, 1989); this is the first record for Amazonian region.

Acre: Reserva Extrativista do Alto Juruá, Rio Tejo, Vila da Restauração, Base de Pesquisa da Restauração, 9°02'52"-72°16'22", on rotten wood along river, 1-XII-2000, *Costa s.n.* (RB).

### Calymperaceae

*Calymperes erosum* C. Müll.

It can be confused with *Calymperes afzelli* Sw., differing in the mamillate cancellina cells, and the gemmae ventrally on the leaf tips. General distribution: Pantropical (Reese, 1993). Brazil: RR, RO, AP, AC, AM, PA, PB, PE, BA, MT, MG, RJ.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, Colocação do Seringal de Macuripe, 8°27'64"-71°22'31", on bark, 20-XI-1995, *Costa 2704* (RB); 8°26'96"-71°20'95", on palm trunk, 21-XI-1995, *Costa 2738* (RB); on palm trunk, 21-XI-1995, *Costa 2741* (RB); Colocação Morada Nova, 8°20'72"-71°11'95", on palm trunk, 25-XI-1995, *Costa 2873, 2882* (RB); Colocação Bom Jardim, 8°17'80"-71°08'60", on palm, 26-XI-1995, *Costa 2907, 2908* (RB).

\* *Syrrhopodon incompletus* Schwaegr. **var. luridus** (Paris & Broth.) Florsch.

According to Reese (1993), recognized by the single teeth on the leaf margins. General distribution: Tropical America (Reese, 1993). Brazil: RR, AM, PA.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, Colocação Bom Jardim, 8°17'80"-71°08'60", on palm, 26-XI-1995,

*Costa 2916* (RB); Reserva Extrativista do Alto Juruá, Rio Tejo, Vila da Restauração, Base de Pesquisa da Restauração, 9°02'52"-72°16'22", on trunk of palm, 2-XII-2000, *Costa 3972 p.p.* (RB).

## Fissidentaceae

\* *Fissidens anguste-limbatus* Mitt. var. *anguste-limbatus* [Syn.: *Fissidens pennula* Broth., fide Pursell, 1994]

Leaves elliptic-ovate, bordered, cells smooth, cells of the vaginant lamina larger (lower half), apex round-obtuse. General Distribution: Colombia and Brazil (Churchill & Linares, 1995). Brazil: RR, RO, AM, PA, PE, FN, MT, MG, RJ, SP, PR, SC.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, Colocação Morada Nova, 8°20'72"-71°11'95", on rotten wood, 22-XI-1995, *Costa 2763* (RB).

### *Fissidens elegans* Brid.

Leaves acute to broad-acute, margin crenulate, entire to denticulate, bordered on the vaginant lamina, apex with one clear cell, costa sub-percurrent to short-excurrent. General distribution: Southern USA and Tropical America (Sharp *et al.*, 1994). Brazil: RR, RO, AC, AM, PA, PE, GO, MT, MG, RJ, SP, SC. Apparently disjunct between northern and southeastern Brazil.

Acre: Reserva Extrativista do Alto Juruá, Rio Bagé, 8°56'11"-72°33'41", on termite nest, 28-XI-2000, *Costa 3911* (RB).

*Fissidens flaccidus* Mitt. [Syn.: *Fissidens mollis* Mitt., fide Bruggeman-Nannenga & Pursell, 1995]

Leaves strongly bordered, 3-4 rows of cells, border confluent at the leaf apex, costa ending below the apex. General distribution: Widespread in Tropical America (Churchill & Linares, 1995). Brazil: RO, AC, PA, PB, PE, BA, MG, RJ, SP, PR. According to Lisboa (1991), is usually found on soil banks and rocks along the rivers, but in Acre collected on rotten wood and soil in the forest.

Acre: Município de Tarauacá, Vale do Alto Juruá, Reserva Indígena da Praia do Carapanã, 8°26'96"-71°20'95", on soil, 21-XI-

1995, *Costa 2744* (RB); Reserva Extrativista do Alto Juruá, Rio Bagé, próximo a Base de Pesquisa da Restauração, 8°56'11"-72°33'41", on rotten wood, 5-XII-2000, *Costa 4007* (RB).

\* *Fissidens guianensis* Mont.

According to Florschütz (1964), this is a very variable species recognized by the leaves with cells bulging, uni- or pluripapillose, cells of vaginant lamina pluripapillose. General distribution: Widespread in Tropical America (Churchill & Linares, 1995). Brazil: RR, RO, AM, PA, PI, PE, GO, MT, ES, RJ, SP, SC.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, Colocação Samauma, 8°23'03"-71°17'27", on the base of tree trunk, 24-XI-1995, *Costa 2851 p.p.* (RB).

\* *Fissidens prionodes* Mont.

Leaves linear-lanceolate, costa excurrent, apiculate, cells mamillate with thickened walls. General distribution: Widespread in Tropical America (Churchill & Linares, 1995). Brazil: RR, RO, AM, PA, PI, PE, BA, RJ, SP.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, 8°26'96"-71°20'95", on termite nests, 21-XI-1995, *Costa 2737* (RB); Fazenda do Barro, 8°20'71"-80"-71°11'97-91", on bark, 16-XI-1995, *Costa 2573* (RB); on palm root, 16-XI-1995, *Costa 2577* (RB); Colocação Bom Jardim, 8°17'80"-71°08'60", on palm, 26-XI-1995, *Costa 2903 p.p.* (RB).

*Fissidens submarginatus* Buch in C. Krauss [Syn.: *F. intermedius* C. Muell., fide Bruggeman-Nannenga & Pursell, 1995]

Leaves lanceolate, vaginant lamina bordered by narrow and elongate cells, margin serrulate-crenulate, apex acute to apiculate, cells unipapillose, costa percurrent. General Distribution: Tropical America (Sharp *et al.*, 1994). Brazil: RO, AC, AM, PA, PE, FN, BA, SP, SC. It is commonly found on soil at low altitude.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, Colocação Bom Jardim, Seringal Pacujá, 8°17'80"-71°08'60", on soil, *Costa 2901*, 26-XI-1995 (RB).

## Hypnaceae

\* *Phylodon truncatulus* (Müll. Hal.)

**W.R. Buck**

Recognized by the ligulate leaves, truncate leaf apex, margins strongly dentate, and cells papillose, papillae large, branched. General distribution: Tropical America and Africa (Buck, 1998). Brazil: AM, BA, SP.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, Colocação do Seringal de Tamandaré, 8°32'85"-71°28'65", on soil, 18-XI-1995, *Costa 2641 p.p.* (RB).

## Macromitriaceae

\* *Groutiella tumidula* (Mitt.) Vitt

Leaves oblong-ligulate, rounded to obtuse, mucronate, margins reflexed, plicate when wet. General distribution: Southern USA and Tropical America (Churchill & Linares, 1995). Brazil: RO, PA, RJ.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, Colocação Bom Jardim, 8°17'80"-71°08'60", fallen on soil, 26-XI-1995, *Costa 2911* (RB).

\* *Macromitrium podocarpü* Müll. Hal.

[Syn.: *M. portoricensis* R. S. Williams, *fade* Allen, 1998]

Leaves with incurved tips, apex fragile, margin crenulate and denticulate on the base, upper cells mammillose. General distribution: Central and South America (Churchill & Linares, 1995). Brazil: RO, AM, BA. This is the fourth record for Brazil, being for a long time known only from the type specimen from Puerto Rico.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, Colocação Samauma, 8°23'03"-71°17'27", on decaying wood, 24-XI-1995, *Costa 2839, 2856, 2858 p. p.* (RB).

\* *Schlotheimia rugifolia* (Hook.)

**Schwaegr.**

Leaves very rugose, broadly oblong, apex apiculate or mucronate, cells rounded or elliptic on the upper half. General distribution: Southeast USA, Mexico, Tropical America (Sharp *et al.*, 1994). Brazil: RO, PA, PE, BA,

GO, MT, DF, MG, ES, RJ, SP, PR, SC, RS. It is common on branches of trees and fallen trunks.

Acre: Reserva Extrativista do Alto Juruá, Rio Tejo, Vila da Restauração, Base de Pesquisa da Restauração, 9°02'52"-72°16'22", on decaying wood, 1-XII-2000, *Costa 3947 p.p.* (RB).

## Meteoriaceae

\* *Squamidium leucotrichum* (Taylor)

**Broth.**

Plant robust, pendent, leaves oblong, apex piliform, crispate or flexuous, alar cells quadrate. General distribution: Widespread in Tropical America (Allen & Crosby, 1986). Brazil: AM, PE, BA, MG, ES, RJ, SP, PR, SC; this is the second record for the Amazonian region.

Acre: Reserva Extrativista do Alto Juruá, Rio Tejo, Vila da Restauração, Base de Pesquisa da Restauração, terra firme, 9°02'52"-72°16'22", on bark, 30-XI-2000, *Costa 3925 p.p.* (RB).

\* *Zelometeorium ambiguum* (Hornsch.) Manuel

Easily recognized by the branch leaves revolute on the base. General distribution: Tropical America and Africa (Manuel, 1977). Brazil: AM, MG, ES, RJ, SP, PR, SC, RS; this is the second record for the Amazonian region.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, após a casa da Sra. Erundina, 8°32'85"-71°28'65", on bark, 17-XI-1995, *Costa 2603* (RB).

## Neckeraceae (= Thamnyobryaceae)

\* *Pinnatella minuta* (Mitt.) Broth.

Small plant, short-stipitate, leaves complanate, ligulate, costa strong, cells porulose to unipapillose. General distribution: Pantropical (Buck, 1998). Brazil: GO, SP, SC; this is the first record for the Amazonian region.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, Colocação do Seringal de Macuripe, 8°27'64"-71°22'31", on bark, 20-XI-1995, *Costa 2692* (RB); Colocação

Samauma, 8°23'03"-71°17'27", on liana, 24-XI-1995, *Costa 2817 p.p.*, 2861 p.p. (RB); Reserva Extrativista do Alto Juruá, Rio Tejo, Vila da Restauração, Base de Pesquisa da Restauração, 9°02'52"-72°16'22", on decaying wood, 30-XI-2000, *Costa 3926 p.p.* (RB); on decaying wood, 1-XII-2000, *Costa 3948 p.p.* (RB).

### Pilotrichaceae

#### \**Callicostella merkelii* (Hornsch.) A.

Jaeger

Recognized by the leaves oblong-lingulate, apex truncate to acute, median cells smooth, margins serrulate on the apex and entire on the base, midrib divergent almost reaching the apex. It is similar to *Callicostella pallida* (Hornsch.) Aongstr. differing in the leaf median cells unipapillose. General distribution: Tropical America (Florschütz-de-Waard, 1986). Brazil: AM, PA, MG, RJ, SC.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, Fazenda do Barro, 8°20'71-80"-71°11'97-91", on decaying wood, 16-XI-1995, *Costa 2587* (RB).

#### *Lepidopilum affine* Müll. Hal.

Leaves complanate, with rounded apex, midrib long and slender, seta hispid-papillose. General distribution: Widespread in Tropical America (Churchill & Linares, 1995). Brazil: known from old collections from Amazonas and Acre, according to Churchill (1998), Yano (1981, 1995).

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, Colocação do Seringal de Macuripe, 8°27'64"-71°22'31", on rotten wood, 20-XI-1995, *Costa 2693 p.p.* (RB); Reserva Extrativista do Alto Juruá, Rio Tejo, Vila da Restauração, Base de Pesquisa da Restauração, 9°02'52"-72°16'22", on bark, 1-XII-2000, *Costa 3946* (RB); on bark, 2-XII-2000, *Costa 3980* (RB).

### Pottiaceae

#### *Barbula indica* (Hook.) Spreng.

Recognized by the papilla at the back of the costa and paragula on the axil leaf.

General distribution: Southern USA, Mexico, Tropical America, and Asia (Churchill & Linares, 1995). Brazil: AC, AM, SE, BA, MG, ES, RJ, SP, PR. This is a plant typical of "salão" vegetation in Acre, growing on rock along river.

Acre: Reserva Extrativista do Alto Juruá, Rio Tejo, em direção ao Rio Bagé, on soil of salão, *Costa 3897*, 27-XI-2000 (RB); Cachoeira da Boa Vista em direção a Restauração, on rock along the river, 3-XII-2000, *Costa 3922* (RB).

### Pterobryaceae

#### *Henicodontium geniculatum* (Mitt.)

W.R. Buck

Secondary stems erects, leaves uncostate, margins recurved, cells unipapillose. General distribution: Florida, Tropical America, Africa, and Asia (Buck, 1998). Brazil: RO, AP, AC, AM, PA, PE, AL, BA, GO, MT, ES, RJ, SP. According to Buck (1998), it is rarely collected in the canopy, but in Acre it was sampled from decaying wood and fallen branches from the canopy.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, Colocação do Seringal de Tamandaré, 8°32'85"-71°28'65", on decaying wood, 18-XI-1995, *Costa 2639* (RB); Reserva Extrativista do Alto Juruá, Rio Tejo, Vila da Restauração, Base de Pesquisa da Restauração, 9°02'52"-72°16'22", on fallen branches, 1-XII-2000, *Costa 3949* (RB); Foz do Rio Tejo, Hospedaria, 8°57'7"-72°33'34", on decaying wood, 6-XII-2000, *Costa 4013* (RB).

#### \* *Pirella pohlii* (Hook.) Spreng.

Stipe with appressed leaves, branch leaf cells elongate, and branch leaves rounded to the insertion. General distribution: Southeastern USA and Tropical America (Buck, 1998). Brazil: RO, AM, PA, GO, MT, ES, SP, PR.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, after Erundina's house, 8°32'85"-71°28'65", on bark, 17-XI-1995, *Costa 2599* (RB); Reserva Extrativista do Alto Juruá, Rio Tejo, Vila da Restauração, Base de Pesquisa da Restauração, 9°02'52"-72°16'22", on decaying wood, 30-XI-2000, *Costa 3926 p.p.*

(RB); on decaying wood, 1-XII-2000, *Costa 3948 p.p.* (RB).

## Splachnobryaceae

### *Splachnobryum obtusum* (Brid.) Müll.

Hal.

Leaves elliptic to lingulate, rounded-obtuse, margins crenulate at the apex (single row of short cells). General distribution: Southern USA and Tropical America (Sharp *et al.*, 1994). Brazil: AC, AM, CE, FN, AL, GO, MS, SP, RS. This is a plant typical of "salão" vegetation in Acre, growing on wet soil along rivers and rivulets.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, Fazenda do Barro, 8°14'70°57", on bank soil along the river, 15-XI-1995, *Costa 2551 p.p.* (RB); Colocação Morada Nova, 8°20'72"-71°11'95", on banks soil along the rivulet (igarapé), 22-XI-1995, *Costa 2768* (RB); Reserva Extrativista do Alto Juruá, Rio Tejo, on bank soil along river, 27-XI-2000, *Costa 3898 p.p.* (RB); Cachoeira da Boa Vista forward to Restauração, on bank soil along the river, 3-XII-2000, *Costa 3989 p. p.* (RB).

## Thuidiaceae

### *Cyrto-hypnum schistocalyx* (Müll.

Hal.) W.R. Buck & H.A. Crum

Leaves of the secondary branches imbricate, covering the branch, periquecials leaves strongly flexuose-ciliate. According to Buck (1998), it is similar to *C. scabrosulum* (Mitt.) W. R. Buck & H. A. Crum, which presents leaves of the secondary branches loosely disposed and periquecials leaves strongly costate and not ciliate. General distribution: Southern USA and Tropical America (Buck, 1998). Brazil: RO, AC, AM, PA, MA, GO e MT.

Acre: Município de Tarauacá, Vale do Alto Juruá, Rio Tarauacá, Reserva Indígena da Praia do Carapanã, Fazenda do Barro, 8°20'71-80"-71°11'97-91", on liana, 16-XI-1995, *Costa 2576* (RB); Colocação Vai quem quer, 8°20'72"-71°11'95", on rotten wood, 23-XI-1995, *Costa 2806 p.p.* (RB).

## CONCLUSIONS

Bryophyte diversity in Brazilian Amazon high, presently recorded at 514 species. The bryoflora of the state of Acre (158 species) is poorly known, as suggested by comparisons of species-richness among the Amazonian states of Brazil. More efforts are needed to document the bryophyte diversity in this important part of the Amazon. This inventory should encourage further collecting in Acre and other areas of the Amazon that remain unexplored, which will permit a better understanding of the ecology and distribution of the bryophyte collections.

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