

The vegetation of Reserva Biológica San Francisco, Zamora-Chinchipec, Southern Ecuador – a phytosociological synthesis

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Abstract

Few floristic inventories and even less syntaxonomical vegetation descriptions of tropical mountain forests exist. The author presents a syntaxonomical treatment of the vegetation of Reserva Biológica San Francisco at the northern limit of Podocarpus National Park, Ecuador. The “Lower Montane Forests” (1800-2150 m), grouped in the new order *Alzateetalia verticillatae*, have a very diverse, 20-35m tall, 2-3 storied *Estrato arboreo*, and are a typical mosaic-climax. They grow on *Terric Haplosaprists* and *Aquic Dystrupects*, developed from old landslide material and extend up to 2300 m at the bottom of wind-protected riverine valleys. At altitudes from 2100 to 2650/2750 m, the forest structure and floristic composition change completely. The vegetation types belonging to this “Upper Montane Forest” form the new *Purdiaeaetalia nutantis*, growing on *Histic Petraquepts*. They represent a monotypic vegetation type, with only one *Estrato arboreo*, and stems between 5-10 m, sometimes up to 15 m tall. The canopy is completely dominated by the twisted stems of *Purdiaea nutans* (Cyrillaceae). The „Subalpine-elfin forest“ which closely resembles the Bolivian „Jalca“ forms the uppermost forest belt of the study area. Described as *Clusio ellipticae* – *Weinmannion cochensis*, this forest – more like an impenetrable bushland - grows on *Humaqueptic Epiaquents* and is closely dovetailed with the adjacent *Páramo* region. The “timberline” in the area is mainly induced by strong winds. The species rich *Páramos* at ECSF (*Neurolepio-Puyetalia*) receive an annual rainfall of up to 6000 mm. Typic *Tropaquepts* and *Lithic Troporthents* are the prevailing soil types. The main grasses are *Bambusiodeae* of the genus *Neurolepis*. Charcoal was found at the base of the A horizons of many soil profiles up to the top region and ¹⁴C dated to 710- 980 50 years BP. This indicates that vegetation fires occurred in the past, and are not only a recent phenomenon.

Key words: Braun-Blanquet, phytosociology, Tropical Mountain Forests, Andes, altitudinal gradient, forest communities

Resumen

Existen pocos inventarios y menos descripciones taxonómicas de la vegetación de bosques montañosos tropicales. El autor presenta un tratamiento fitosociológico de la vegetación de Reserva Biológica San Francisco, al límite Norte del Parque Nacional Podocarpus, Sur de Ecuador. El “Bosque Montano Bajo (1800-2150 m) formando el nuevo orden Alzateetalia (OJO) verticillatae, muestra 2-3 estratos arbóreos muy diversos, con árboles de 20-35 m de altura. Creciendo sobre Terric haplosapristis y Aquic Dystrupeats (OJO), originando del material de derumbes viejos, este tipo de bosque se extiende hasta 2300 m en quebradas protegido del viento. A altitudes de 2100 – 2650/2750 m la estructura del bosque y la composición florística cambian totalmente. En esta vegetación, el “Bosque Montano Alto” forma el orden de Purdiaeaetalia nutantis que crecen sobre Histic Petraquepts. Representando una vegetación monotípica con un solo estrato arbórico de 5-10 m (15 m) de altura, el estrato arbórico es completamente dominado por Purdiaea nutans (Cyrillaceae). El bosque más alto del área, densamente engranado con el Páramo es el “Bosque Nublado Subalpino” con fisionomía similar que la “Jalca” de Bolivia. Descrito como Clusio ellipticae – Weinmannietum cochensis aparece más que una vegetación arbustiva casi impenetrable, y crece sobre Humaquic Epiaquepts (OJO). El límite del bosque está causado por los vientos fuertes de la región. Los Páramos de la ECSF (Neurolepio-Puyetalia) muestran una diversidad alta y reciben hasta 6000 mm de lluvia anuales. Typic Trophaquepts y Tithic Troportents (OJO), son los tipos de suelos comunes, y Bambusoideae del género Neurolepis las gramíneas dominantes. Se encontró carbón a la base de los niveles A de muchos perfiles de suelo. El análisis ¹⁴C indicaba una edad de 710- 980 50 años AP. Este indica que fuegos en la vegetación habían ocurrido en el pasado y que no son un fenómeno reciente.

Palabras clave: Braun-Blanquet, fitosociología, bosque montano tropical, andes, gradiente altitudinal, comunidades forestales

Introduction

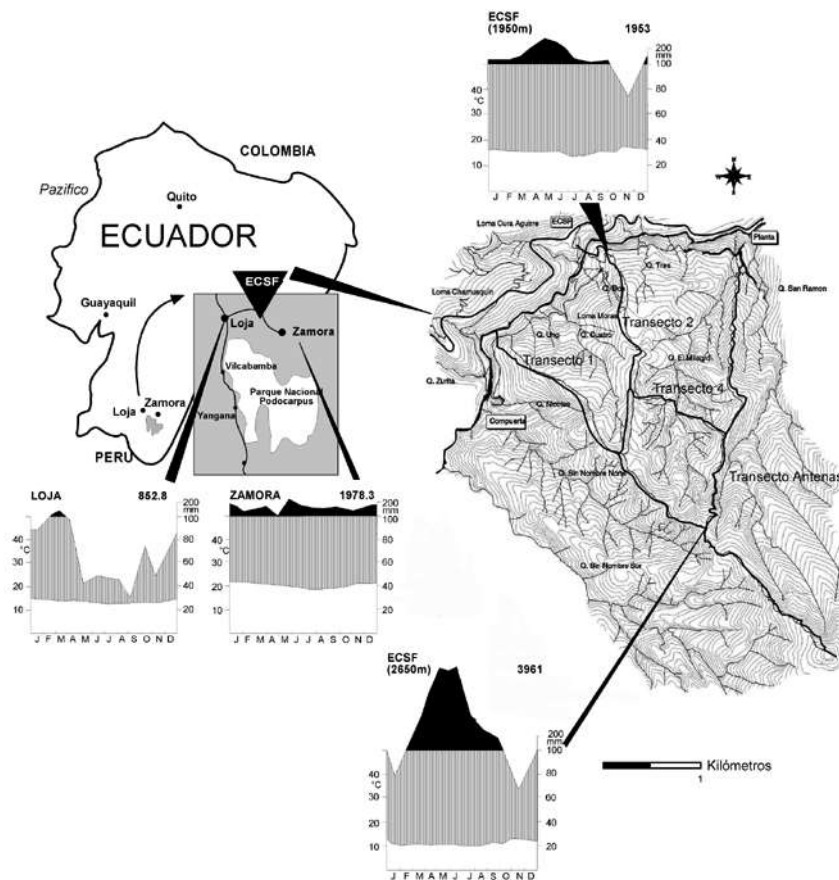
Tropical mountain forests are amongst the species richest ecosystems worldwide. Particularly the Eastern Andean Region represents one of the most important “biodiversity-hotspots” (Myers et al. 2000). In striking contrast to tropical lowland rainforests, these tropical montane forests have received only marginal attendance in science and society until recently, despite their ecological and economical importance as water catchments and erosion barriers. At the same time, mountain forests are especially sensitive ecosystems due to their steep relief, which allows extreme erosion under a high rainfall regime. Due to increased population pressure and resource use (firewood, mineral resources, pastures, and agriculture), montane forests are more and more rapidly dwindling. Most studies carried out in tropical ecosystems have focused on the lowland rainforests, and most research stations are located there (Leigh 1999). Even there, very little is known about the regeneration processes in the ecosystem (Finegan 1996), and fairly nothing about its functioning. In Tropical Mountain Ecosystems, studies concentrated often on the alpine zone, whereas the often-inaccessible forest belt with its extreme species richness has rarely been studied (Gentry 1995, Webster 1995). Although Andean forests host an unbelievably high species richness (Barthlott et al. 1996, Ibisch 1996), often comparable or higher than species counts for Amazonian areas (Balslev et al. 1998), hardly any comprehensive phytosociological studies of neotropical mountain forest ecosystem have been undertaken. Meier (1998) has presented the only study with a focus on vegetation for the Avila-Nationalpark in Venezuela. Even broad-focused projects like “Ecoandes” in Colombia (Hammen et al. 1983, 1984, 1989, 1995) included the forest regions only marginally. Moreover, although the majority of the vascular flora in tropical forests belongs to non-woody life forms (Gentry & Dodson 1987 a, b, Ibisch 1996, Balslev et al. 1998, Galeano et al. 1999), most vegetation studies have focused entirely on woody species (Gentry 1988, 1995; Kitayama 1992, Aiba & Kitayama 1999). Most investigations have also been limited to very few areas and elevations, rarely studying the whole altitudinal gradient. The few publications concerning the mountain forest vegetation of Ecuador mainly contain

species lists, or mention the montane region as short comparison to the forests of the Amazon basin (Grubb et al. 1963, 1966; Ek 1997). First attempts to bring the frugal knowledge existing together were made only recently (Hamilton et al. 1994, Churchill et al. 1995). The work presented here was designed to document the vegetation and its zonation in the Ecuadorian mountain forests and subalpine region of Southern Ecuador.

Study area

The border region of Ecuador and Peru is one of the most biologically diverse areas worldwide, and thus a “biodiversity-hotspot” par excellence. Low passes in the Andean chain allow an easy exchange between the floras and faunas of the Amazon Basin and the Pacific lowlands. Additionally, the region shows a very fast transition between the humid mountain forests of the northern Andes and the dry, deciduous forests of the northern Peruvian lowlands. Until the recent past, the Podocarpus National Park and the study area have been almost unknown scientifically. Few studies deal with the flora of Loja province (Espinosa 1948a,b; Emperaire & Friedberg 1990, Øllgaard & Madsen 1993, Ulloa & Jørgensen 1993, Jørgensen & Ulloa 1994, Madsen & Øllgaard 1994, Bussmann & Lange 1998, Jørgensen & León-Yanez 1999, Bussmann 2001), or attempt short descriptions of the area and its vegetation (Espinosa 1989/92, Madsen 1989, 1991, Jørgensen 1991, Bøgh 1992, Keating 1995, 1997, 1998, 1999, 2000). The most recent new approach for the classification of the vegetation of Ecuador (Sierra 1999) lists all montane forests between 1800 – 3000 m altitude as “bosque de neblina montano”, without further distinction.

Fig. 1: Study area in Southern Ecuador



Studies of composition and regeneration of the forest vegetation of Reserva Biológica San Francisco are being carried out since 1997 as part of the DFG Project "Functionality in a tropical mountain forest: Diversity, dynamic processes & use-potential under ecosystem aspects".

Reserva Biológica San Francisco is located between the provincial capitals Loja and Zamora. The research area covers 1000 ha of the northern slopes of Cordillera de Consuelo, at 03° 58'18''S - 079°04'44''W, in Zamora-Chinchipe Province, Ecuador, adjacent to the 146,200 ha Podocarpus National Park (Fig. 1), the only protected area in Southern Ecuador. Ranging from 1800 – 3150 m, it contains a complete transect primary forest types and their respective regeneration stages of the montane forest of the region, as well as comparable anthropogenically disturbed areas in the close vicinity. The relief is extremely steep with slope inclinations reaching partly 90°, and mainly ranging between 40-60°. The forests of the reserve are accessible using 4 Transects (Transect 1, 2, 4 and Antenna Transect in Fig. 1).

Geology and soils

In the Southern part of Ecuador and the North of Peru, a number of lower ridges with deep and dry valleys are found. The highest elevation is 4600 m and for most parts 4000 m is not exceeded (Jørgensen & Ulloa 1994). The area is the lowest part of the Andes near the equator. While the substrate of the Northern Andes are of Quaternary volcanic origin, the southern part is built of pre-Cretaceous to Tertiary material (Hall 1977). The geological substrate consists mainly of sandstones and phyllites. Most soils at ECSF exhibit a huge forest floor up to 48 cm thick. The soils of the lower parts of the area up to about 2100 m are mainly Dystrudepts and Haplosaprists which developed mainly in landslide material rich in rocks. Charcoal found at these altitudes was ¹⁴C dated to 710 ± 50 years BP, suggesting that a landslide occurred after the original forest had been destroyed by fire. They still contain a high percentage of weakly weathered rock material. At higher elevations, from 2100-2700 m Petraquepts are the common soil type, which at least partly must have developed in solifluction covers, followed by Epiaquepts to the top region. Charcoal was found at the base of the A horizons of many soil profiles up to the top region and ¹⁴C dated to 710- 980 ± 50 years BP. This indicates that vegetation fires occurred in the past, and are not only a recent phenomenon (Schrumpp et al. 2001).

Climatic conditions

Emck (in prep.) reports an average annual precipitation of about 2500 mm in the, and more than 5000 mm in the uppermost regions of the reserve, with the mean annual temperatures between 15-17 °C and 9-11°C respectively, registered during 1997-2001 (Fig. 1). Dense clouds or mist covers particularly the peak regions most time of the year. The rainfall from February-May consists of fairly regular, almost daily downpours, whereas from June-September constant drizzling with high winds occurs. The accumulated monthly rainfall however shows almost no difference during these months. From October-January rainfall consists mainly of heavy but irregular downpours, reaching almost the rainfall average of the period previously described. However, the very sunny intervals between these heavy rains might last from several days to almost 3 weeks, which can lead to a periodically negative water balance during these "dry" months (Fig. 1), although the climate as such is clearly perhumid and the diagram does not indicate "arid" periods. This fact however clearly explains why many canopy species show xeromorphic leaves and drought tolerance adaptations, although the forest appears to be covered with clouds most of the time.

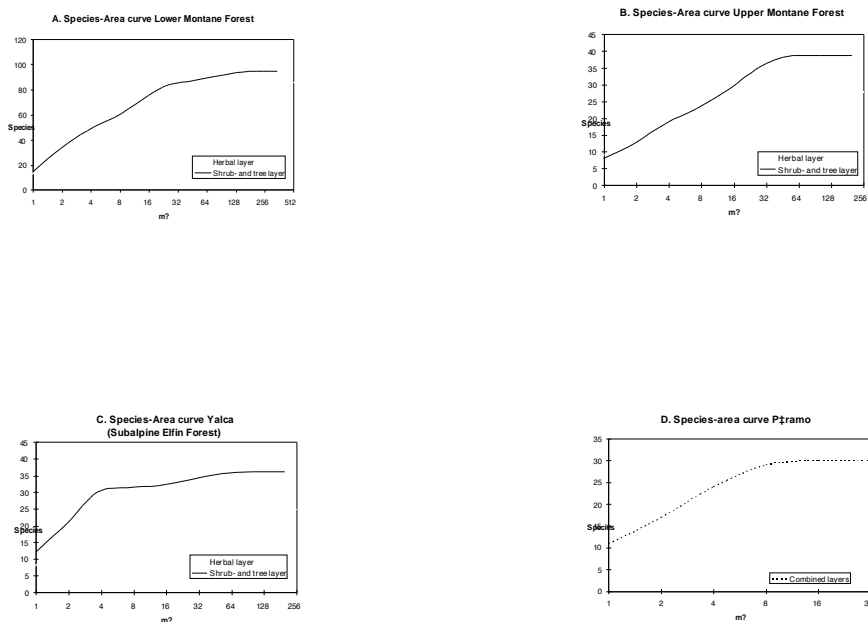
Materials and Methods

Fieldwork is being conducted in an ongoing effort since September 1995, allowing revisits of all plots during all seasons of the year, including a strong El Niño/La Niña cycle in 1997/98. After a detailed floristic inventory of the study area based on random samples, non-permanent phytosociological plots (307 in natural forest areas, 76 plots on natural, as well as 40 plots on

antropogenically induced landslides) were established and sampled, following the method of Braun-Blanquet (1964) as described in detail by Mueller-Dombois & Ellenberg (1974), using the cover/abundance scheme as modified by Hammen et al. (1989). This scale has been chosen because a more detailed scale proved to be not practicable due to extreme species richness.

Sampling sites were chosen subjectively in ecologically and physiognomically representative and homogenous forest- and Páramo areas and habitats in different stages of regeneration. The plot size chosen (400 m² in Lower Montane Forest areas, 225 m² in the Upper Montane and Subalpine Forest, 100 m² in Páramo) was always larger than the minimum areas determined, to obtain more reliable data on cover/abundance of the species present (Fig. 2), but was small enough to keep environmental factor in the plots uniform. Generally plots were square shaped, but frequently other shapes were chosen, particularly in linear habitats as ridges, ravines, landslides or roadsides.

Fig. 2: Species-Area curves for different vegetation units



To obtain data on forest structure also, fourteen additional plots of 20 x 50 m (1000 m²) were established in intervals of 200 m altitude, following two transects, to document the stand structure of the area. Height and diameter at breast height (dbh) of all living and dead tree species with a dbh > 10cm were measured. In each plot five additional sub-plots of 2 x 2 m were established, to get data on tree regeneration.

Vouchers of all plant species encountered in the research area (but not in every single plot) were collected, and deposited at the Herbarium of Estación Científica San Francisco (ECSF), the Herbario Reinaldo Espinosa Loja (LOJA), the National Herbarium of Ecuador (QCNE) and the Herbario de la Pontificia Universidad Católica Quito (OCA). The nomenclature follows Jørgensen & León-Yáñez (1999). The nomenclatural treatment of syntaxa follows Barkmann et al. (1986).

Presence/absence of all species was registered in each plot. Epiphytic species were collected from fallen trees and branches as well as by climbing randomly selected tree, with 8m trimming poles, and by observation through binoculars (also outside the plots to allow a more

complete survey of the epiphyte flora). At 9 sites of different altitudinal level, the epiphyte flora of selected trees was completely mapped, and the distribution in the Johansson Zones registered (Johansson 1974). Up to date 2258 species of vascular plants and ferns, belonging to 636 genera of 176 families have been identified in Reserva Biológica San Francisco.

Results – Synopsis of the plant communities of Reserva Biológica San Francisco

The vegetation of Reserva Biológica San Francisco could be grouped into 4 large forest formations, distinguishing the most conspicuous altitudinal zones. Extremely steep slopes and deeply incised riverine valleys, providing a mosaic of different microclimates, as well as frequent natural landslides, lead to a very variable mosaic of vegetation units in the Southern Ecuadorian region. (Bussmann 2001): The Lower Montane Forests (1800-2150 m), Upper Montane Forests (2150-2650 m), Jalca (Subalpine Elfin Forests, 2650-3000 m) and Páramo (2700-3150 m). Particularly Jalca and Páramo communities were closely interlaced along the wind-induced timberline.

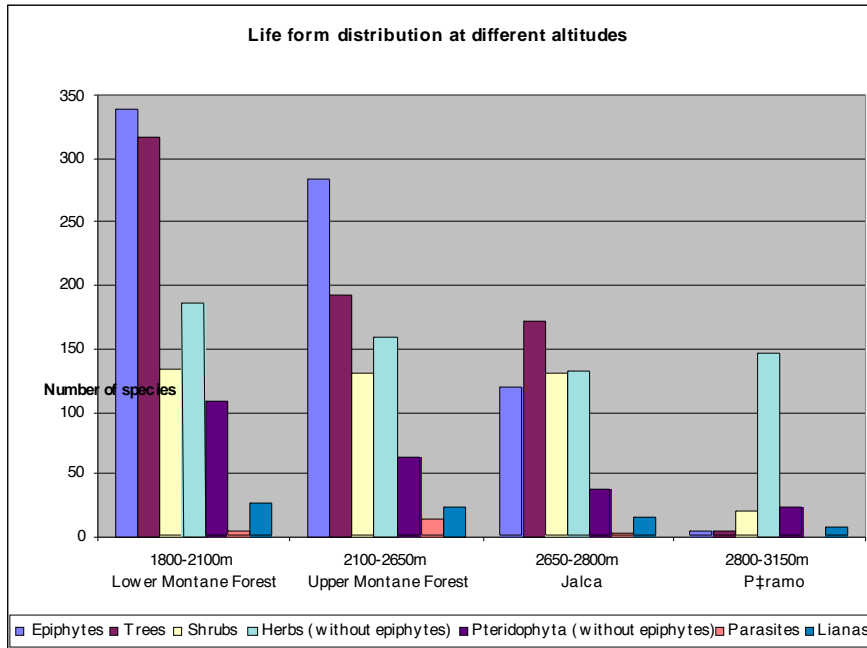
Lower Montane Forests (Tab. 1,7)

Alzateetalia verticillatae ord. nov., Holotype Alzation verticillatae all. nov. (Tab. 1, 7)

This new order comprises the prevalent forest types at altitudes from 1800 – 2150 m, with a very diverse, 20-35m tall and 2-3 storied tree stratum, representing a well developed multi-species mosaic-climax, with very few species occurring with higher cover/abundance (Photo 1), grows on Terric Haplosaprists and Aquic Dystrupects (Schrumpf et al. 2001). This “Lower Montane Forest” (*Ocotea – Nectandra* forest, Bussmann 2001), extends up to 2300 m at the bottom of wind-protected riverine valleys. Species belonging to families found mainly at lower altitudes (e.g. Cyclanthaceae, Lauraceae, and Hymenophyllaceae) are very common, whereas representatives of the flora of higher regions are very rare. Undisturbed tracts of the Alzateetalia could be mainly encountered on very steep slopes with an inclination of 30-50° or more, as well as in almost inaccessible valleys. In areas easier to reach, the Alzateetalia have been almost entirely destroyed by human activities, and have been replaced by secondary forest. Receiving about 2500 mm of annual rainfall, the Alzateetalia verticillatae are amongst the “driest” forest communities of the study area, and grow mainly on Typic Trophotents and Oxaquic Humitropects (Schrumpf 1999).

With 880-1210 trees of more than 10cm diameter at breast height (dba)/ha, the Lower Montane Forest showed the highest tree abundance in the research area, and one of the highest encountered so far in tropical forests. With 339 species epiphytes are the most diverse life form in these forests, followed by trees (318 species), herbs (186), shrubs (134), ground ferns (108) and few lianas (26) and parasites (4) (Fig. 3). Half of all genera of Araceae encountered at ECSF occurred only in these lower regions. Orchids are still the dominant epiphyte group (153 species), with again almost half the genera restricted to this region. The zonation of the different vegetation types on the ECSF transects is shown on Figs. 4A-F.

Fig. 3: Life form distribution at different altitudinal levels



Characteristic taxa: **Tree strata:** *Abarema killipii*, *Alchornea grandiflora*, *A. pearcei*, *Alzatea verticillata*, *Aniba cf. coto*, *A. muca*, *Axinea pauciflora*, *Byrsonima sp.* (Neill 12631 in QCNE), *Clethra revoluta*, *Clusia magnifolia*, *Elaeagia karstenii*, *Eschweillera sp.* (Rbu & SL 2712 in ECSF), *Graffenrieda emarginata*, *Guarea kunthiana*, *Hedyosmum goudotianum*, *Hyeronima asperifolia*, *H. duquei*, *H. moritziana*, *Inga striata*, *Joosia aequatorialis*, *Licaria sp.* (Galvez & Ordoñez in LOJA), *Matayba sp.* (Neill in QCNE), *Meliosma sp.* Neill in QCNE), *Meriania drakei*, *Miconia jahnii*, *Myrsine coriacea*, *Naucleopsis glabra*, *Nectandra cf. subullata*, *N. laevis*, *N. sp.* (Neill in QCNE), *Ocotea sp.* (Neill 12617), *Podocarpus sprucei*, *Prunus opaca*, *Schefflera dielsii*, *S. lasiogyne*, *Weinmannia fagaroides*. **Shrub stratum:** *Heliconia burleana*, *Manettia alba*, *Palicourea stipularis*, *Piper aduncum*, *P. aequale*, *Psychotria herzogii*, *P. tinctoria*. **Herbal stratum:** *Agonandra excelsa*, *Anthurium grex-avium*, *A. pulchrum*, *A. rubrinervum*, *Saccoloma inaequale*. **Epiphytes:** *Anthurium breviscapum*, *A. dombeyanum*, *A. incomptum*, *A. scandens*, *A. truncicola*, *Asplenium serra*, *Hymenophyllum fucooides*, *Lepanthes drymocharis*, *L. nummularia*, *Nephrolepis cordifolia*, *N. pectinata*, *Pecluma consimilis*, *P. ptilodon*, *Peperomia cluveja*, *Pitcairnia riparia*, *Pleopeltis macrocarpa*, *Polypodium caceresii*, *Terpsichore dependens*.

Photo 1: View of Lower Montane Forest.

Photo 2: *Alzateetum verticillatae*- The species with large leaves is *Graffenrieda emarginata*.



Alzation verticillatae all. nov. (Tab. 1, 1-33; 7 units 1-5); Holotype: *Alzateetum verticillatae* ass. nov., Tab. 1, Column 15, Relevé 266

The *Alzation verticillatae* comprises the primary forest communities of the class, with a tree cover of normally 100 %. The shrub and herbal layers are mostly open. This alliance includes the communities of steep, broad slopes, as well as riverine forest communities on the bottom of the numerous small creeks and rivers of the area. The *Myricantho ternifoliae*-*Weinmannion pinnatae* Cleef et al. 1984 shows a clear resemblance to these new syntaxa.

Characteristic taxa: **Tree strata:** *Beilschmiedia olloiophylla*, *B. sulcata*, *Casearia fasciculata*, *Chamaedora pinnatifrons*, *Cinchona macrocalyx*, *Clusia latipes*, *Croton wagneri*, *Cyathea caracasana* var. *bolivensis*, *Geissanthus vanderwerfii*, *Geonoma interrupta*, *Guarea glabra*, *Hyeronima oblonga*, *Licaria cannella*, *L. peckii*, *Mabea elata*, *Mauria heterophylla*, *M. membranifolia*, *M. simplicifolia*, *Meriania rigida*, *Miconia corymbiformis*, *M. imitans*, *M. punctata*, *Nectandra* cf. *crassiloba*, *N. laurel*, *Ocotea cernua*, *O. cf. benthamiana*, *Persea caerulea*, *P. hexandra*, *Pouteria bangii*, *Prumnopytis montana*, *Prunus debilis*, *Sapindus saponaria*, *Symplocos peruviana*, *Tapiria obtusa*, *Trichilia guianensis*, *T. maynasiana*, *Weinmannia pubescens*. **Shrub stratum:** *Boehmeria pavonii*, *Cavendishia loranthifolium*, *Palicourea amethystina*, *P. chloracaerulea*, *Piper elongatum*, *P. lacunosum*, *P. peltatum*, *Psychotria caerulea*, *P. hazenii*, *Siphocampylus scandens*. **Herb stratum:** *Arachnoides denticulata*, *Asplenium tabinense*, *A. uniseriale*, *Blechnum cordatum*, *B. fragile*, *B. occidentale*, *Ctenitis subincisa*, *Dichorisandra bonitiana*, *D. hexandra*, *Dictyostegia orobanchoides*, *Didymochlaena truncatula*, *Diplazium ambiguum*, *D. ambiguum* var. *ambiguum*, *D. ambiguum* var. *dissectum*, *D. pinnatifidum*, *Epidendrum aggregatum*, *Hypolepis nigrescens*, *Macrothelypteris torresiana*, *Megalastrum andicola*, *Oplismenus burmannii*, *Pilea obetiifolia*, *Polystichum platyphyllum*, *Pseudoechinochloa polystachya*, *Pteris altissima*, *P. decurrens*, *P. haenkeana*, *Selaginella arthritica*, *S. sericea*, *S. silvestris*, *Thelypteris dentata*, *T. pteroidea*, *Tripogandra serrulata*. **Epiphytes:** *Asplenium auritum*, *A. flabellulatum*, *A. harpeodes*, *Blechnum acutum*, *Dryadella perpusilla*, *Elaphoglossum ciliatum*, *E. crassipes*, *E. isophyllum*, *E. muscosum*, *E. platyphyllum*, *E. preselianum*, *Guzmania killipiana*, *Huperzia linifolia* var. *tenuifolia*, *Hymenophyllum myriocarpum*, *H. polyanthes*, *Lellingeria subsesillis*, *Maxillaria acuminata*, *M. arachnites*, *Nephrolepis pendula*, *Peperomia eburnea*, *P. ecuadorensis*, *P. emarginella*, *Pitiphyllum*

laricinum, *Platystele acicularis*, *Polypodium coriaceum*, *P. fraxinifolium*, *P. latissimum*, *P. sessilifolium*, *P. subandinum*, *Racinaea monticola*, *R. multiflora*, *R. tetrantha*, *R. euryelytra*, *Stelis nexiopus*, *Stenospermation longipetiolatum*, *Tillandsia confinis*, *T. naundorffiae*, *Trichomanes cristatum*, *Vittaria gardeniana*, *Vriesea appendiculata*, *V. barthlottii*.

1. *Nectandro acutifoliae* – *Endlicherietum sericeae* ass. nov. (Tab. 1, 1-11; 7 unit 1); Holotype: Tab. 1, Column 1, Relevé 1

Deeply incised, wind protected and particularly humid riverine valleys are densely covered with this association. Surpassing the normal altitudinal limit of the Alzateetalia, these riverine forests grow up to 2300 m, however only occupying the lowermost 20-30 m on both sides of the valley bottom. The flora of these forests is extremely rich, approaching 200 species in some relevés, with the highest occurrence of shade tolerant pteridophytes in the whole region. The *Cavendishio callistae*-*Tovomitetum weddellianae* Cleef et al. 1984 and the *Cavendishio*-*Tovomitetum graffenriedetosum santamartensis* of the *Gustavio speciosae*-*Tovomitetum weddellianae* Cleef et al. 1984 are closely related syntaxa to this association.

Characteristic taxa: **Tree strata:** *Alsophila cuspidata*, *Aniba* sp. (Galvez & Ordoñez in LOJA), *Blakea subconnata*, *Calyptanthes* cf. *bipennis*, *Centronia laurifolia*, *Chrysoclamys membranacea*, *Conceveiba trigonocarpa*, *Cupania americana*, *Cyathea bipinnatifida*, *C. bradei*, *C. divergens*, *C. lechleri*, *C. microdonta*, *Endlicheria sericea*, *Ficus krukovii*, *F. subandina*, *Hirtella triandra*, *Ilex inundata*, *Leonia glycyocarpa*, *Miconia amazonica*, *M. multispicata*, *Nectandra acutifolia*, *N. cissiflora*, *Ocotea aciphylla*, *O. cuneifolia*, *Rugaea glabra*, *R. pubescens*, *Sloanea* sp. (Neill in QCNE), *Symplocos bogotensis*, *Tovomita weddelliana*, *Trichilia* cf. *moschata*, *T. cipo*, *Weinmannia auriculifera*, *Zanthoxylum martinicense*. **Shrub stratum:** *Boehmeria ulmifolia*, *Centropogon capitatus*, *C. comosus*, *Clidemia hirta*, *Miconia nervosa*, *M. rigida*, *Ossaea quadrisulca*, *Piper obliquum*, *P. obtusilimbium*, *Psychotria gentryi*, *Urera baccifera*. **Herb stratum:** *Adiantum alarconicum*, *A. concinnum*, *A. fructuosum*, *A. latifolium*, *A. pulverulentum*, *Blotiella lindeniana*, *Boerhavia coccinea*, *Danaea moritziana*, *Dennstaedia cicutaria*, *D. globulifera*, *D. cornuta*, *Diplazium ceratolepis*, *D. chimborazense*, *Hemidictyum marginatum*, *Klaprothia mentzelloides*, *Lastraeopteris effusa*, *Lindsorea guianensis*, *Lonchitis hirsuta*, *Renealmia thyrsoidea*, *Thelypteris amphoxypteris*, *T. peruviana*. **Epiphytes:** *Bolbitis lindegii*, *Caladium bicolor*, *Cheiroglossa palmata*, *Cochlidium serrulatum*, *Elaphoglossum decorum*, *Lepanthes stalactites*, *Oleandra pilosa*, *Oliveriana brevilibia*, *Peperomia macrostachya*, *Pitcairnia maidifolia*, *Racinaea dielsii*, *Satyria grandifolia*.

2. *Alzateetum verticillatae* ass. nov. (Tab. 1, 12-27; 7 units 2-3); Holotype: Tab. 1, Column 15, Relevé 266

The typical forests of the slopes of the research area are included in this association. The dark green crowns of *Alzatea verticillata*, as well as the rusty colored large leaves of *Graffenrieda emarginata* are the most common feature of these forests (Photos 2,3). In comparison to the riverine community, species numbers are considerably lower. Meier (1998) described a “*Clusia multiflora*-Gesellschaft” and the “*Micropholis crotonoides*-Gesellschaft”. Those can be seen as closely related syntaxa.

Characteristic taxa: **Tree strata:** *Annona cherimola*, *Chamaedora linearis*, *Clusia minor*, *C. multiflora*, *Cyathea ebeniana*, *Elaeagia myriantha*, *E. utilis*, *Endlicheria formosa*, *Eschweilleria caudiculata*, *Eugenia* sp. (Neill in QCNE), *Hedyosmum anisodorum*, *Hyeronima alchorneoides*, *Ilex aboroica*, *Inga edulis*, *Leandra subseriata*, *Miconia asplundii*, *Myricanthes myrsinoides*, *Nectandra membranacea*, *Ocotea javitensis*, *Oreopanax microfloroum*, *Ossaea bracteata*, *Picramnia sellowii*, *Piper perareolatum*, *Spondias mombin*, *Stilpnophyllum oellgaardii*, *Symplocos coriacea*, *Vochysia aurantiaca*, *Zinowiewia australis*. **Shrub stratum:** *Fuchsia lehmanni*, *Macleania floribunda*, *Piper nebuligaudens*, *P. scutilimbium*, *Thibaudia floribunda*. **Herb stratum:** *Aethanthus dichotomus*, *Bansteriopsis padifolia*, *Elleanthus blatteus*, *Guzmania acuminata*, *Lasiacis divaricata*, *Lophosoria quadripinnata*, *Smilax mollis*, *S. zarzaparilla*, *Stenospermation densiovulatum*, *Tradescantia zanonii*, *Tristerix longibracteatus*, *Utricularia jamesonii*, *Voyria tenella*. **Epiphytes:** *Cyclanthus bipartitus*, *Epidendrum amethystinum*, *E.*

mancum, *Guzmania gloriosa*, *Masdevallia carruthersiana*, *Octomeria grandiflora*, *Oncidium hartwegii*, *Peperomia laxiflora*, *P. tetraphylla*, *Racinaea schumanniana*, *Thelypteris gorresiana*, *Tillandsia barbeyana*, *T. fendleri*, *T. floribunda*, *T. stenoura*, *Zygophlebia mathewsii*.



Photo 3: Interior of *Alzateetum verticillatum*, with high number of Bromeliacean epiphytes.

Photo 4: *Cecropio montanae* – *Isertietum laevis*. The large leaved trees are *Cecropia montana*.

2.1. *Alzateetum verticillatae* typicum (Tab. 1, 13-27; 7 unit 3); Holotype: Tab. 1, Column 15, Relevé 266

Characteristic taxa: see *Alzateetum verticillatae* ass. nov.

The *Alzateetum verticillatae*, as naming association of the whole forest formation, resembles exactly the description rendered for the respective higher syntaxa.

2.2. *Alzateetum verticillatae* – *Elaphoglossum cuspidatum* facies (Tab. 1, 12; 7 unit 2); Holotype: Tab. 1, Relevé 24

Growing on almost flat or only little inclined areas, this facies was found only in a few places, where the naming species covers the entire forest floor. The shrub stratum is also denser than in other communities of the syntaxon. *Elaphoglossum cuspidatum* forms also a facies in the “*Clusia multiflora*-Gesellschaft” of Meier (1998).

3. *Alzateo verticillatae* – *Dictyocaryetum lamarckiana* ass. nov. (Tab. 1, 28-30; 7 unit 4); Holotype: Tab. 1, Column 28, Relevé 2

Where the terminal forest community had been disturbed, probably by natural fires, the tree stratum was dominated by groups of large palms (*Dictyocaryum lamarckianum*). Characteristically, the herb stratum is dominated by different species of bamboo (*Chusquea dombeyana*, *Rhipidoctadum harmonicum*), as well as large Gleicheniaceae (*Dicranopteris*, *Sticherus*), forming almost impenetrable thickets. In Colombia, the *Catatolo costaricensis*-*Dictyocaryetum schultzei* Cleef et al. 1984 is found as closely related taxon.

4. *Alzateetalia verticillatae* – *Purdiaeaetalia nutantis* transitional stage (Tab. 1, 28-33; Tab. 7 unit 4); Holotype: Tab. 1, Column 32, Relevé 189

This stage growing on the uppermost parts of the *Alzateetalia* marks the transition to the Upper Montane Forest. The species number is heavily decreasing, the shrub stratum getting very dense. Species characteristic for the upper forest formations started appearing in canopy and lower strata, and the tree species characteristic for the *Alzateetalia* disappeared gradually.

Cecropio montanae – *Isertium laevis* all. nov. (Tab. 1, 34-47; 7 unit 5); Holotype: *Cecropio montanae* – *Isertietum laevis* ass. nov.

Natural gaps, resulting from small landslides or single treefall events, are colonized by an open community of large leafed, fast growing pioneer tree species – mainly *Cecropiaceae*, *Rubiaceae* and *Asteraceae* - with a very sparse epiphytic flora accompanying them, and almost all shade tolerant species in the ground flora disappearing (Photo 4).

Characteristic taxa (tree stratum): *Aparisthmium cordatum*, *Cecropia montana*, *C. polyphlebia*, *Coussapoa* sp. (Neill in QCNE), *C. villosa*, *Heliocarpus americanus*, *Isertia laevis*, *Piptocoma discolor*, *Tibouchina lepidota*, *Vismia tomentosa*.

5. *Cecropio montanae* – *Isertietum laevis* (Tab. 1, 34-47; 7 unit 5); Holotype: Tab. 1, Column 34, Relevé 269

Characteristic taxa: see *Cecropio montanae* – *Isertium laevis* all. nov.

6. *Axineo quitensis* – *Dicranopteretum flexuosae* ass nov. (Tab. 1, 48-58; 7 units 6.1 – 6.3); Holotype: Tab. 1, Column 50, Relevé 87

In areas with formerly strong human influence (slash-and-burn, clearcutting), a completely different, monotypic secondary forest develops. The *Axineo* - *Dicranopteretum* has one single tree stratum, completely dominated by the 10-12 m tall stems of *Axinea quitensis* (*Melastomataceae*). Species diversity is much lower, and besides *Axinea*, only *Vismia tomentosa* (*Clusiaceae*), another pioneer species, contributes to the canopy in larger numbers. Almost no epiphyte species are encountered, and the ground flora is extremely impoverished.

Characteristic taxa: *Axinea quitensis*, *Baccharis genistelloides*, *Brachyotum campanulare*, *Desfontainia spinosa*, *Dicranopteris flexuosa*, *Epidendrum cochlidium*, *E. calanthum*, *E. catillus*, *E. lacustre*, *Pteridium arachnoideum*, *Sticherus revolutus*, *Sphagnum* sp.

6.1. *Axineo quitensis* – *Dicranopteretum flexuosae* typicum (Tab. 1, 48-52; 7 unit 6.1); Holotype: Tab. 1, Relevé 87

Characteristic taxa: see *Axineo quitensis* – *Dicranopteretum flexuosae*

6.2 / 6.3 *Axineo quitensis* – *Dicranopteretum flexuosae melinietosum minutiflorae* subass. nov. (Tab. 1, 53-58; 7 units 6.2 and 6.3); Holotype: Tab. 1, Column 53, Relevé 91

Where larger areas have been clear-cut, even species like *Axinea* disappeared. After initial colonization by cryptogams, a dense grass stratum, dominated by the introduced *Melinis minutiflora* develops. Astonishingly, an extremely high number of orchids starts to colonize these areas, and often builds very dense tufts between the grassy patches.

Differential taxa: *Andropogon bicornis*, *A. leucostachyus*, *Bejaria aestuans*, *Gaultheria erecta*, *Melinis minutiflora*, *Oreocallis grandiflora*, *Sobralia fimbriata*, *S. crocea*, *S. candida*, *Sticherus melanoblastus*.

Upper Montane Forests (Tabs. 2-4, 8)

The syntaxonomic position of the Upper Montane Forests is not completely clear at present. The new order established shows some relations to the “*Hedyosmum pseudoandromeda* Gesellschaftsgruppe” established by Meier (1998), however. This syntaxon however might rather be seen as a sister taxon, than of higher hierarchy.

Purdiaeaetalia nutantis ord. nov. (Tabs. 2-4; 8); Holotype: Purdiaeion nutantis all. nov.

At altitudes above 2100 m, up to about 2650/2750 m, the forest structure and floristic composition change completely, stems become twisted, low and lichen covered. This “Upper montane forest” (*Purdiaea nutans* – *Myrica pubescens* – *Myrsine andina* forest, Bussmann 2001), represents a monotypic vegetation type, with only one tree stratum, with stems between 5-10 m, sometimes up to 15 m tall, growing on Histic Petraquepts (Schrumpf et al. 2001) replaces the *Alzateetalia verticillatae* forest. Lowland species are completely disappearing. The twisted stems of *Purdiaea nutans* (Cyrillaceae), which has its main distribution in Northern Peru, dominate the canopy. Only in few places some other species become co-dominant. A very diverse stratum of small treelets and shrubs occurs (Photos 5,6). Many species of the *Purdiaeaetalia* show xeromorphic leaves, as adaptation to very high radiation, and waterstress during the “drier” months. The Upper Montane Forest grows mainly on Oxaquic and Aquic Dystropepts and receives an annual rainfall of almost 4000 mm.

In the Upper Montane Forest, the species and stem numbers decline considerably. At 2225 m, still 650 stems/ha were encountered, dropping to 160 at 2425 m, where the forest is very open subsequently. Epiphytes are still the most diverse life form, contributing 283 species. Tree and non-epiphytic-fern diversity fall sharply (192 and 63 species respectively), herbs (159) and shrubs (131) become more important in comparison to the Lower Montane Forests, as do lianas (24) and parasites (13) (Fig. 3). Although the most important families remain the same, they decrease in species. Notable exceptions are the orchids. Particularly *Pleurothallidinae* (*Lepanthes*, 32 species; *Pleurothallis* 25 species) have their main distribution in these misty forests. Small epiphytic Polypodiaceae as *Terpsichore* and *Melpomene* are also most species-rich at mid altitudes, and also Hymenophyllaceae have their center here. This correlates directly with humidity. For the zonation of the different units along the altitudinal gradient see Figs. 4A-F.

Characteristic taxa: **Tree stratum:** *Cinchona mutisii*, *Clusia ducoides*, *C. elliptica*, *C. multiflora*, *Cyathea straminea*, *Cybianthus marginatus*, *Geonoma densa*, *Graffenrieda harlingii*, *Hedyosmum goudotianum*, *Miconia acutifolia*, *M. rivettii*, *Myrica pubescens*, *Myrsine andina*, *Podocarpus oleifolius*, *Purdiaea nutans*, *Schefflera pentandra*, *S. sodiroi*, *Symplocos coriacea*, *Weinmannia elliptica*, *W. fagaroides*, *W. pinnata*. **Shrub stratum:** *Baccharis macrantha*, *Ceratostema loranthifolium*, *Disterigma pentandrum*, *Ilex* sp. (PHAXII005), *Macleania mollis*, *Miconia poortmannii*, *M. rivettii*. **Herb stratum:** *Blechnum cordatum*, *Guzmania acuminata*, *G. diffusa*, *G. gloriosa*, *G. vanvolxemii*, *Lophosoria quadripinnata*. **Epiphytes:** *Anthurium ovatifolium*, *Disterigma acuminatum*, *Lepanthes nummularia*, *Masdevallia carruthersiana*, *Melpomene sodiroi*, *Semiramisia speciosa*, *Terpsichore alsopteris*.

Photo 5: *Purdiaeaetalia nutantis*. Very dense canopy with small treelets with globular crowns. Trees with white tipped crowns are flowering specimens of *Purdiaea nutans*.

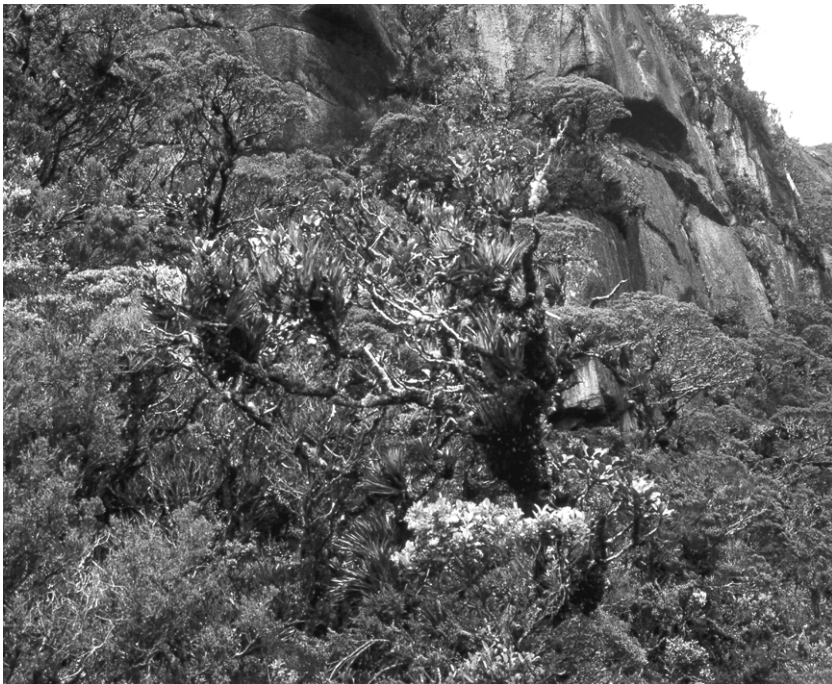


Photo 6: *Purdiaea nutans* with typical epiphytes.

1. *Neurolepietum elatae* ass. nov. / *Neurolepietum elatae* typicum (Tab. 2, 1-29; 8 unit 1);
Holotype: Tab. 2, Column 5, Relevé 153

On top of wind-exposed ridgetops, which are subject to heavy drought during the dry-season from October-January, the undergrowth of the *Purdiaeaetalia* is often completely dominated by the small bamboo *Neurolepis elata*. Here, the tree stratum becomes very open, and light is reaching the ground unhindered. The species composition is impoverished in comparison to the terminal associations of the Upper Montane Forest. *Neurolepis* shows the mass-flowering phenomenon characteristic for many *Bambosoids*: In some years, induced by factors unknown so

far, shortly before the “dry” season starts in October, most specimens start flowering, after which a fast dieback follows. This provides ideal conditions for natural fires, sweeping easily over the ridges. Indeed, many older tress show indications of former burning, and charcoal particles are a common feature in the soil. After burning, woody species manage to establish on the open sites, before the grassy layer develops again. Presently it is unclear, how the mass flowering is induced, and if this alliance represents only a late successional stage of the overaged terminal community, or if it is a stable community of itself. The high variability of relief and microclimate leads to the development of a high number of subassociations, mostly characterized by few taxa only.

Only scattered trees occur in most areas of the typical association of the Neurolepietum, and the shrub stratum is also impoverished. *Neurolepis elata* forms an extremely dense layer, which can hardly be penetrated. The large ground-bromeliads, otherwise a striking feature in the Purdiaeaetalia, disappear completely, and the vegetation makes a very monotonous impression.

Characteristic taxa: *Clethra revoluta*, *Cyathea caracasana*, *Geissanthus vanderwerffii*, *Roupala loxensis*, *Symbolanthus calygonus*, *Neurolepis elata*, *Peperomia hartwegiana*, *Blechnum fragile*, *Bomarea nervosa*, *Columnnea strigosa*, *Eriosorus flexuosus*, *E. rufescens*, *Trichomanes capillaceum*.

2. Neurolepietum elatae mezobromelietosum capituligerae subass. nov. (Tab. 2, 30-41; 8 unit 2); Holotype: Tab. 2, Column 30, Relevé 19

In more humid ridgetop areas and small depressions the cover of *Neurolepis* decreases significantly, making space for other species. The ground becomes instantly covered with *Mezobromelia capituligera*, which is only found in such places.

3. Neurolepietum elatae chusqueetosum falcatae subass. nov. (Tab. 2, 42-46; 8 unit 3); Holotype: Tab. 2, Column 42, Relevé 105

Within the research area, some small Quartz-islands occur. Eroding much slower than the surroundings, they tend to form little knolls with a strikingly different vegetation. The bases of these hilly sites are mostly covered with dense layers of *Chusquea falcata*, another bamboo species, being co-dominant to *Neurolepis elata* in such places. This subassociation shows relations to the “*Chusquea fendleri*-Gesellschaft” described by Meier (1998).

4. Neurolepietum elatae cladonietosum subass. nov. (Tab. 2, 47-53; 8 unit 4); Holotype: Tab. 2, Column 47, Relevé 99

On top of many of the mentioned small hills, where the soil often becomes very shallow, and small, vegetation free Quartz-bands become visible in places, trees disappear almost entirely, the shrub stratum impoverishes further, and few species coexist with the bamboo. The ground between the *Neurolepis* tufts is often bare, except for a densely growing reindeer lichen (*Cladonia spec.*), which could not be identified so far.

5. Neurolepietum elatae lycopodiellietosum cernuae subass. nov. (Tab. 2, 54-63; 8 unit 5.1/5.2); Holotype: Tab. 2, Column 59, Relevé 116

In the transition zone to the “Jalca” or Subalpine Elfin Forest, some parts of the Purdiaeaetalia have been disturbed by human activities, and different secondary forest communities have developed. A dense layer of *Lycopodiella cernua* and *Baccharis genistelloides* differentiates them.

6. Neurolepietum elatae – *Dicranopteris flexuosa* facies (Tab. 3, 64-67; 8 unit 6); Holotype: Tab. 3, Column 66, Relevé 67

In few areas in transition to the terminal communities of the Purdiaeion, Gleicheniaceae become very common, whereas characteristic species of the following syntaxa are still lacking. Thus, this community is being regarded as facies.

Purdiaeion nutantis all. nov. (Tab. 3, 64-109; 8 units 7-18); Holotype: Purdiaeaetum nutantis ass. nov., Tab. 4, Column 120, Relevé 158

The terminal communities of the Purdiaeaetalia are included in this new alliance. Growing mainly on the ridgetops of the research area, the Purdiaeion receives more moisture than the Neurolepion, and is also less exposed to drought. The main visible effect is a striking replacement of the dense grass layer by an equally dense stratum of large bromeliads, covering often the whole ground. This provides for a rather strange feeling, when trying to find a way through the more than 2 m tall thicket of these ground bromeliads. As in the Neurolepion, the extremely varying relief creates a wide variety of niches, providing space for a large number of communities. As they are mainly characterized by few taxa, they have been classified as subassociations. In most cases, the communities of the Purdiaeion are much richer in species than the monotonous Neurolepion.

Characteristic taxa: see Purdiaeaetalia nutantis

7. Purdiaeaetum nutantis rhynchosporetosum locupletis subass. nov. (Tab. 3, 68-81; 8 unit 7.1/7.2); Holotype: Tab. 3, Column 80, Relevé 51

Swampy, flat depressions are often filled with dense layers of Cyperaceans under a partly closed tree stratum, whereas the shrub layer remains very open.

8. Purdiaeaetum nutantis sticheretosum revolutae subass. nov. (Tab. 3, 82-88; 8 unit 8); Holotype: Tab. 3, Column 87, Relevé 63

Where disturbances occur, particularly due to natural treefall in humid places, Gleicheniaceae tend to invade, forming small impenetrable thickets. As soon as the canopy becomes denser again, these ferns disappear, making space for the common bromeliad cover again.

9. Purdiaeaetum nutantis sphagnetosum subass. nov. (Tab. 3, 89-95; 8 unit 9); Holotype: Tab. 3, Column 89, Relevé 56

Sphagnum species occur mainly in steep sections of the area where little springs reach the surface. Although the overall species composition does not change, the cover of the herb layer decreases, and the gaps are filled with dense moss cushions.

10. Purdiaeaetum nutantis macrocarpetosum revolutae subass. nov. (Tab. 3, 96-100; 8 unit 10); Holotype: Tab. 3, Column 97, Relevé 95

This subassociation is found on sites directly adjacent to ridgetops, in direct neighborhood to the Neurolepion, where dry conditions may prevail sometimes. Here, the bat-pollinated Gentianeacean shrub *Macrocarpaea revoluta*, whose large yellow flowers are often visible already from afar, dominates the shrub layer.

11. Purdiaeaetum nutantis clusietosum magnifoliae subass. nov. (Tab. 3, 101-104; 8 unit 11); Holotype: Tab. 3, Column 101, Relevé 30

Almost flat but not waterlogged areas provide the best conditions for this community, where large leafed Clusiaceans and small palms become very common under a comparatively dense canopy.

Differential taxa: *Clusia magnifolia*, *Chamaedora pinnatifrons*

12. Purdiaeaetum nutantis geonometosum orbygniana subass. nov. (Tab. 3, 105-109; 8 unit 12); Holotype: Tab. 3, Column 106, Relevé 14

In slowly ascending transition zones to the Neurolepion, where already grassy patches develop under drier conditions, *Clusia* and *Chamaedora* are fast being replaced by the small palm *Geonoma orbygniana*.

13. Purdiaeaetum nutantis ass. nov. (Tab. 4, 110-125; 8 unit 13); Holotype: Tab. 4, Column 120, Relevé 158

The Purdiaeaetum nutantis represents the terminal association of this forest formation. Here, the bromeliad layer on the ground can become particularly dense. Apart from *Purdiaea*, a variety of other tree species contributes to the canopy, and a species rich shrub- and herb layer can develop.

The Purdiaeaetum shows a distinct regeneration cycle after natural landslides occur. *Podocarpus oleifolius* reaches its highest cover/abundance in this association, and thus shows close connections to the “*Podocarpus oleifolius*-Gesellschaft” of Meier (1998), however lacking all other species found by this author.

Characteristic taxa: see Purdiaeaetalia / Purdiaeaetalia nutantis

14. Clusietum latipedis ass. nov. (Tab. 4, 126-132; 8 unit 14); Holotype: Tab. 4, Column 132, Relevé 289

This very dense forest community often covers larger hilltops in the region. *Clusia latipes* might reach up to 15 m here, and thus represents the largest tree in the Purdiaeaetalia. The treelayer is often completely closed, reducing the amount of light reaching the ground significantly. Consequently, the number of species drops dramatically in this association.

Characteristic taxa: *Clusia latipes*, *Cornus peruviana*, *Drimys granadensis*, *Freziera canescens*, *Graffenrieda emarginata*, *Panopsis ferruginea*

15. Purdiaeaetum nutantis – graffenriedietosum harlingii subass. nov. (Tab. 4, 133-139; 8 unit 15); Holotype: Tab. 4, Column 136, Relevé 293

On few steep slopes close to the transition zone to the Lower Montane Forest, Melastomataceans, particularly *Graffenrieda harlingii* become co-dominant canopy species. The flora becomes impoverished in this region, and particularly the bromeliad cover decreases.

16. Purdiaeaetum nutantis – hedyosmentosum goudotianii subass. nov. (Tab. 4, 140-146; 8 unit 16); Holotype: Tab. 4, Column 140, Relevé 50

At the upper limit of the Purdiaeaetalia, the abundance of the naming species decreases, and Chloranthaceae, especially *Hedyosmum goudotianum* are more and more important amongst the canopy trees.

17. Purdiaeaetum nutantis – overaged stage (Tab. 4, 147-161; 8 unit 17); Holotype: Tab. 4, Column 155, Relevé 121

In 300-400 year old forests (Homann, pers. comm.), many canopy species have already disappeared, and finally the old specimens of *Purdiaea nutans* begin to die also. The typical bromeliad ground cover gets thinner and thinner due to the unhindered influx of sunlight, and a large number of ferns, shrubs and grasses start invading the newly available niches. On a long term, the flora gets more and more impoverished, organic material is being accumulated, and during heavy rains the ground gets very waterlogged, providing ideal conditions for the occurrence of small landslides, after which the regeneration cycle to the terminal stage can start again.

18. Transitional stage to Alzateetalia verticillatae (Tab. 4, Column 162; 8 unit 18)

On the lower limits of the Purdiaeaetalia, a fast transition to the Alzateetalia occurs, clearly marked by the presence of a large number of species characteristic for the latter syntaxon. The higher humidity allows the growth of a large number of ferns in the herb stratum. Although the characteristic species of the Upper Montane Forest are still abundant, their cover is markedly reduced.

Common taxa: **Tree stratum:** *Meriania radula*, *Miconia aggregata*, *Ocotea* cf. **Herbal stratum:** *Aetanthus andreanus*, *Asplenium uniseriale*, *Chusquea uniflora*, *Diplazium macrophyllum*, *Elaphoglossum latifolium*, *E. tectum*, *Pecluma curvans*, *Peperomia galioides*, *P. glandulosa*, *Phoradendron trianae*, *Polypodium thyssanolepis*, *Pteris muricata*, *P. podophylla*. **Epiphytes:** *Asplenium serra*, *Epidendrum mancum*, *Odontoglossum ramosissimum*, *Pecluma eurybasis*, *Pleurothallis canaligera*, *Polypodium sessilifolium*, *P. triseriale*, *Stelis purpurea*.

Jalca (Subalpine Elfin Forests, Tabs. 5,9)

Clusio ellipticae – *Weinmannietalia cochensis* ord. nov.; Holotype: *Clusio ellipticae* – *Weinmannion cochensis* all. nov.

Clusio ellipticae – *Weinmannion cochensis* all. nov. (Tabs. 5, 9); Holotype: *Clusio ellipticae* – *Weinmannietum cochensis* ass. nov., Tab. 5, Relevé 138

The uppermost forest belt of the study area is formed by the “Subalpine-elfin forest” (Bussmann 2001), which closely resembles the Bolivian “Jalca”. This formation – more like an impenetrable bushland than a forest, grows on Humaqueptic Epiquents (Schumpff et al. 2001) and is closely dovetailed with the adjacent Páramo region. The “timberline” in the area is mainly induced by strong winds. Wind-protected areas are densely covered with Jalca vegetation, whereas more open, wind-exposed regions at the same altitude are covered with grassy Páramo vegetation. A real timberline thus does not exist in the study area (Photo 7). From an altitude of 2450 m, patches of Jalca occur already in the upper montane forest. The only 1-2 m wide crowns of the dominant species – particularly Cunoniaceae (*Weinmannia* spp.), Clusiaceae (*Clusia* spp.), Clethraceae (*Clethra* spp.) and many small Melastomataceae (*Brachyotum* spp., *Miconia* spp.), form a very dense canopy, allowing only little light to reach the ground. The stems of these “trees”, never reaching a dbh of more than 10 cm thus protrude from a literally meter-deep carpet of mosses. Trees become the main life form with 172 species, shrubs (131), herbs (132), ground-ferns (37), lianas (15) and parasites (2) following behind. Only 120 epiphyte species are registered in the Subalpine Elfin Forest or “Jalca”. Lowland families like Araceae and Piperaceae have disappeared, Bromeliacean and Orchid diversity has declined. In the other forest types Orchids accounted for about one third of epiphytes. In the Jalca, their importance grows to about 60 percent. This comes very close to the findings of Bøgh (1992) who found 138 species in one Plot in the closeby Cajanuma area. The Jalca communities stock also mainly on Oxaquic and Aquic Dystropepts and receives an annual rainfall of almost 4000 mm. Additional moisture is provided by an almost continuous mist-cover. For altitudinal zonation see see Figs. 4A-F

Characteristic taxa: *Baccharis genistelloides*, *Clethra ovalifolia*, *Clusia elliptica*, *Disterigma acuminatum*, *Geonoma weberbaueri*, *Hedyosmum luteynii*, *Miconia bullata*, *Weinmannia cochensis*, *W. fagaroides*, *Paepalanthus meridensis*, *Peperomia hartwegiana*.



Photo 7: Transition zone between Jalca and Páramo: forest – grassland mosaic.

1. *Clusio ellipticae* – *Weinmannietum cochensis* ass. nov. (Tab. 5, 1-15; 9 unit 1); Holotype: Tab. 5, Column 2, Relevé 138

The Clusio-Weinmannietum is regarded as the terminal association of the Subalpine Elfin Forest. The normally completely closed “tree” layer is an almost impenetrable thicket of closely interlaced stems, branches and roots. Thick bryophyte cushions occur, and a very large amount of organic matter accumulates under the small crowns. The presence of many species also characteristic to the Páramo vegetation shows how closely interlaced the formations are. Even at lower altitudes, Páramo communities where the soil is particularly shallow, or the wind especially strong immediately replaces the Jalca. The species diversity of these high-altitude forests is breathtaking, and reaches the level of the Purdiaeaetalia.

Characteristic taxa: **Tree stratum:** *Cinchona mutisii*, *Cyathea brevistipes*, *Cybianthus magnus*, *Drimys granadensis*, *Freziera canescens*, *F. karsteniana*, *Geissanthus vanderwerffii*, *Geonoma orbignyana*, *Hedyosmum racemosum*, *H. scabrum*, *Hyeronima duquei*, *H. moritziana*, *Hypericum decandrum*, *Miconia theaezans*, *Myrica pubescens*, *Myrsine andina*, *Ocotea infrafoveolata*, *Panopsis ferruginea*, *Persea bullata*, *Schefflera acuminata*, *Weinmannia elliptica*, *W. reticulata*. **Shrub stratum:** *Antidaphne andina*, *Arctophyllum setosum*, *Baccharis latifolia*, *B. macrantha*, *Berberis beauverdiana*, *B. lutea*, *Bomarea dissitifolia*, *Brachyotum confertum*, *B. setosum*, *Ceratostema reginaldii*, *Desfontainia spinosa*, *Gynoxis cuicochensis*, *Gynoxis laurifolia*, *Hesperomeles ferruginea*, *Ilex rimbachii*, *Oreocallis mucronata*, *Pernettya prostrata*, *Rhamnus granulosa*, *Ribes andicola*, *R. ecuadorensis*. **Shrub stratum:** *Blechnum divergens*, *Calceolaria fusca*, *Elaphoglossum tectum*, *Eriosorus cheilanthoides*, *E. flexuosus*, *E. rufescens*, *Gunnera magellanica*, *Hydrocotyle humboldtii*, *Luzula gigantea*, *Neurolepis laegaardii*, *Pitcairnia trianae*, *Valeriana microphylla*. **Epiphytes:** *Disterigma codonanthum*, *D. empetrifolium*, *Hymenophyllum amabile*, *H. dependens*, *Maxillaria klugii*, *Melpomene moniliformis*, *M. sodiroi*, *Racinaea seemannii*, *R. tripinnata*, *Terpsichore alsopteris*, *T. dependens*.

2. Axinieetum macrophyllae ass. nov. (Tab. 5, 16-21; 9 unit 2); Holotype: Tab. 5, Column 16, Relevé 209

This is an association of boggy depressions within the Jalca region. The canopy is more open than in the typical Clusio-Weinmannietum. The ground is often covered with bryophytes. The species numbers decrease drastically, as most characteristic species of the terminal community disappear.

Characteristic taxa: *Axinea macrophylla*, *Arctophyllum vernicosum*, *Arracacia xanthorrhiza*, *Brachyotum andreanum*, *B. fraternum*, *Epidendrum macrostachyum*, *E. fimbriatum*, *Gaultheria glomerata*, *Mezobromelia fulgens*, *Valeriana plantaginea*, *Vaccinium crenatum*, *V. floribundum*.

3./3A. Chusqueetum loxensis ass. nov. (Tab. 5, 22-32; 9 unit 3/3A); Holotype: Tab. 5, Column 29, Relevé 241

The Chusqueetum loxensis with its dense bamboo cover represents a species poor secondary community. After destruction of the dense tree/shrub layer – probably when natural fires sweep down from the Páramo, the bare ground is very fast colonized by bamboo. Various tough grasses like *Calamagrostis intermedia* occur here as clear indicators for fire. However, already after a short period woody species start to reemerge, partly from old roots, and the dense Clusio-Weinmannietum terminal community regenerates.

Characteristic taxa: *Calamagrostis intermedia*, *Castilleja fissifolia*, *Chusquea loxensis*, *Cybianthus marginatus*, *Epidendrum frigidum*

4. Rhynchosporetum kunthii ass. nov. (Tab. 5, 33-42; 9 unit 4); Holotype: Tab. 5, Column 37, Relevé 198

Flat, wet places are covered with this association, showing the relation to the Páramo vegetation most closely. The species numbers are very low, even in comparison to the adjacent Páramo, with which many species are shared.

Characteristic taxa: *Blechnum loxense*, *Bomarea brachysepala*, *Disterigma alaternoides*, *Eriocaulon microcephalum*, *Lycopodiella alopecuroides*, *Lysimachia andina*, *Orithrophium*

repens, *Paepalanthus celsus*, *Pinguicula calyptata*, *Puya nitida*, *Rhynchospora kunthii*, *R. rugosa*, *Valeriana rigida*, *Xyris subulata*.

Páramo (Tab. 6, 10)

Neurolepio – Puyetalia ord. nov. (Tabs. 6, 10); Holotype: *Neurolepio laegaardii* all. nov.

The species rich Páramos at ECSF are mostly covered in dense clouds, with annual rainfall reaching up to 6000 mm. Frequently strong winds (average maximum windspeed around 60 km/h) sweep the whole area. Typic Tropaquepts and Lithic Troprothents are the prevailing soil types. The main grasses are Bambusiodeae of the genus *Neurolepis*. These species seem to be particularly sensitive to frequent fires, and are then immediately replaced by sturdier and tussock forming genera like *Calamagrostis*, *Festuca* and *Stipa*, which do not play a major role in the undisturbed Neurolepietum. With their high abundance of different *Neurolepis* species, the Páramos of the research area can be seen as remnants of the potential natural vegetation that must have covered wide areas of the Southern Ecuadorian high mountains originally, whereas the “Tussock-Páramos” prevalent in most regions nowadays have to be regarded as secondary communities induced by long term human impact. Trees (3 species), epiphytes (4) and lianas (7) almost disappear. Shrubs (20) and ground-ferns (22) become much less important, whereas herbs (147 species) are the major life form of the Páramos (Fig. 3). Syntaxonomically the Neurolepio-Puyetalia belong to the Wernerietea Cleef 1981. Their altitudinal distribution is shown in Figs. 4A-G

Characteristic taxa: *Arracacia xanthorrhiza*, *Baccharis genistelloides*, *Bidens andicola*, *Bomarea brachysepala*, *B. uncifolia*, *Castilleja fissifolia*, *Chuquiragua jussieui*, *Cystopteris fragilis*, *Diplostephium empetrifolium*, *Eryngium humile*, *Galium hypocarpium*, *Gaultheria glomerata*, *G. amoena*, *Gentianella rapunculoides*, *Geranium sibbaldioides*, *Gregia mulfordii*, *Hieracium frigidum*, *Hypochaeris radicata*, *Oritrophium peruvianum*, *Pernettya prostrata*, *Vaccinium floribundum*.

Neurolepio laegaardii all. nov. (Tab. 6, 1-11; 10 units 1-2); Holotype: Neurolepietum *laegaardii* ass. nov., Tab. 6, Column 4, Relevé 150

The Neurolepio represents the most undisturbed Páramo areas with a very low percentage of woody species, and a very rich herbal flora. The dense grass layer is interspersed with a wide variety of pteridophytes – the genus *Huperzia* has its distribution center here, bromeliads and orchids. Large species of *Puya* however, are not found in this community.

Characteristic taxa: *Brachyotum andreanum*, *B. campanulare*, *Calceolaria nivalis*, *Castilleja ecuadorensis*, *Chusquea tessellata*, *Clethra fagifolia*, *Fuchsia steyermarkii*, *Huperzia reflexa*, *Hypericum decandrum*, *Lachemilla nivalis*, *Lomatia hirsuta*, *Lycopodium jussiaei*, *Lysimachia andina*, *Montocalia peruviana*, *Neurolepis laegaardii*, *N. weberbaueri*, *Paepalanthus meridensis*, *Sisyrinchium tinctorum*, *Sticherus lechleri*.



Photo 8: *Neurolepio laegaardii* – *Geonometum weberbaueri*, with many small palms protruding from dense bambusoid stratum.

Photo 9: *Neurolepietum laegaardii*.

1. *Neurolepio laegaardii* – *Geonometum weberbaueri* ass nov. (Tab. 6, 1-3; 10 unit 1); Holotype: Tab. 6, Column 1, Relevé 128

Small palms are a striking feature in the steepest areas of the Neurolepietum, where they give the Páramo an almost forest like appearance in parts (Photo 8).

Characteristic taxa: *Geonoma weberbaueri*, *Mezobromelia fulgens*, *Miconia theazans*.

2. *Neurolepietum laegaardii* typicum ass. nov. (Tab. 6, 4-11; 10 unit 2); Holotype: Tab. 6, Column 4, Relevé 150, Photo 9.

Characteristic taxa: See *Neurolepietum elatae*

Gynoxion cuicochensis all. nov. (Tab. 6, 12-21; 10 units 3-4); Holotype: *Gynoxietum cuicochensis* ass. nov., Tab. 6, Column 12, Relevé 145

Steeper slopes in transition to the Subalpine Elfin Forest are occupied by this alliance, where herbal species are often being replaced by small shrubs. The shrub stratum however remains open, and the alliance still shows a grassy aspect. The *Gynoxion* shows relations to the *Vaccinium floribundi* Cuatrecasas 1934, the “*Hypericum laricifolium* community” Cleef 1981 and the “Dwarf forest of *Gynoxis albivestita*” Cleef 1981.

Characteristic taxa: *Chusquea perligulata*, *Clusia elliptica*, *Disterigma acuminatum*, *Gynoxis cuicochensis*, *Lycopodium vestitum*, *Miconia bullata*, *Weinmannia cochensis*.

3. *Gynoxietum cuicochensis* ass. nov. (Tab. 6, 12-16; 10 unit 3); Holotype: Tab. 6, Column 12, Relevé 145

A dense bamboo layer formed by *Chusquea loxensis*, interspersed with the characteristic shrubs characterizes the typical *Gynoxietum*. Species of the *Neurolepietum laegaardii* are commonly found in-between.

Characteristic taxa: *Asplenium triphyllum*, *Chusquea loxensis*, *Miconia ledifolia*.



Photo 10: *Neurolepietum aristatae*, with dense stratum of *Neurolepis aristata*.

4. *Neurolepietum aristatae* ass. nov. (Tab. 6, 17-21; 10 unit 4); Holotype: Tab. 6, Column 18, Relevé 147

In small, nutrient rich depressions, the woody species are less common, and the characteristic grass species of the pure *Gynoxyetum* are replaced by closely related taxa, forming equally dense grass strata. Again, *Bambusoideae* dominate the herbal layer entirely (Photo 10). Cleef 1981 described a closely related community as “Bamboo groves of *Neurolepis aristata*” from Colombia.

Characteristic taxa: *Chusquea leonardiorum*, *Gentianella fastigiata*, *Miconia dodsonii*, *Neurolepis aristata*, *N. nana*, *Rumex tolimensis*, *Weinmannia fagaroides*.

Puyon eryngioidis all. nov. (Tab. 6, 22-45; 10 units 5-8); Holotype: *Puyetum eryngioidis* ass. nov., Tab. 6, Column 25, Relevé 133

Places with shallow soil, where springs reach the ground level, are the niche for this new alliance. The large, spiny rosettes of the naming bromeliads, often densely clustered together, and tussock forming grass species are the most obvious feature of this alliance. Obviously, the bamboo species do not tolerate the rocky soil, and disappear under these conditions.

Characteristic taxa: *Arenaria lanuginosa*, *Blechnum auratum*, *Calamagrostis intermedia*, *Cerastium mollissimum*, *Dicksonia sellowiana*, *Grammitis paramicola*, *Halenia weddeliana*, *Huperzia hypogaea*, *Jamesonia pulchra*, *Loricaria complanata*, *Lupinus semperflorens*, *Lycopodiella cernua*, *Orthrosantus chimboracensis*, *Pedicularis incurva*, *Puya eryngioides*, *Rhynchospora ruiziana*, *Senecio chinogeton*, *Valeriana convallarioides*.

5. *Puyetum eryngioidis* ass. nov. (Tab. 6, 22-36; 10 unit 5); Holotype: Tab. 6, Column 25, Relevé 133

The typical *Puyetum eryngioidis* shows the highest bromeliad cover of the alliance. *Puya eryngioides* may cover large areas, interspersed with tussocks of *Calamagrostis intermedia*. The tree fern *Blechnum auratum* with its large stems is particularly often encountered in this association (Photo 11).

Characteristic taxa: see *Puyon eryngioidis* all. nov.



Photo 11: Puyetum eryngioidis. Specimens of *Blechnum auratum* protruding from dens grass and bromeliad stratum.

6. Epidendretum frigidae ass. nov. (Tab. 6, 37-42; 10 units 6-7); Holotype: Tab. 6, Column 40, Relevé 134

Flat, windswept places, where more organic material managed to accumulate, are densely covered with real orchid thickets, giving them an appearance that resembles closely that of the Tepuis of the old Guyana shield. Various large orchid species are closely interlaced, with grasses in-between.

Characteristic taxa: *Dorobaea pimpinellifolia*, *Epidendrum fimbriatum*, *E. frigidum*, *E. macrostachyum*, *Eriocaulon microcephalum*, *Loricaria thuyoides*, *Lycopodium thuyoides*, *Neurolepis asymmetric*.

6.1. Epidendretum frigidae – *Pitcairnia trianae* facies (Tab. 6, 37-39; 10 unit 6); Holotype: Tab. 6, Column 40, Relevé 134

In few areas this large Bromeliad occurs with high cover/abundance in the orchid thicket.

6.2. Epidendretum frigidae typicum (Tab. 6, 40-42; 10 unit 7); Holotype: Tab. 6, Column 37, Relevé 130

The typical Epidendretum is comparatively species poor, and almost entirely dominated by orchids. Few other species, mainly Asteraceans, manage to survive under this heavy competition. Characteristic taxa: see Epidendretum frigidum



Photo 12: Puyetum nitidae.

7. Puyetum nitidae ass. nov. (Tab. 6, 43-45; 10 unit 8); Holotype: Tab. 6, Column 43, Relevé 148 This final association is probably one of the most striking ones, with the inflorescence of the large *Puya nitida* growing often more than 2 m tall (Photo 12). The yellow flowers of this species are pollinated by bats as well as hummingbirds, and are thus representing an early evolutionary stage. The Puyetum nitidae can be found mainly in flat, permanently washed streambeds, where the topsoil has been carried away almost entirely, exposing pure coarse gravel. The Puyetum nitidae shows a physiognomic resemblance to the “*Sphagnum* bog with giant *Puya*” Cleef 1981 and the “*Xyris-Sphagnum* bog” Cleef 1981.

Characteristic taxa: *Azorella aretioides*, *A. biloba*, *Brachyotum fraternum*, *Disticha acicularis*, *Gentiana sedifolia*, *Hydrocotyle tambalomaensis*, *Isoetes ecuadoriensis*, *Isolepis inundata*, *Juncus microcephalus*, *Ophioglossum crotalophoroides*, *Oreobolus ecuadorensis*, *O. goeppingeri*, *Oritrophium mucidum*, *Pinguicula calyprata*, *Plantago rigida*, *Puya nitida*, *Ranunculus gusmanii*, *R. peruvianus*, *Rostkovia magellanica*, *Scirpus rigidus*, *Tofieldia falcata*, *T. sessiliflora*, *Valeriana rigida*, *Xenophyllum humile*, *Xyris revoluta*.

5. Discussion

The main montane forests types encountered in Reserva Biológica San Francisco can be grouped into three main formations. As the floral species richness of montane forests largely consists of herbs, shrubs and epiphytes (Gentry 1988, 1995; Gentry & Dodson 1987), whereas particularly trees are less diverse in comparison to lowland forests, an approach focusing not only on the larger woody species allows a much more detailed assessment of mountain forest species richness. The montane forests studied show striking differences to comparative studies even in areas nearby, as well as to other areas in Ecuador. The high abundance of *Alzatea verticillata* (Alzateaceae) – a family that never before had been encountered in Ecuador (Foster pers. comm.) –, in the montane broad-leaved forest is a unique feature, although generally the floristic composition of this formation is comparable to other areas (Frei 1958, Grubb et al. 1963, 1966; Madsen 1989, 1991; Madsen & Øllgaard 1994, Meier 1998). In contrast, the upper montane forest, dominated by *Purdaea nutans*, has to be regarded as a very special and isolated forest formation, with only small areas in Northern Peru being comparable (Foster pers. comm.). Even in the Cajanuma area close-by, the forest composition is completely different (Madsen 1989, 1991; Madsen & Øllgaard 1994). Floristically, the forests of ECSF are not representative for a typical southern Ecuadorian cloud forest area, and less for Andean cloud forests as such. Classification approaches based on structural rather than floristic criteria (Paulsch & Czimczik 2001) lead to a very similar set of forest types.

The role of the landslides in vegetation development in this region is very important. Most species found during succession are not elements of the mature forest. Therefore landslides are an important factor in the regeneration of this ecosystem. Landslide succession followed a similar pattern to that described from other montane regions (Herzog 1923, Simonett 1967, Garwood et al. 1979, Garwood 1985, Guariguata 1990, Stern 1995). However, as Kessler (1999) already observed in Bolivia, the regeneration of Andean landslides seems to show striking differences particularly with respect to the role of fern species. As in Bolivia, *Pteridium arachnoideum* – although extremely important in the succession processes of anthropogenically disturbed areas – had no importance at all in the regeneration of natural landslides in southern Ecuador, and the main ferns found in different early and mid successional stages belonged mainly to the Gleicheniaceae. In clear contrast to the findings of Stern (1995) in northern Ecuador, and Kessler (1999), different Bamboos (*Chusquea* spp.) have no importance at all in landslide regeneration in southern Ecuador. Grasses such as *Cortaderia* had no large influence in the successional process either. In contrast to the findings of Kessler (1999), almost no fern- or bamboo-dominated senescent forests are encountered – in contrast, grassy species like *Neurolepis elata* or *Rhynchospora locuples* are found in areas where the terminal community had been destroyed probably by natural fires, or was overaged. Long-term research on the succession of landslides in the whole Andean region needs to be stimulated to come up with generally applicable data about their regeneration.

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Fig. 4A 1-3. Transecto 1 Partes 1-3: 1850 - 2320 m

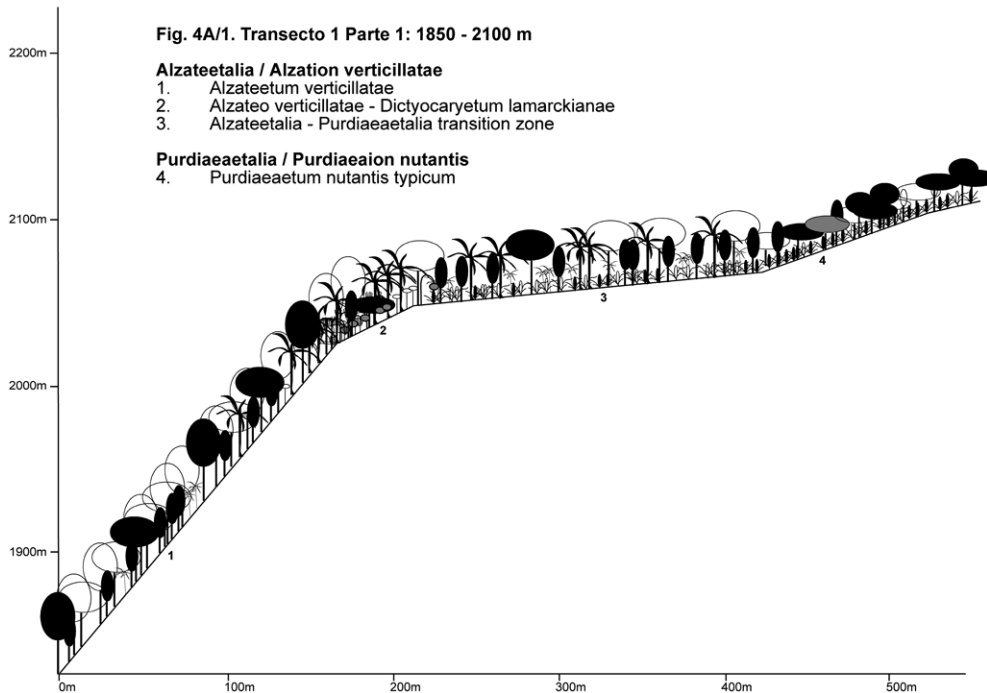
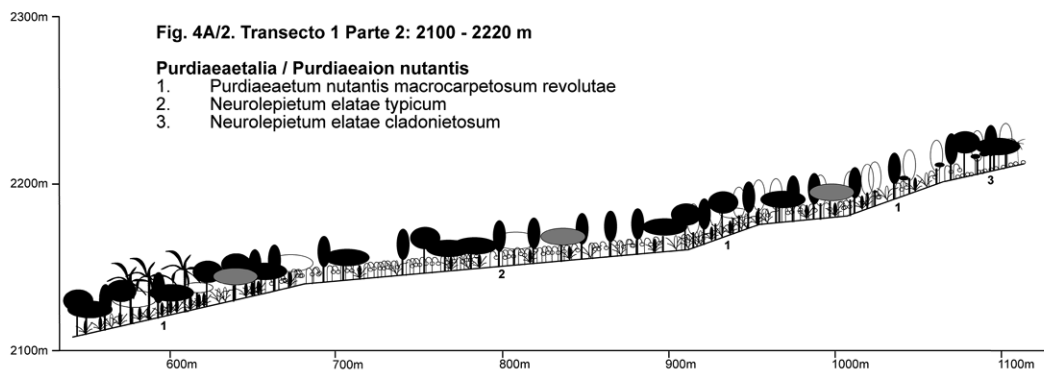
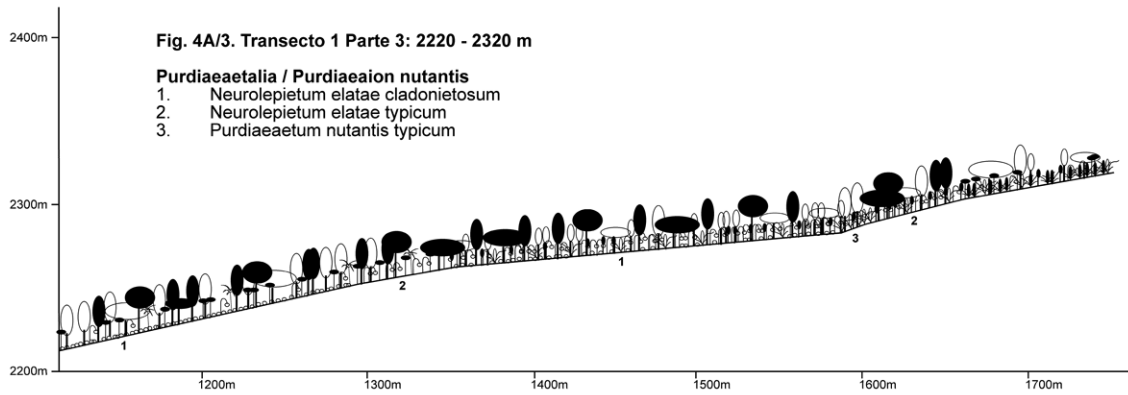


Fig. 4B 1-4. Transecto 1 Partes 4-7: 2320 - 2750 m

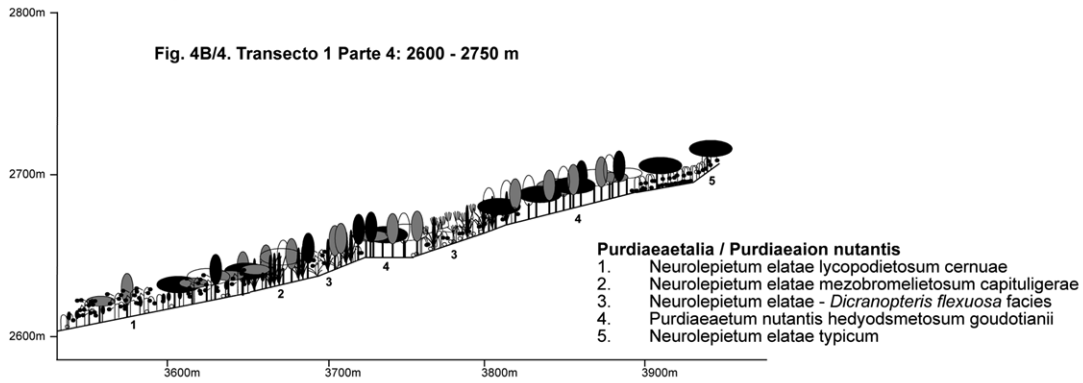


Fig. 4B/3. Transecto 1 Parte 3: 2500 - 2600 m

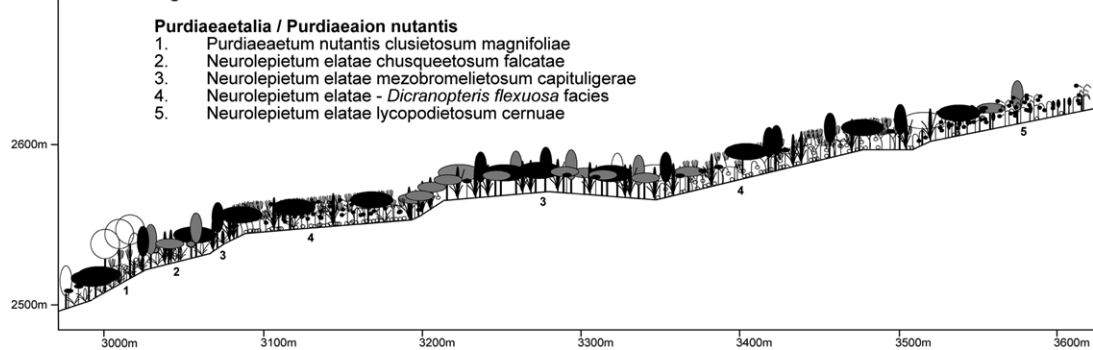


Fig. 4B/2. Transecto 1 Parte 2: 2380 - 2500 m

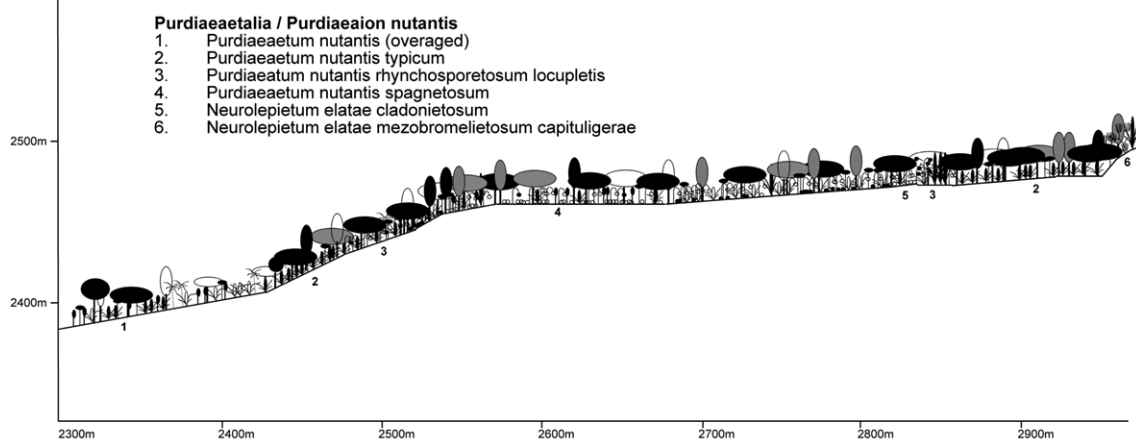


Fig. 4B/1. Transecto 1 Parte 4: 2320 - 2380 m

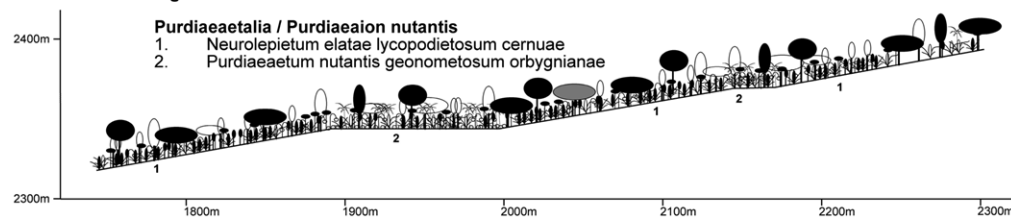


Fig. 4C 1-3. Transecto Antenas Partes 1-3: 1900 - 2420 m

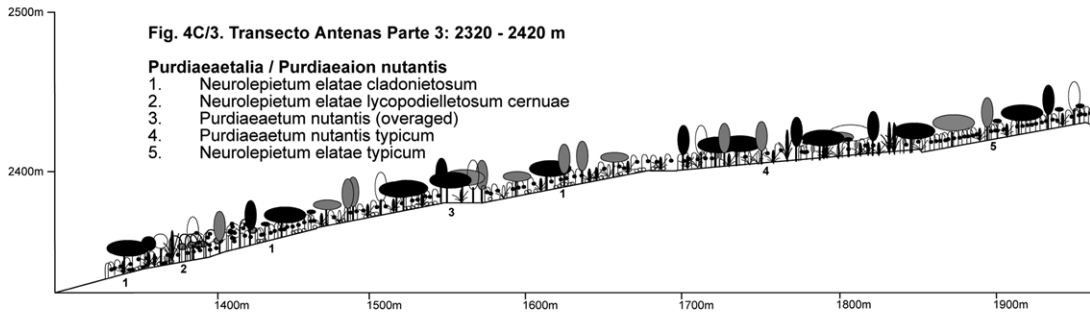


Fig. 4C/2. Transecto Antenas Parte 2: 2080 - 2320 m

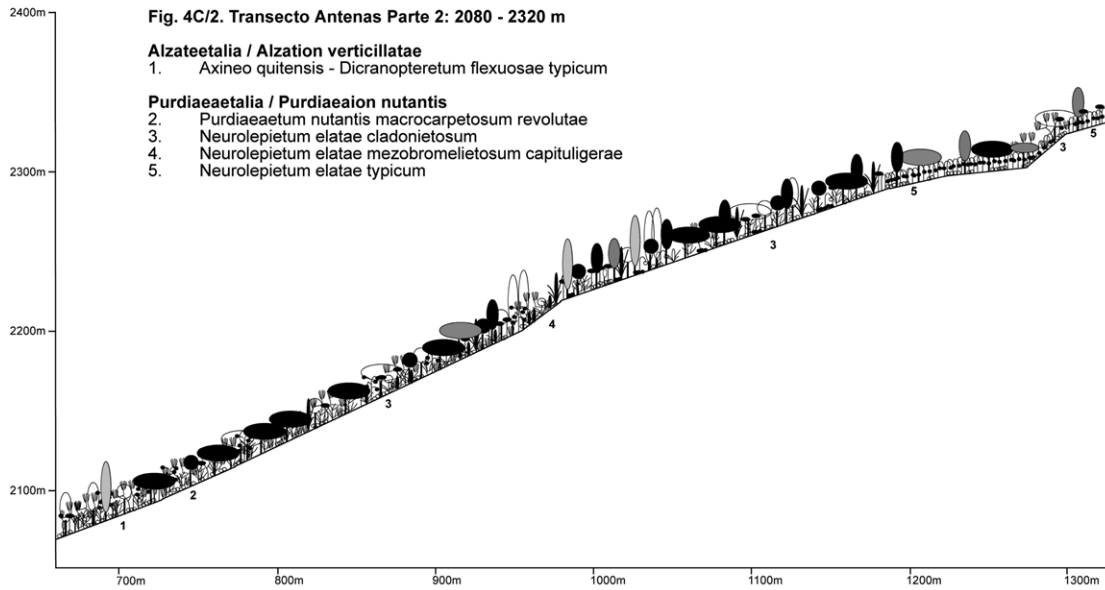
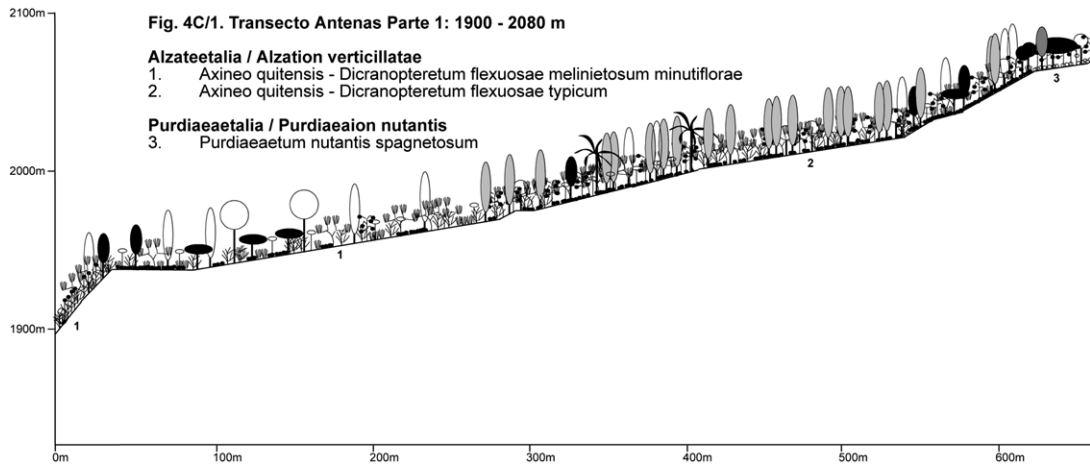


Fig. 4C/1. Transecto Antenas Parte 1: 1900 - 2080 m



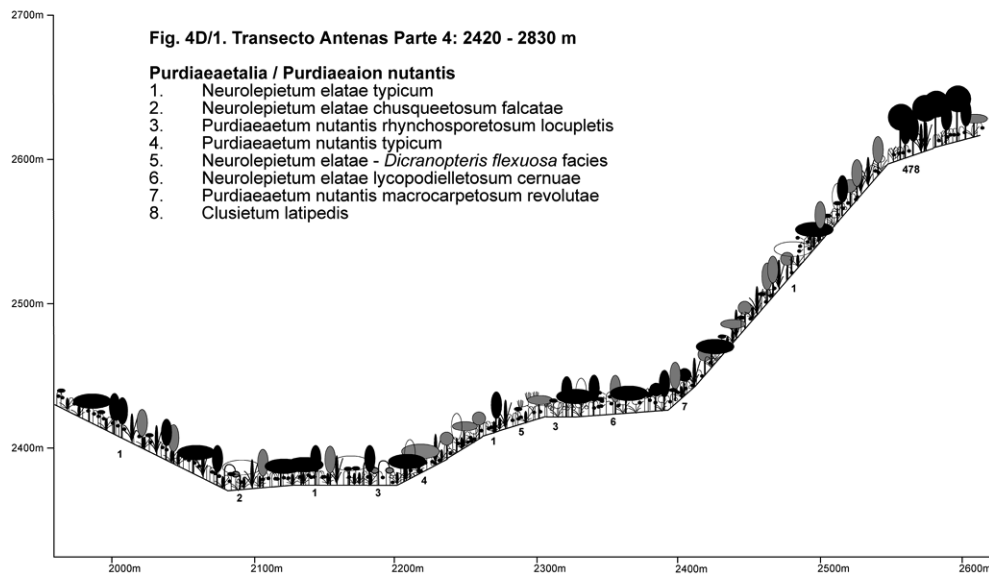
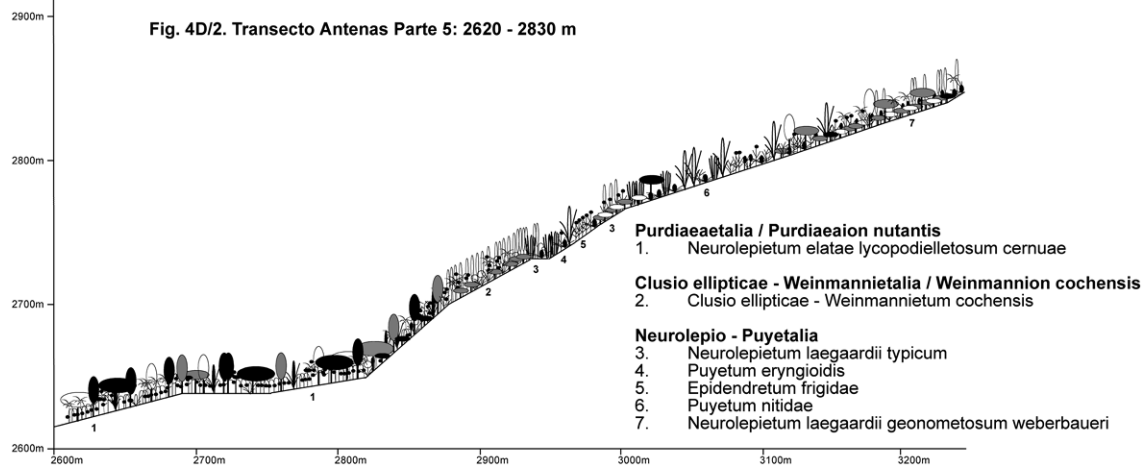
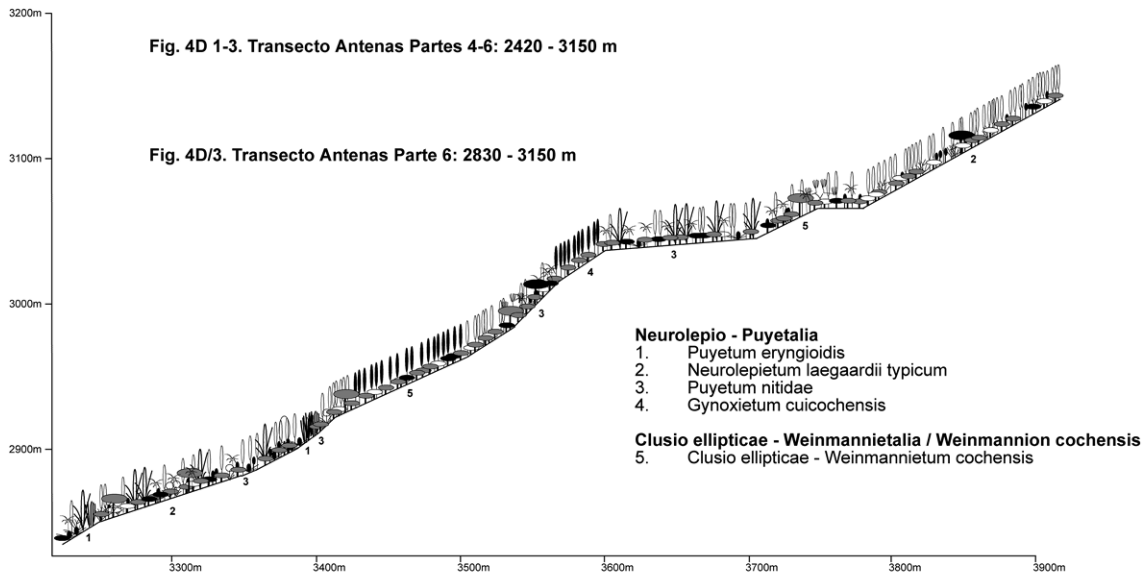
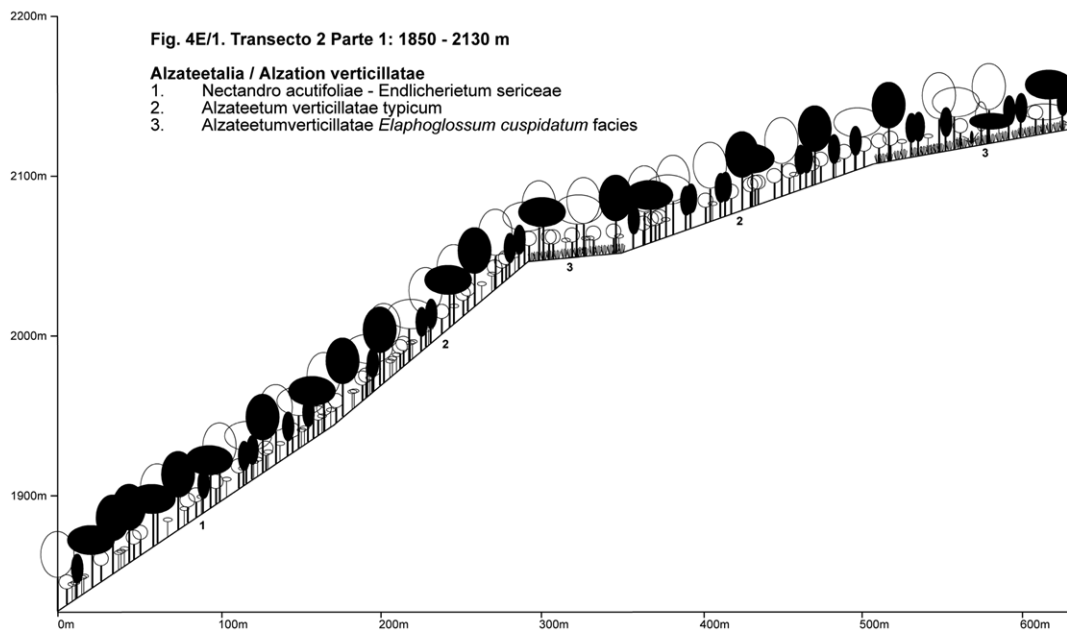
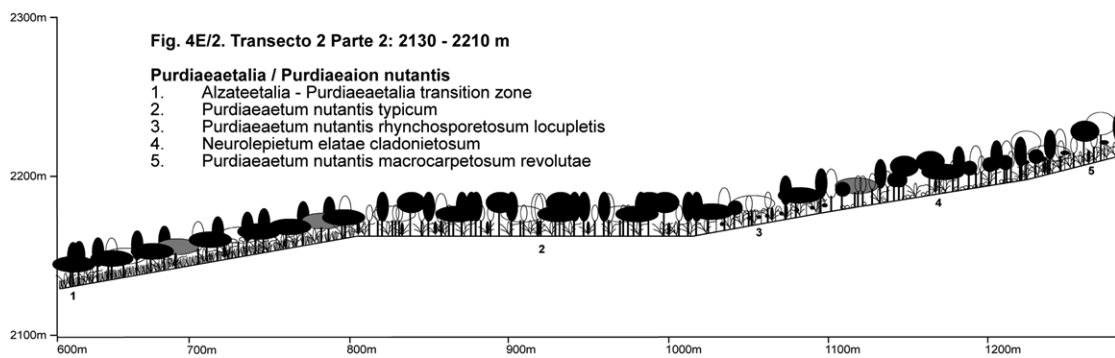
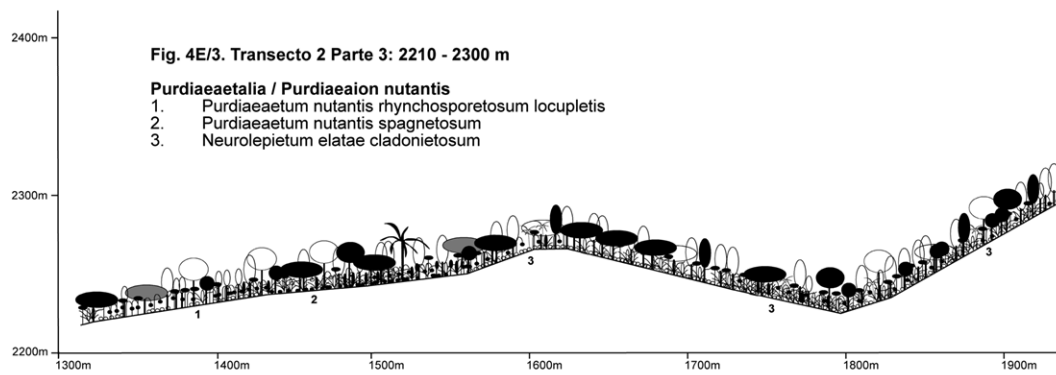
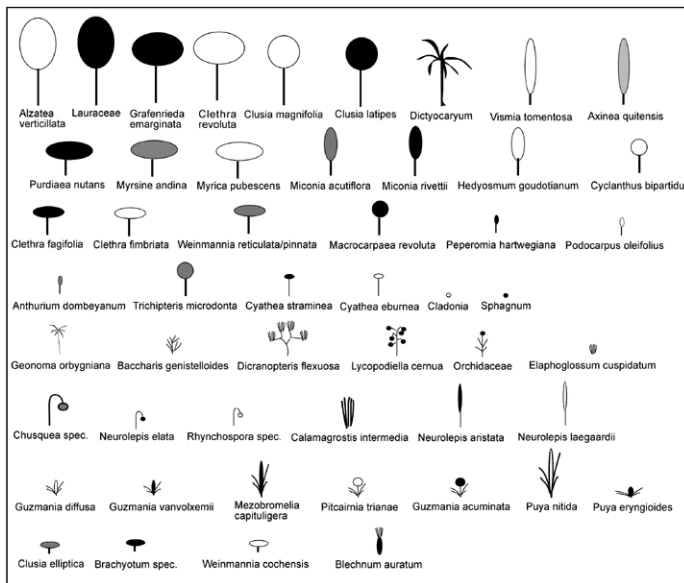
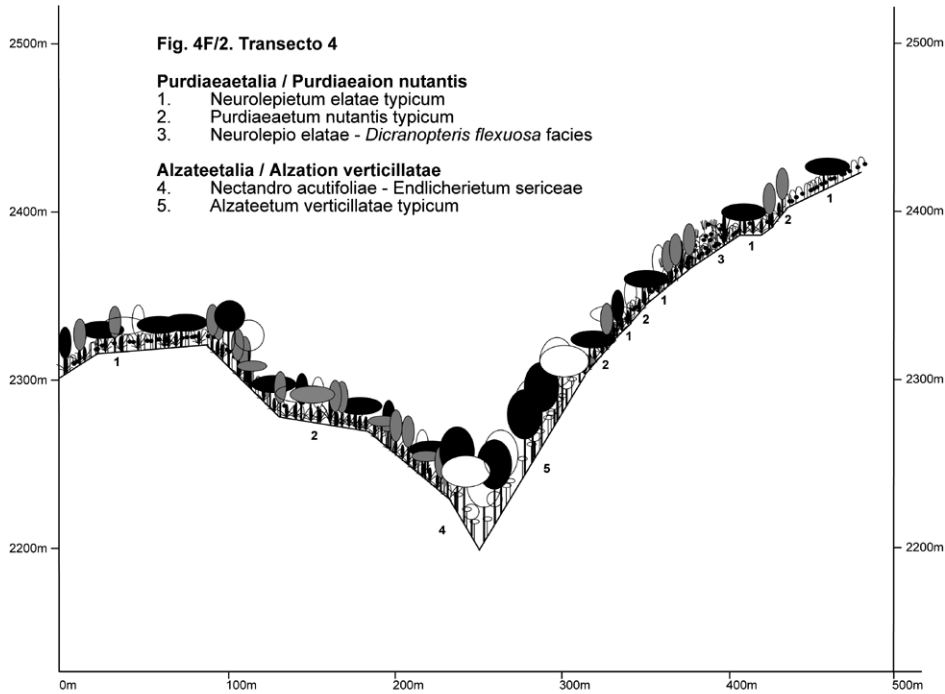
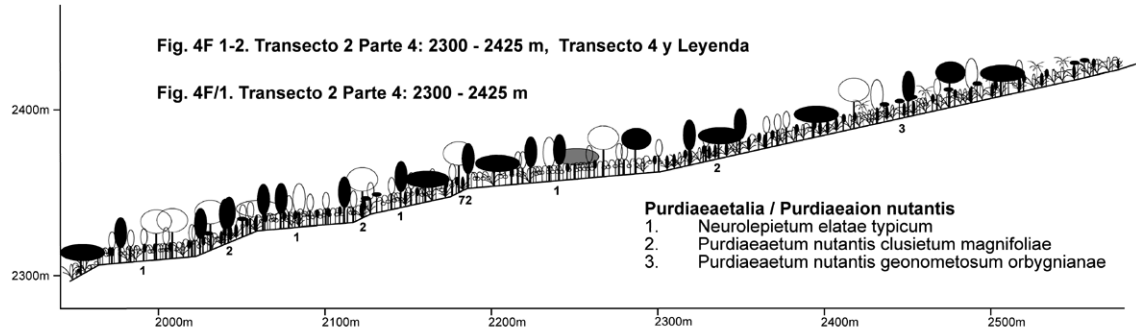


Fig. 4E 1-3. Transecto 2 Partes 1-3: 1800 - 2300 m





Appendix 1. Syntaxonomy

Lower Montane Forest - Alzateetalia verticillatae

Alzation verticillatae

1. Nectandro acutifoliae – Endlicherietum sericeae
2. Alzateetum verticillatae
 - 2.1. Alzateetum verticillatae typicum
 - 2.2. Alzateetum verticillatae – Elaphoglossum cuspidatum facies
3. Alzateo verticillatae – Dictyocaryetum lamarckianae
4. Alzateetalia – Purdiaeaetalia transition stage

Cecropio montanae – Isertion laevis

5. Cecropio montanae – Isertietum laevis

Syntaxonomía para clarificar:

6. Axineo quitensis – Dicranopteretum flexuosae
 - 6.1. Axineo quitensis – Dicranopteretum flexuosae typicum
 - 6.2. Axineo quitensis – Dicranopteretum flexuosae melienietosum minutiflorae

Upper Montane Forest - Purdiaeaetalia nutantis

Purdiaeaion nutantis

1. Neurolepietum elatae typicum
 2. Neurolepietum elatae mezobromelietosum capituligerae
 3. Neurolepietum elatae chusqueetosum falcatae
 4. Neurolepietum elatae cladonietosum
 - 5.1/5.2 Neurolepietum elatae lycopodiellietosum cernuae
 - 6.1/6.2 Neurolepietum elatae – *Dicranopteris flexuosa* facies
 - 7.1/7.2 Purdiaeaetum nutantis rhynchosporietosum locupletis
 8. Purdiaeaetum nutantis sticheretotum revolutae
 9. Purdiaeaetum nutantis sphagnetosum
 10. Purdiaeaetum nutantis macrocarpetosum revolutae
 11. Purdiaeaetum nutantis clusietosum magnifoliae
 12. Purdiaeaetum nutantis geonometosum orbygnianae
13. Purdiaeaetum nutantis typicum
14. Clusietum latipedis
 15. Purdiaeaetum nutantis graffenriedietosum harlingii
 16. Purdiaeaetum nutantis hedyosmentosum goudotianii
 17. Purdiaeaetum nutantis (overaged)
 18. Transitional stage to Alzateetalia verticillatae

Jalca (Subalpine Forest) - Clusio ellipticae – Weinmannietalia cochensis

Clusio ellipticae – Weinmannion cochensis

1. Clusio ellipticae – Weinmannietum cochensis
2. Axineetum macrophyllae
- 3./3A. Chusqueetum loxensis
4. Rhynchosporietum kunthii

Páramo - Neurolepio – Puyetalia

Neurolepio laegaardii

1. Neurolepio laegaardii – Geonometum weberbaueri
2. Neurolepietum laegaardii typicum

Gynoxion cuicochensis

3. Gynoxietum cuicochensis
4. Neurolepietum aristatae

Puyon eryngioidis

5. Puyetum eryngioidis
6. Epidendretum frigidae
 - 6.1. Epidendretum frigidae – *Pitcairnia triana* facies
 - 6.2. Epidendretum frigidae typicum
7. Puyetum nitidae

Additional species with low constancy in Tab. 1:

Rare companions Alzation verticillatae

Casearia silvestre T, 170:r, 184:r, 268:r; *Centropogon alsophilus* S, 183:+, 266:+, 174:++; *Ocotea sp. nov.* T, 178:+, 269:r, 186:r; *Dendropanax sp.* T, 183:+, 173:+, 265:++; *Berteria guianensis* 188:+, 265:+, 268:++; *Clidemia cursoris* S,

177:+, 183:+, 174:+; *Elaphoglossum andreanum* EF, 1:+, 263:+, 157:+; *Epidendrum polystachyum* E, 183:+, 266:+, 190:+; *Guzmania poortmanii* E, 175:+, 188:+, 24:+; *Lepanthes acarina* E, 262:r, 174:r, 268:r; *Mayna odorata* T, 264:+, 184:+, 265:+; *Polystichum bonapartei* F, 184:r, 188:r, 265:r; *Racinaea undulifolia* E, 171:r, 267:r, 195:r; *Rhodospatha ammonifolium* E, 263:r, 24:r, 266:r; *Stigmaphyllon bogotense* L, 170:+, 174:+, 178:+; *Alloplectus fimbriatus* S, 188:+, 265:+; *Anthurium myosuroides* E, 264:+, 177:+, 24:+, 173:+; *Anthurium obtusum* E, 184:+, 265:+, 174:+; *Begonia parcifolia* H, 170:r, 171:r, 156:r; *Pleurothallis bivalvis* E, 1:+, 175:r, 157:r; *Pleurothallis fastidiosa* E, 263:r, 174:r, 3:+; *Pleurothallis loranthophylla* E, 188:r, 24:r, 3:+; *Celtis iguanaea* T, 175:+, 169:+; *Cischweinfia suarezii* E, 263:r, 157:r; *Croton lechleri* T, 177:+, 178:+; *Dracula simia* E, 263:+, 156:+; *Heliosis cayennensis* P, 183:r, 174:r; *Lepanthes agglutinata* E, 184:r, 173:r; *Lepanthes eresipes* E, 177:r, 195:r; *Stephanopodium angulatum* F, 171:+, 270:+; *Miconia dodecandra* T, 171:+, 173:+; *Miconia stelligera* S, 171:+, 169:+; *Mikania micrantha* H, 263:+, 265:+; *Macrocnemum roseum* T, 183:+, 265:+; *Pearcea hypocyrtifolia* E, 177:+, 265:+; *Philodendron herthae* E, 177:r, 267:r; *Restrepiopsis inaequalis* E, 177:r, 178:r; *Stigmaphyllon sarmentosum* L, 262:+, 157:+; *Acnistus arborescens* S, 170:+, 156:+

Rare companions *Nectandro acutifoliae* - *Endlicheretum sericeae*

Guarea pterorachis T, 262:r, 188:r, 269:r; *Trichomanes polypodioides* EF, 262:r, 4:+; *Besleria solanoides* S, 171:+, 195:+; *Miconia splendens* T, 262:+, 265:2; *Lepanthes auriculata* E, 175:r; *Guzuma ulmifolia* T, 170:r; *Eupatorium procerum* S, 263:+; *Pouteria torta* T, 177:+; *Prosthechea grammatoglossa* H, 188:+; *Psiguria triphylla* H, 263:r; *Psychotria poeppingeriana* S, 1:r; *Restrepiopsis pandurata* E, 171:r; *Rhypsalis micrantha* E, 262:r; *Sarcopera anomala* S, 177:r; *Simira spec.* S, 188:+; *Sterculia cf. apetala* T, 175:r; *Tapiria cf. guianensis* T, 263:+; *Tectaria cicutaria* F, 183:+; *Tetrapteryx acapulcensis* L, 1:+; *Tradescantia flominensis* H, 188:r; *Trichomanes elegans* EF, 170:r; *Trichomanes radicans* EF, 175:r; *Trichosalpinx dependens* E, 264:+; *Trichosalpinx dura* E, 263:+; *Trisetella didyma* E, 184:+; *Trisetella triglochis* E, 171:r; *Utricularia subbulata* H, 171:+; *Stilpnophyllum revolutum* T, 177:+; *Marcgraviastrum mixtum* S, 263:+; *Masdevallia dalessandroi* E, 264:r; *Maxillaria elegantula* E, 171:r; *Maxillaria imbricata* E, 183:r; *Maxillaria mapirensis* E, 262:r; *Maxillaria pastense* E, 263:r; *Passiflora putumayensis* L, 1:+; *Peperomia crotalophora* E, 263:+; *Peperomia dolabriformis* E, 184:+; *Peperomia pellucida* H, 188:+; *Phenax hirtus* S, 183:+; *Phenax urticaefolius* S, 170:+; *Pleurothallis peronioccephala* E, 264:r; *Pleurothallis revoluta* E, 183:r; *Pleurothallis talpinaria* E, 171:r; *Pleurothallis tunguraguae* E, 175:r; *Pleurothyrium trianae* T, 262:r; *Ponthievia maculata* E, 263:r; *Poroglossum schramii* E, 170:r; *Microgramma fuscopunctata* EF, 184:+; *Monnina pilosa* S, 1:+; *Adelobotrys adscendens* L, 188:+; *Aechmea vetchii* E, 264:+; *Alloplectus tetragonus* E, 175:+; *Canna jaegeriana* H, 188:r; *Chamaedora pirinata* T, 262:+; *Chromolaena laevigata* S, 264:+; *Conostegia extinctoria* T, 175:+; *Coussarea paniculata* T, 263:+; *Diplazium lindbergii* F, 1:+; *Elateriopsis oerstedii* H, 183:+; *Epidendrum tridens* E, 170:+; *Gurania eriantha* H, 170:+; *Guzmania morreniana* E, 177:+; *Heteropsis brachiata* L, 177:r; *Huperzia acifolia* F, 262:+; *Huperzia curvifolia* F, 170:+; *Eirmocephala brachiata* S, 171:+; *Lepanthes dalessandroi* E, 263:r; *Lepanthes focalis* E, 1:r; *Lepanthes gargantua* E, 175:r; *Lepanthes wagneri* E, 183:r; *Lepanthopsis floripecten* 175:r; *Lepanthopsis vinacea* E, 175:r; *Licania heteromorpha* T, 264:r; *Masdevallia roseola* E, 177:r; *Sterculia cf. apetala* T, 263:r; *Tapiria cf. guianensis* T, 263:+; *Tectaria cicutaria* F, 183:+; *Tetrapteryx acapulcensis* L, 1:+; *Tradescantia flominensis* H, 188:r; *Trichomanes elegans* EF, 175:r; *Trichomanes radicans* EF, 175:r; *Trichosalpinx dependens* E, 264:r; *Trichosalpinx dura* E, 263:r; *Trisetella didyma* E, 184:r; *Trisetella triglochis* E, 171:r; *Utricularia subbulata* H, 171:+; *Stilpnophyllum revolutum* T, 177:r; *Desmodium campyloclados* H, 184:+

Rare companions *Alzateetum variegatae*

Rubus boliviensis S, 266:+, 168:+, 192:+, 172:+, 176:+ 87:+; *Myrica pubescens* T, 24:+, 174:+, 168:+, 269:+, 192:+, 172:+; *Cuscuta odorata* P, 185:+, 268:+, 168:+, 187:+; *Dendropanax sp.* T, 266:+, 157:+, 168:+, 269:+; *Endlichera sp. nov.* T, 174:+, 180:+, 269:r, 192:+; *Saurauia crassisejala* T, 265:+, 182:+, 194:+; *Tillandsia biflora* E, 264:r, 265:r, 156:r; *Alchornea glandulosa* T, 173:+, 169:+, 189:+; *Maxillaria jenischiana* E, 184:r, 174:r, 156:r; *Trichosalpinx berlineri* E, 24:r, 266:r, 157:r; *Tillandsia buseri* E, 24:r, 173:r; *Palicourea hospitalis* S, 265:+, 185:+; *Scaphyglottis stellata* E, 157:+, 4:+; *Weinmannia spruceana* T, 174:r, 86:+; *Panicum maximum* H, 173:+, 270:+; *Phyllanthus dubifolia* S, 178:+, 180:+; *Polystachya nana* E, 174:r, 156:r; *Racinaea penlandii* E, 173:r, 157:r; *Aegiphila sp.* E, 173:+, 267:+; *Centropogon bruneotomentosus* S, 180:+, 156:+; *Epidendrum globiflorum* E, 173:+, 156:+; *Sanchezia oxysepala* S, 156:r; *Lepanthes curiosa* E, 265:r; *Lepanthes ejecta* E, 195:r; *Lepanthes floripecten* E, 24:r; *Lepanthes intricata* E, 156:r; *Lepanthopsis acetabulum* E, 268:r; *Lepanthopsis acuminata* E, 268:r; *Lepanthopsis culiculosa* E, 265:r; *Masdevallia lilacina* E, 267:r; *Masdevallia persicina* E, 266:r; *Maxillaria discolor* E, 180:r; *Maxillaria perryae* E, 265:r; *Maxillaria porrecta* E, 268:r; *Maxillaria pulla* E, 24:r; *Paradrymonia metamorphophylla* S, 174:+; *Philodendron verrucosum* E, 266:+; *Piper oroense* S, 156:+; *Platystele oxyglossa* E, 190:r; *Pleurothallis batillacea* E, 24:r; *Pleurothallis dasypetala* E, 173:r; *Pleurothallis verbiformis* E, 268:r; *Restrepiopsis metalis* E, 173:r; *Aphelandra peruviana* S, 180:+; *Canna indica* H, 268:r; *Cardamine africana* H, 268:+; *Clidemia densifolia* S, 267:+; *Conostegia montana* T, 266:r; *Diastema scabrum* H, 185:+; *Dresslerella caesariata* E, 169:+; *Dyschioriste quitensis* H, 190:+; *Jungia spectabilis* L, 195:+; *Habenaria amalfitiana* H, 157:r; *Trisetella abbreviata* E, 185:r; *Trisetella scobina* E, 24:r; *Unonopsis spectabilis* T, 178:+; *Mikania psilostachya* H, 195:+

Rare companions *Alzateo verticillatae* - *Dictyocaryetum lamarckianae*

Centaurium quitense H, 3:+; *Cortaderia jubata* H, 2:+; *Erato polymnioides* S, 3:+; *Senecio urbani* H, 2:+; *Kohleria spicata* S, 2:+; *Panicum stoloniferum* H, 2:+

Rare companions Cecropio montanae - Isertieum laevis

Cyathea caracasana var. *caracasana* FT, 25:+, 4:+, 168:+, 269:+, 86:+, 87:+; *Critoniopsis floribunda* S, 168:+, 269:r, 186:+, 187:+; *Critoniopsis pycnantha* S, 25:+, 269:r, 182:+; *Critoniopsis boliviana* S, 189:+, 269:r, 176:+; *Stemodia suffruticosa* S, 4:+, 269:+, 191:+; *Calaua caricifragrans* T, 189:+, 269:+; *Oxalis jasminifolia* H, 25:+, 168:+; *Phytolacca bogotensis* H, 186:+, 196:+; *Pourouma bicolor* T, 182:+, 181:+; *Calceolaria alata* H, 194:+; *Lasiacis sorghoidea* H, 182:+; *Syzygium jambos* T, 187:r; *Zinowiewia madensii* T, 269:r; *Mikania syszylowiczii* H, 168:+; *Mutingia calabura* T, 179:+; *Myrcia ayabambensis* T, 189:+; *Myrcia mollis* T, 269:+; *Myrcia splendens* T, 269:+; *Myrsine acutilobata* T, 168:+

Rare companions Axineo quitensis - Dicranopteretum flexuosae

Sticherus bifidus F, 3:+, 82:+, 84:+; *Myoxanthes monophyllus* E, 3:+, 87:+; *Lycopodium clavatum* F, 84:+; *Cladonia* sp. 89:2; *Carex polystachya* H, 88:+; *Ichnanthus pallens* H, 86:+; *Isachne arundinacea* H, 84:+; *Arundinella berteroniana* H, 86:+; *Peltapteris peltata* EF, 88:+; *Ludwigia peruviana* S, 89:+; *Sticherus penniger* F, 90:+; *Parodiolyra lateralis* H, 84:+

Rare companions Axineo quitensis - Dicranopteretum flexuosae Mellinetosum minutiflorae

Baccharis latifolia S, 91:+, 81:+; *Drymaria cordata* H, 91:+, 82:+; *Gnaphalium antennarioides* H, 3:+, 81:+; *Holcus lanatus* H, 3:+, 81:+; *Pennisetum peruvianum* H, 3:+, 81:+; *Macrocarpaea revoluta* S, 91:2; *Chloris barbata* H, 91:+; *Gnaphalium luteo-album* H, 82:+; *Gnaphalium pensylvanicum* H, 91:+; *Erechtites hieraciifolia* H, 82:+; *Kyllingia pumila* H, 82:+; *Myoxanthes uxoris* E, 91:+; *Sida rhombifolia* H, 91:+; *Siegesbeckia jorullensis* H, 91:+; *Solanum nigrum* H, 82:+; *Sporobolus indicus* H, 82:+; *Vismia baccifera* T, 82:+; *Axonopus compressus* H, 81:+; *Tagetes minuta* H, 81:+; *Gamochaeta americana* H, 81:+; *Malva pusilla* H, 81:+; *Cortaderia bifida* H, 82:+; *Setaria sphacellata* H, 81:+; *Verbena littoralis* H, 81:+; *Veronica serpyllifolia* H, 81:+; *Viola arguta* H, 81:+

Additional species with low constancy in Tab. 2:**Rare companions Purdieaon nutantis / Neurolepietum elatae**

Macrocarpaea revoluta S, 162:+, 271:+, 273:+, 8:+, 9:+, 11:+, 272:+, 102:+, 99:+, 276:+, 124:+, 70:+; *Baccharis genistelloides* S, 80:+, 112:+, 111:+, 64:+, 68:+, 118:+, 70:+, 71:+; *Hymenophyllum hirsutum* EF, 19:+, 44:+, 49:+, 274:+, 117:+, 276:+; *Sticherus revolutus* F, 80:+, 43:+, 271:2, 9:+, 114:+, 99:+, 124:+; *Rubus bogotensis* S, 166:+, 271:+, 105:+, 117:+, 99:+, 276:+; *Sticherus penniger* F, 163:+, 11:+, 45:+, 112:+, 109:+, 105:+, 117:+, 38:+, 101:+, 124:+; *Sticherus simplex* F, 107:+, 111:+, 275:+, 117:+, 167:+, 103:+; *Hydrocotyle steyermarkii* H, 162:r, 271:r, 274:r, 113:r, 124:r; *Hydrocotyle humboldtii* H, 273:r, 45:r, 46:r, 113:r, 100:r; *Chamaedora pinnatifrons* T, 153:+, 165:+, 126:+, 167:+; *Sibthorpia repens* H, 43:+, 163:+, 166:+, 273:+, 64:+; *Rubus niveus* S, 45:+, 46:+, 79:+, 113:+, 101:+; *Piper townsendii* S, 11:+, 111:+, 114:+, 38:+, 70:+; *Muehlenbeckia tamnifolia* H, 163:+, 164:+, 41:+, 106:+, 110:+; *Lycopodium clavatum* F, 163:+, 165:+, 45:+, 68:+, 100:+; *Ceratostema alatum* S, 273:+, 49:+, 105:+, 117:+; *Blechnum occidentale* F, 271:+, 18:+, 106:+, 71:+; *Dendrophthora lindeniana* P, 166:r, 102:r, 126:r, 105:r; *Uncinia hamata* H, 272:r, 114:r, 99:r, 71:r; *Miconia media* T, 163:+, 153:+, 165:+, 167:+; *Sticherus arachnoides* F, 153:+, 45:+, 109:+, 113:+; *Vittaria gardeniana* EF, 271:+, 273:r, 272:+, 64:+; *Themistoclesia epiphytica* S, 272:r, 19:r, 117:r; *Tillandsia stenoura* E, 162:+, 18:+, 19:3; *Dictyocaryum lamarckianum* T, 8:+, 11:+, 79:+; *Asplenium auritum* EF, 8:+, 47:+, 79:+; *Anthurium patulum* H, 111:+, 126:+, 99:+; *Clusia magnifolia* T, 80:+, 273:+, 38:+; *Rhynchospora locuples* H, 80:+, 19:+, 38:+; *Clusia latipes* T, 68:+, 114:+, 118:+; *Pilea myriantha* H, 273:+, 272:+, 38:+; *Miconia lutescens* S, 166:+, 18:+, 46:+; *Bomarea pardina* L, 43:+, 47:+, 17:+; *Bomarea distichifolia* L, 163:+, 16:+, 19:+; *Elleanthus sodiroi* H, 16:+, 18:+, 70:+; *Histiopteris incisa* F, 165:r, 273:+; *Dendrophthora clavata* P, 45:r, 114:r, 99:r; *Bomarea setacea* L, 45:+, 46:+, 38:+; *Pleurothallis antennifera* E, 273:+, 17:+, 46:+; *Guzmania candelabrum* E, 18:+, 104:+, 276:+; *Sphagnum spec.* 80:+, 167:+; *Fuchsia lehmanni* S, 46:+, 114:+; *Tillandsia ionochroma* E, 166:r, 11:r; *Terpsichore dependens* EF, 273:r, 11:r; *Bejaria aestuans* S, 272:1, 276:+; *Miconia radula* S, 166:+, 273:+; *Centropogon steyermarkii* S, 161:+, 271:+; *Tibouchina lepidota* T, 112:r, 109:r; *Piper bogotense* S, 273:+, 9:+; *Sticherus melanoblastus* F, 47:+, 99:+; *Valeriana hirtella* H, 16:r, 64:r; *Miconia tatamera* S, 42:+, 79:+; *Brachyotum confertum* S, 80:+, 19:+; *Hymenophyllum ruizianum* EF, 11:+, 16:+; *Myricanthes rhopaloides* T, 79:r, 114:r; *Cinchona pubescens* T, 164:+, 272:+; *Lepanthes gargantua* E, 273:r, 272:r; *Rhamnus granulosa* S, 164:+, 171:+; *Siparuna echinata* T, 80:+, 271:+; *Terpsichore asplenifolia* EF, 274:r, 114:r; *Clethra fimbriata* T, 18:+, 64:+; *Miconia poortmannii* S, 164:+, 276:+; *Graffenrieda emarginata* T, 8:+; *Drimys granadensis* T, 276:+; *Dendrophthora luerii* P, 11:r; *Siparuma aspera* T, 70:+; *Pecluma divaricata* EF, 166:r; *Dendrophthora dalstroemii* P, 68:r; *Weinmannia pubescens* T, 49:+; *Gaultheria reticulata* S, 276:+; *Cranichis fertilis* H, 104:r; *Vallea stipularis* T, 273:r; *Myrica parvifolia* T, 46:+; *Rubiaceae pha5013* S, 273:+; *Lellingeria major* EF, 273:+; *Trichosalpinx arbuscula* E, 164:r; *Maxillaria arachnites* E, 11:+; *Ocotea infrafoveolata* T, 276:+; *Pteridium arachnoideum* F, 272:+; *Gunnera pilosa* H, 271:+; *Melastomataceae phax022* S, 273:+; *Myrteola nummularia* T, 71:+; *Hedyosmum scabrum* T, 8:+; *Masdevallia macropus* E, 126:r; *Rubiaceae phaxIII005* S, 272:+; *Melastomataceae pha4045* S, 273:+; *Dictyostegia orobanchoides* P, 273:+; *Monnina pilosa* S, 272:+; *Conostegia extinctoria* T, 273:2; *Elleanthus aurantiacus* H, 19:+; *Miconia theaezans* T, 19:+; *Miconia latifolia* T, 271:+; *Monnina obtusifolia* S, 70:+; *Elleanthus amethystinoides* H, 16:+; *Campyloneurum cochense* EF, 11:r; *Carex jamesonii* H, 276:+; *Myricanthes fimbriata* T, 64:r; *Hyeronima macrocarpa* T, 271:r; *Hymenophyllum lobatoalatum* EF, 8:+; *Pleurothallis adalae* E, 8:+; *Munnozia hastifolia* H, 164:+; *Lamourouxia virgata* S, 164:+; *Carex muricata* H, 99:r; *Galium corymbosum* H, 110:r; *Sticherus remotus* F, 41:+; *Niphidium longifolium* EF, 104:r; *Poa aequatoriensis* H, 99:+; *Neonelsonia acuminata* H, 46:3; *Siphocampylus scandens* S, 70:+; *Agrostis peremans* H, 46:r; *Geissanthus ecuadorensis* T, 46:r; *Maxillaria irrorata* E, 70:r; *Maxillaria stenophylla* E, 44:r; *Maxillaria yanganensis* E, 68:r; *Lepanthes aurita* E, 118:r; *Lepanthes fusiformis* E, 114:r; *Masdevallia uncifera* E, 114:r; *Ditassa endoleuca* L, 274:r; *Alloplectus peruvianus* E, 276:r; *Cyperus friburgensis* H, 166:r; *Masdevallia sernae* E, 166:r; *Lepanthes wagneri* E, 273:r; *Restrepiopsis tubulosa* E, 273:r; *Pleurothallis salpingantha* E, 273:r; *Pleurothallis sclerophylla* E, 274:r; *Miconia obscura* T, 273:+; *Oreopanax palmatophyllum* T, 70:+; *Tournefortia fuliginosa* T, 273:r; *Pilea microphylla* H, 164:+; *Clusia alata* T, 273:+; *Miconia espinosae* S, 166:+; *Eriosorus aureonitens* F, 38:+; *Vriesea tequendamae* E, 166:r; *Hymenophyllum dependens* EF, 273:+; *Orthaea fimbriata* S, 164:+; *Persea bullata* T, 271:+; *Miconia crocea* S, 44:+; *Cnemidaria ewanii* FT, 273:+; *Ditassa anderssonii* L, 272:+; *Alchornea pearcei* T, 272:r

Additional species with low constancy in Tab. 3:

Rare companions *Purdiaeon nutantis*

Clusia latipes T, 122:+, 116:+, 120:+, 69:+, 51:+, 127:3; *Tillandsia stenoura* E, 60:2, 39:2, 55:+, 21:+, 56:+, 20:+; *Anthurium scandens* E, 35:+, 36:+, 29:+, 28:+, 30:+, 32:+; *Dictyocaryum lamarckianum* T, 77:+, 12:+, 32:r, 13:+, 92:+; *Hydrocotyle steyermarkii* H, 66:r, 53:r, 127:r, 52:r, 20:r; *Anthurium patulum* H, 29:+, 279:+, 12:+, 34:+, 31:+; *Valeriana hirtella* H, 67:r, 95:r, 32:r, 13:r, 15:r; *Muehlenbeckia tilifolia* H, 122:+, 120:+, 74:+, 48:+, 127:+; *Orthaëa secundiflora* E, 37:+, 97:+, 30:+, 32:+, 92:+; *Pitcairnia trianae* H, 122:2, 29:+, 28:+, 127:+, 13:+; *Rubus bogotensis* S, 55:+, 280:+, 39:+, 14:+; *Muehlenbeckia tamnifolia* H, 67:+, 28:+, 56:+, 15:+; *Styrax tomentosus* T, 54:+, 52:+, 280:+, 282:+; *Fuchsia lehmanni* S, 116:+, 51:+, 37:+, 98:+; *Sticherus arachnoidens* F, 31:+, 39:+, 13:+, 20:+; *Escallonia paniculata* T, 28:+, 278:+, 30:+, 13:+; *Elaphoglossum lingua* F, 93:2, 94:2, 95:+, 30:+; *Tillandsia ionochroma* E, 116:r, 54:r, 62:r, 279:r; *Themistoclesia epiphytica* S, 76:r, 60:r, 52:r, 281:r; *Bejaria aestuans* S, 36:+, 277:+, 278:+, 279:+; *Thalictrum podocarpum* H, 62:r, 127:r, 279:r, 282:r; *Hypolepis bogotensis* F, 29:+, 282:+, 31:+, 14:+; *Eriosorus aureonitens* F, 282:+, 31:+, 39:+, 92:+; *Tibouchina laxa* T, 95:+, 282:+, 32:r, 14:+; *Centropogon erythraeus* S, 66:+, 51:+, 281:+; *Dendrophthora lindeniana* P, 69:r, 31:r, 13:r; *Uncinia hamata* H, 116:r, 127:r, 37:r; *Miconia radula* S, 127:+, 279:+, 281:+; *Dendrophthora luerii* P, 65:r, 28:r, 13:r; *Hedyosmum cuatrecasazum* T, 116:+, 37:+, 98:+; *Piper bogotense* S, 30:+, 32:+, 14:+; *Sticherus melanoblastus* F, 35:+, 36:+, 97:+; *Terpsichore dependens* EF, 77:r, 63:r, 34:r; *Tibouchina lepidota* T, 122:r, 60:r, 281:r; *Bomarea pardina* L, 40:+, 37:+, 15:+; *Histiopteris incisa* F, 116:+, 278:+; 279:+; *Vallea stipularis* T, 55:r, 62:r, 282:r; *Miconia obscura* T, 120:+, 62:+, 127:+; *Oreopanax palmatophyllum* T, 60:+, 127:+, 281:+; *Tournefortia fuliginosa* T, 36:r, 63:r, 280:r; *Trichosalpinx chamaelepanthes* E, 73:r, 60:r, 54:r; *Piper andream S*, 28:+, 97:+, 14:+; *Palicourea weberbaueri* S, 28:+, 279:+, 282:+; *Berberis lutea* S, 120:+, 278:+, 97:+; *Baccharis arbutifolia* S, 278:+, 282:+, 92:+; *Stelis nextiopis* E, 95:+; 282:+, 32:+; *Aionea dubia* T, 120:r, 62:r, 127:r; *Anthurium incomptum* E, 36:+, 12:+, 34:+; *Palicourea flavescens* S, 29:+, 95:+, 14:+; *Peperomia loxensis* H, 282:+, 31:+, 14:+; *Viburnum pichichense* T, 48:r, 63:r, 31:r; *Rhipidocladum harmonicum* H, 122:+, 97:+, 14:+; *Monnina subscandens* S, 35:+, 36:+, 31:2; *Antidaphne andina* P, 279:+, 282:+, 30:+; *Eriosorus cheilanthoides* F, 95:+, 31:+, 92:+; *Pernettya prostrata* S, 55:+, 20:+; *Blechnum occidentale* F, 62:+, 56:+; *Lycopodium clavatum* F, 69:+, 28:+; *Centropogon steyermarkii* S, 116:+, 281:+; *Dendrophthora dalstroemii* P, 76:r, 39:r; *Miconia tatamera* S, 116:+, 98:+; *Pecluma divaricata* EF, 281:r, 37:r; *Bomarea distichifolia* L, 21:+, 20:+; *Elleanthus sodiroi* H, 21:+, 20:+; *Myrica parvifolia* T, 94:r, 281:r; *Masdevallia macropus* E, 60:r, 63:r; *Sticherus penniger* F, 40:+, 32:+; *Sticherus simplex* 34:+, 31:+; *Oreopanax rosei* T, 74:+, 62:+; *Miconia glandulosa* T, 62:+, 37:+; *Meriania maguirei* T, 116:+, 67:+; *Polystichum platyphyllum* F, 63:+, 279:+; *Pilea microphylla* H, 63:+, 98:+; *Begonia urticae* H, 127:r, 279:r; *Miconia espinosae* S, 65:+, 98:+; *Spaeropteris quinidensis* FT, 127:+, 37:+; *Dichaea laxa* E, 12:+, 34:+; *Cybianthus magnus* T, 277:+, 279:+; *Baccharis latifolia* S, 277:+, 95:+; *Tovomita weddeliana* T, 63:+, 279:+; *Trichosalpinx acronoma* E, 60:r, 29:r; *Myricanthes fragrans* T, 116:+, 282:+; *Hyeronima asperifolia* T, 127:r, 37:r; *Themistoclesia cordifolium* S, 116:r, 280:r; *Trichosalpinx systremmata* E, 94:r, 279:r; *Geonoma weberbaueri* S, 278:+, 279:+; *Centropogon ferrugineus* S, 67:+, 280:+; *Cortaderia bifida* H, 122:+, 278:2; *Niphogeton dissecta* H, 40:+, 95:+; *Sphyraspermum buxifolium* S, 51:+, 127:+; *Trichosalpinx intricata* E, 122:r, 62:r; *Trichosalpinx dirhamphis* E, 279:r, 280:r; *Rubiaceae pha5017* S, 77:+; 279:+; *Brachyotum setosum* S, 282:+, 31:+; *Croton spec.* S, 277:+, 279:+; *Cardamine bonariensis* H, 63:+, 279:+; *Monnina subspeciosa* S, 30:+, 14:+; *Brachyotum campanulare* S, 122:2, 127:2; *Disterigma empetrifolium* E, 281:+, 282:r; *Campyloneurum amphostenon* F, 35:r, 15:r; *Pityrogramma ebenea* F, 97:r, 282:r; *Viola arguta* H, 29:+, 32:+; *Prosthechea hartwegii* H, 95:+, 30:+; *Aulonemia longiaristata* H, 282:+, 13:+; *Panopsis ferruginea* T, 21:4; *Pilea myriantha* H, 63:+; *Miconia lutescens* S, 116:+; *Brachyotum confertum* S, 279:+; *Siparuma aspera* T, 57:+; *Hymenophyllum ruizianum* EF, 12:+; *Weinmannia pubescens* T, 37:+; *Myricanthes rhopaloides* T, 98:r; *Rubiaceae pha5013* S, 279:+; *Lellingeria major* EF, 62:+; *Cinchona pubescens* T, 98:+; *Trichosalpinx arbuscula* E, 54:r; *Gunnera pilosa* H, 279:+; *Melastomataceae phax022* S, 278:+; *Myrteola nummularia* T, 62:r; *Melastomataceae pha4045* S, 62:+; *Dictyostegia orobanchoides* P, 62:+; *Miconia theaezans* T, 20:+; *Miconia latifolia* T, 54:+; *Campyloneurum cochense* EF, 39:r; *Carex jamesonii* H, 63:+; *Persea ferruginea* T, 277:+; *Clusia alata* T, 73:+; *Dendrophthora ambigua* P, 127:+; *Vriesea appendiculata* E, 37:r; *Nectandra discolor* T, 281:r; *Vriesea tequendamae* E, 62:r; *Miconia ligustrina* T, 55:+; *Hymenophyllum dependens* EF, 279:+; *Alchornea coelophylla* T, 116:+; *Asplenium sessilifolium* EF, 62:r; *Gordonia fruticosa* T, 127:r; *Miconia stenophylla* S, 62:+; *Myrcia splendens* T, 74:r; *Naucleopsis ulei* T, 280:+; *Myrcia mollis* T, 60:r; *Orthaëa fimbriata* S, 39:+; *Peperomia glabellata* E, 282:+; *Freziera karsteniana* T, 277:+; *Passiflora cumbalensis* L, 279:+; *Lepanthes acarina* E, 281:r; *Lepanthes intricata* E, 63:r; *Myoxanthes priapus* E, 77:r; *Nectandra obtusata* T, 98:r; *Cnemidaria ewanii* FT, 62:r; *Peperomia striata* E, 120:r; *Ribes leptostachyum* S, 127:+; *Ditassa anderssonii* L, 278:+; *Arctophyllum setosum* S, 282:r; *Cavendishia zamorensis* S, 120:r; *Oreanthes fragilis* S, 120:+; *Utricularia uniflora* H, 279:r; *Lepanthes eresipes* E, 56:r; *Lepanthes xenos* E, 65:r; *Neurolepis nobilis* H, 48:r; *Pleurothallis aves-seriales* E, 60:+; *Oreopanax microflorum* T, 37:+; *Cavendishia cuatrecasii* S, 37:r; *Gaultheria foliosa* S, 14:+; *Oreocallis mucronata* S, 32:+; *Pleurothallis lilijae* E, 98:r; *Baccharis buxifolia* S, 13:+; *Asplenium alatum* F, 127:r; *Peperomia rotundata* E, 97:+; *Cranichis antioquiensis* H, 48:r; *Carex lehmanniana* H, 13:+; *Hesperomeles ferruginea* S, 13:+; *Huperzia eversa* F, 30:+; *Masdevallia anachaeta* E, 281:r; *Polygonum hydropiperoides* H, 48:+; *Elleanthus flavescens* H, 20:+; *Miconia suborbicularis* T, 34:+; *Axinea sclerophylla* T, 127:+; *Blechnum schomburgkii* F, 35:+; *Cranichis ciliata* H, 57:r; *Graffenridia calyptrilloides* T, 54:r; *Lepanthes ictalurus* E, 54:r; *Masdevallia ampullacea* E, 116:r; *Pleurothallis deflexa* E, 116:r; *Pleurothallis ligulata* E, 127:r; *Pleurothallis steliidiopsis* E, 51:r; *Pleurothallis vegrandis* E, 73:r; *Rhynchospora hieronymi* H, 116:r; *Sticherus rubiginosus* F, 278:2; *Sticherus tomentosus* F, 278:+; *Symplocos fuscata* T, 280:+; *Elaphoglossum erinoceum* EF, 280:r; *Justicia chlorantha* H, 278:+; *Masdevallia*

amaluzae E, **280**:r; *Maxillaria exaltata* E, **280**:r; *Pleurothallis diminuta* E, **281**:r; *Polypodium remotum* EF, **281**:+; *Rhynchospora barbata* H, **281**:r; *Rhynchospora polyphylla* H, **277**:r; *Macrocarpaea ovalis* S, **279**:+; *Aniba muca* T, **279**:r; *Cyathea brevistipes* FT, **62**:r; *Guzmania paniculata* E, **63**:+; *Philodendron herthae* E, **63**:r; *Selaginella hartwegiana* F, **63**:+; *Gynoxis cuicochensis* S, **30**:+; *Gynoxis laurifolia* S, **28**:+; *Arctophyllum rivettii* S, **29**:r; *Baccharis buddlejoides* S, **32**:r; *Brachyotum gracilescens* S, **39**:r; *Calceolaria chelidonioides* H, **28**:r; *Calceolaria tripartita* H, **29**:r; *Huperzia hippuridea* F, **282**:+; *Lomatia hirsuta* S, **97**:+; *Prosthechea pulcherrima* H, **13**:+; *Oreocallois grandiflora* S, **14**:+; *Arracacia xanthorrhiza* H, **92**:r; *Huperzia polycarpos* F, **95**:+; *Gynoxis calyculisolvens* S, **95**:r; *Baccharis prunifolia* S, **13**:r; *Baccharis tricuneata* S, **95**:r; *Calceolaria calycina* H, **97**:r; *Thelypteris rudis* F, **282**:+; *Viola stipularis* H, **13**:+; *Lycopodiella pendulina* F, **282**:+; *Isachne rigens* H, **282**:+

Additional species with low constancy in Tab. 4:

Rare companions *Purdiaeon nutantis*

Clethra revoluta T, 115:+, 303:+, 155:+, 158:+, 159:+, 151:+, 96:+, 302:+, 108:+, 154:+, 160:+, 119:+, 121:+, 152:+; *Blechnum fragile* EF, 6:+, 27:+, 26:+, 5:+, 7:+, 10:+, 155:+, 158:+, 159:+, 22:+, 154:+, 160:+, 4:+; *Bomarea nervosa* L, 155:+, 158:+, 159:+, 290:+, 293:+, 306:+, 154:+, 166:+, 298:+; *Cyathea caracasana* FT, 115:+, 303:+, 151:+, 96:+, 302:+, 108:+, 50:+, 78:+, 22:+, 121:+, 4:+; *Chusquea falcata* H, 304:+, 291:+, 292:+, 308:+, 307:+, 75:+, 72:+, 305:+, 297:2, 294:+, 4:3; *Mezobromelia capituligera* H, 115:2, 303:+, 151:+, 96:+, 302:+, 108:+, 59:+, 154:+, 121:+; *Piper townsendii* S, 115:+, 303:+, 151:+, 96:+, 302:+, 108:+, 121:+, 4:+; *Rubus bogotensis* S, 6:+, 284:+, 307:+, 72:+, 298:+, 152:+, 295:+; *Muehlenbeckia tilifolia* H, 155:+, 158:+, 159:+, 154:+, 160:+, 119:+, 152:+; *Trichomanes capillaceum* EF, 155:+, 158:+, 159:+, 22:+, 154:+, 119:+, 152:+; *Sticherus revolutus* F, 304:+, 10:+, 283:+, 286:+, 289:+, 290:+, 306:+, 59:+; *Clusia magnifolia* T, 308:+, 305:+, 298:+, 297:2, 296:+, 295:+, 4:+; *Oreopanax rosei* T, 159:+, 284:+, 288:+, 291:+, 307:+, 50:+, 160:+, 119:+; *Miconia obscura* T, 159:+, 302:+, 284:+, 291:+, 154:+, 300:+, 121:+; *Baccharis genistelloides* S, 50:+, 59:+, 75:+, 78:+, 72:+, 61:+, 58:+; *Rubus niveus* S, 6:+, 287:+, 306:+, 119:+, 301:+, 295:+; *Dictyocaryum lamarckianum* T, 6:+, 5:+, 7:1, 10:+, 287:2, 4:+; *Symbolanthus calygonus* S, 290:+, 292:+, 305:+, 301:+, 300:+, 299:+; *Blechnum occidentale* F, 155:+, 302:+, 285:+, 288:+, 300:+, 152:+; *Persea ferruginea* T, 291:+, 307:+, 305:+, 298:2, 296:+, 295:+; *Nectandra laurel* T, 283:+, 287:2, 293:+, 308:+, 305:+, 299:+; *Pernettya prostrata* S, 158:+, 108:+, 289:+, 61:+, 296:+; *Styrax tomentosus* T, 26:+, 159:+, 50:+, 300:+, 152:+; *Fuchsia lehmanni* S, 10:+, 158:+, 108:+, 290:+, 291:+; *Miconia poortmannii* S, 286:+, 290:+, 61:+, 305:+, 301:+; *Miconia glandulosa* T, 158:+, 96:+, 108:+, 290:+, 297:+; *Oreopanax palmatophyllum* T, 159:+, 151:+, 185:+, 287:+, 298:+; *Meriania maguirei* T, 155:+, 96:+, 285:+, 287:+, 78:+; *Clusia alata* T, 283:+, 284:+, 286:2, 293:+, 306:+; *Asplenium auritum* EF, 6:+, 26:+, 7:+, 4:+; *Anthurium patulum* H, 27:+, 5:+, 292:1, 294:+; *Tillandsia ionochroma* E, 7:r, 155:r, 293:r, 58:r; *Miconia radula* S, 158:+, 284:+, 50:+, 61:+; *Dendrophthora luerii* P, 303:r, 59:r, 72:r, 121:r; *Hedyosmum cuatrecasazum* T, 7:+, 155:+, 50:+, 119:+; *Dendrophthora dalstroemii* P, 159:r, 151:r, 290:r, 306:r; *Cyathea ebeniana* FT, 27:+, 26:+, 297:+, 4:+; *Guzmania candelabrum* E, 26:+, 306:+, 75:+, 22:2; *Ruellia puri* H, 159:+, 151:+, 72:+, 296:+; *Tournefortia fuliginosa* T, 288:r, 290:r, 75:r, 22:r; *Pilea microphylla* H, 61:+, 58:+, 301:+, 297:+; *Polystichum platyphyllum* F, 285:+, 293:+, 305:+, 297:+; *Begonia urticae* H, 158:r, 50:r, 61:r, 301:r; *Spaeropteris quinidensis* FT, 293:+, 307:+, 306:+, 154:+; *Dendrophthora ambigua* P, 27:+, 26:+, 158:+, 307:r; *Vriesea appendiculata* E, 303:r, 302:r, 160:r, 297:r; *Rhynchospora kunthii* H, 22:+, 299:+, 295:+, 294:2; *Cladonia* 115:+, 27:+, 26:+, 22:+; *Vriesea tequendamae* E, 155:r, 302:r, 50:r, 300:r; *Themistoclesia epiphytica* S, 61:r, 58:r, 305:r; *Uncinia hamata* H, 61:r, 58:r, 305:r; *Dendrophthora lindeniana* P, 285:r, 61:r, 297:r; *Bejaria aestuans* S, 289:+, 298:+, 296:+; *Terpsichore dependens* EF, 10:r, 108:r, 22:r; *Tibouchina lepidota* T, 6:r, 285:r, 119:r; *Centropogon steyermarkii* S, 155:+, 158:+, 75:+; *Rhynchospora locuples* H, 290:+, 293:+, 308:+; *Pilea myriantha* H, 50:+, 305:+, 119:+; *Miconia media* T, 6:+, 5:+, 4:+; *Miconia lutescens* S, 285:+, 301:+, 299:+; *Siparuma aspera* T, 151:+, 291:+, 299:+; *Cranichis fertilis* H, 155:r, 59:r, 160:r; *Gaultheria reticulata* S, 205:+, 296:+, 294:+; *Escallonia paniculata* T, 306:+, 296:+, 294:+; *Piper andreaeanum* S, 27:+, 26:+, 4:+; *Miconia espinosae* S, 108:+, 284:+, 287:+; *Cybianthus magnus* T, 305:+, 296:+, 294:+; *Baccharis latifolia* S, 292:+, 295:+, 294:+; *Nectandra discolor* T, 155:r, 108:r, 50:r; *Miconia ligustrina* T, 115:+, 289:+, 50:+; *Hymenophyllum dependens* EF, 293:+, 297:+, 4:+; *Zygophlebium mathewsii* EF, 301:+, 298:+, 4:+; *Persea bullata* T, 115:+, 305:+, 297:+; *Maxillaria graminifolia* E, 302:r, 307:r, 121:r; *Prosthechea pamplonensis* H, 6:+, 5:+, 4:+; *Hydrocotyle steyermarkii* H, 50:r, 305:r; *Muehlenbeckia tamnifolia* H, 304:+, 96:+; *Tillandsia stenoura* E, 10:3, 22:+; *Lycopodium clavatum* F, 283:+, 295:+; *Piper bogotense* S, 10:+, 297:+; *Sticherus melanoblastus* F, 27:+, 5:+; *Brachyotum confertum* S, 78:+, 22:+; *Pecluma divaricata* EF, 119:r, 297:r; *Hymenophyllum ruizianum* EF, 6:+, 10:+; *Weinmannia pubescens* T, 50:+, 59:1; *Rubiaceae pha5013* S, 61:+, 297:+; *Maxillaria arachnites* E, 121:+, 4:+; *Ocotea infrafoveolata* T, 308:+, 305:+; *Pteridium arachnoideum* F, 283:+, 305:+; *Hedyosmum scabrum* T, 7:+, 4:+; *Rubiaceae pha501005* S, 292:+, 307:+; *Conostegia extinctoria* T, 307:+, 297:+; *Monnina obtusifolia* S, 59:+, 299:+; *Sticherus penniger* F, 26:+, 10:+; *Clethra fimbriata* T, 50:+, 72:+; *Orthaea secundiflora* E, 27:+, 26:+; *Pitcairnia trianae* H, 27:+, 119:2; *Trichosalpinx chamaelepanthes* E, 286:r, 50:r; *Palicourea weberbaueri* S, 292:+, 294:+; *Berberis lutea* S, 303:+, 293:+; *Dichaea laxa* E, 7:+, 4:+; *Baccharis arbutifolia* S, 292:+, 298:+; *Tovomita weddeliana* T, 61:+, 297:+; *Trichosalpinx acremona* E, 290:r, 160:r; *Myricanthes fragrans* T, 59:+, 72:+; *Hyeronima asperifolia* T, 159:r, 59:r; *Alchornea coelophylla* T, 96:r, 160:r; *Asplenium sessilifolium* EF, 61:r, 305:r; *Gordonia fruticosa* T, 304:r, 158:r; *Miconia stenophylla* S, 304:+, 283:+; *Myrcia splendens* T, 108:+, 61:r; *Naucleopsis ulei* T, 290:+, 291:+; *Myrcia mollis* T, 159:r, 202:r; *Orthaea fimbriata* S, 304:+, 284:+; *Peperomia glabellata* E, 291:+, 59:+; *Miconia crocea* S, 50:+, 61:+; *Epidendrum cuencanum* E, 304:r, 298:r; *Dicranopteris flexuosa* H, 291:+, 59:+; *Lepanthes angulata* E, 302:r, 285:r; *Meriania rigida* T, 288:+, 152:+; *Weinmannia lentiscifolia* T, 158:r, 152:r; *Eriosorus flexuosus* F, 115:+, 22:+; *Cyathea bipinnatifida* F, 305:+, 297:2; *Trichosalpinx pumila* E, 158:r, 72:r; *Trichosalpinx tenuis* 59:r, 75:r; *Ditassa anderssonii* L, 300:+, 298:+; *Myrsine manglilla* T, 5:+, 295:+; *Myricanthes discolor* T, 298:+, 22:+; *Ribes hirtum* S, 22:+, 301:+; *Alloplectrus hispidus* S, 287:r, 160:r; *Thibaudia joergensenii* S, 290:+, 301:+; *Nectandra membranacea* T, 293:r, 59:r; *Rhynchospora vulcani* H, 159:+, 306:+; *Aetanthus nodosus* P, 151:r, 299:+; *Stelis bicornis* E, 303:+, 151:+; *Erodium moschatum* H, 59:+, 154:+; *Rubiaceae pha5026* S, 61:+, 297:+; *Sphaeradenia steyermarkii* H, 6:+, 5:+; *Asplenium auriculatum* EF, 6:+, 4:+; *Fuchsia loxensis* S, 6:+, 5:+; *Asplenium flabellulatum* EF, 5:+, 4:+; *Macleania floribunda* S, 159:+, 96:+; *Macrocarpaea harlingii* S, 291:+, 301:+; *Miconia tatamera* S, 286:+; *Bomarea distichifolia* L, 22:+; *Histiopteris incisa* F, 158:+; *Dendrophthora clavata* P, 75:r; *Myricanthes rhopaloides* T, 295:r; *Myrcia parvifolia* T, 284:r; *Lellingeria major* EF, 61:+; *Cinchona pubescens* T, 108:r; *Trichosalpinx arbuscula* E, 61:r; *Gunnera pilosa* H, 158:+; *Lepanthes gargantua* E, 159:r; *Melastomataceae pha022* S, 293:+; *Myrteola nummularia* T, 7:r; *Rhamnus*

granulosa S, 50+; *Melastomataceae pha4045* S, 293+; *Monnina pilosa* S, 302+; *Elleanthus aurantiacus* H, 305+; *Miconia theaezans* T, 22+; *Elleanthus amethystinoides* H, 22+; *Myricanthes fimbriata* T, 291:r; *Hyeronima macrocarpa* T, 152:r; *Lamourouxia virgata* S, 27+; *Stelis pusilla* E, 26+; *Anthurium scandens* E, 10+; *Thalictrum podocarpum* H, 152:r; *Elaphoglossum lingua* F, 4+; *Hypolepis bogotensis* F, 27+; *Eriosorus aureonitens* F, 27+; *Stelis nexiopus* E, 27+; *Palicourea flavescens* S, 4+; *Peperomia loxensis* H, 4+; *Viburnum pichichense* T, 27:r; *Aionea dubia* T, 288:r; *Anthurium incomptum* E, 10+; *Cortaderia bifida* H, 300:2; *Themistoclesia cordifolium* S, 50:r; *Trichosalpinx systremmata* E, 301:r; *Geonoma weberbaueri* S, 294+; *Centropogon ferrugineus* S, 300+; *Niphogeton dissecta* H, 27+; *Spherospermum buxifolium* S, 115+; *Trichosalpinx intricata* E, 152:r; *Trichosalpinx dirhamphis* E, 61:r; *Rubiaceae pha5017* S, 297:2; *Brachyotum setosum* S, 27+; *Freziera karsteniana* T, 305+; *Passiflora cumbalensis* L, 294+; *Lepanthes acarina* E, 61:r; *Lepanthes intricata* E, 209:r; *Myoxanthes priapus* E, 307:r; *Nectandra obtusata* T, 151:r; *Cnemidaria ewanii* FT, 305+; *Peperomia striata* E, 293:r; *Ribes leptostachyum* S, 96+; *Arctophyllum setosum* S, 27+; *Cavendishia zamorensis* S, 291+; *Oreanthes fragilis* S, 302+; *Utricularia uniflora* H, 283:r; *Lepanthes eresipes* E, 298:r; *Lepanthes xenos* E, 61:r; *Neurolepis nobilis* H, 78:r; *Pleurothallis aves-seriales* E, 159:r; *Oreopanax microflorum* T, 290+; *Cavendishia cuatrecasii* S, 304:r; *Gaultheria foliosa* S, 27+; *Oreocallis mucronata* S, 27+; *Pleurothallis lilijae* E, 96:r; *Trichosalpinx robleorum* E, 115:r; *Asplenium harpeodes* EF, 297:r; *Gentianella gilioides* H, 297:r; *Carex lehmanniana* H, 27+; *Desfontainia spinosa* S, 50+; *Dicksonia sellowiana* F, 115+; *Diplopterygium bancroftii* F, 304+; *Guzmania squarrosa* E, 50:r; *Masdevallia parvula* E, 303:r; *Myrcia ayabambensis* T, 290:r; *Lepanthes monitor* E, 75:r; *Clethra ovalifolia* T, 58+; *Miconia asperrima* T, 155+; *Sticherus bifidus* F, 304+; *Masdevallia xanthina* E, 121+; *Maxillaria jamesonii* E, 121+; *Meliosma meridensis* T, 121+; *Miconia cladonia* T, 108:2; *Saurauia harlingii* T, 121+; *Weinmannia macrophylla* T, 295+; *Disterigma codonantherum* E, 294+; *Alchornea pearcei* T, 307:r; *Hyeronima moritziana* T, 155:r; *Weinmannia dryadifolia* T, 154+; *Blotiella lindeniana* F, 159+; *Ceratostema tarapotana* S, 304+; *Centropogon densiflorus* S, 158:r; *Centropogon intonsus* S, 119:r; *Cranichis lehmannii* H, 304:r; *Cybianthus pastensis* T, 50:r; *Cyperus tabina* H, 119:r; *Elaphoglossum erinoceum* EF, 299:r; *Epidendrum decurviflorum* H, 158:r; *Epidendrum scabrum* E, 119:r; *Gunnera atropurpurea* H, 59+; *Justicia chlorantha* H, 308+; *Lepanthes adelphe* E, 58:r; *Lepanthes agglutinata* E, 306:r; *Lepanthes disjuncta* E, 290:r; *Lepanthes hirtzii* E, 303:r; *Lepanthes micropetala* E, 301:r; *Macrocarpaea stenophylla* S, 119+; *Malva sylvestris* H, 151+; *Maxillaria densifolia* E, 155:r; *Maxillaria disticha* E, 58:r; *Miconia corymbiformis* T, 154+; *Miconia salicifolia* S, 301+; *Pachyphyllum falcifolium* E, 303:r; *Persea campii* T, 96:r; *Pleurothallis bivalvis* E, 152:r; *Pleurothallis cernua* E, 293:r; *Pleurothallis cylindrica* E, 59:r; *Pleurothallis divaricans* E, 291:r; *Pleurothallis dunstervillei* E, 115:r; *Pleurothallis elagans* E, 121:r; *Pleurothallis floribunda* E, 151:r; *Pleurothallis galeata* E, 290:r; *Polypogon elongatus* H, 155+; *Ponthievia andicola* E, 301:r; *Prescottia cordifolia* H, 307:r; *Rhamnus sphaerosperma* S, 302:r; *Rugaea hirta* T, 96+; *Salpistele dielsii* E, 119:r; *Prunus opaca* T, 297+; *Hedyosmum anisodorum* T, 288+; *Hyeronima duquei* T, 288:2; *Ilex aboroica* T, 289+; *Alsophila erinacea* FT, 61:r; *Asplenium aethiopicum* EF, 305:r; *Caladium bicolor* E, 305:r; *Codonanthe erubescens* E, 297:r; *Cyathea brevistipes* FT, 305:r; *Drymaria cordata* H, 298:r; *Elaeagia ecuadorensis* T, 288+; *Lepanthes focalis* E, 285:r; *Lepanthes monoptera* E, 61:r; *Lepanthes series* E, 286:r; *Lepanthes yanganae* E, 305:r; *Masdevallia teaguei* E, 286:r; *Maxillaria calantha* E, 289:r; *Pachyphyllum peperomioides* E, 305:r; *Pearcea sprucei* H, 285:r; *Pleurothallis laevigata* E, 297:r; *Pleurothallis laminata* E, 285:r; *Pleurothallis linguifera* E, 297:r; *Pleurothallis pulchella* E, 298:r; *Rhynchospora tenuis* H, 287:r; *Selaginella cavifolia* F, 305+; *Selaginella poeppingiana* F, 285+; *Trisetella pantex* E, 61:r; *Begonia parviflora* H, 115:r; *Calamagrostis rupestris* H, 26:r; *Calceolaria fusca* H, 26:r; *Elaphoglossum muscosum* EF, 7:r; *Macrocarpaea sodiroana* S, 26+; *Elaphoglossum paleaceum* EF, 5+; *Hedyosmum strigosum* T, 6+; *Lycopodiella cernua* F, 72+; *Sphagnum* 115+; *Columnea strigosa* E, 22+; *Geissanthus vanderwerffii* T, 22+; *Eriosorus rufescens* F, 22+;

Additional species with low constancy in Tab. 5:

Rare companions *Clusio ellipticae* - *Weinmannietum cochensis*

Ilex ovalis S, 258+; 255+; 140+; 259+; *Valeriana convallarioides* H, 149+; 146+; 211+; 249+; *Valeriana hirtella* H, 144+; 140+; 142+; *Ribes microphyllum* S, 138+; 149+; 254+; *Symplocos fuscata* T, 149+; 254+; 142+; *Tibouchina lepidota* T, 135+; 140+; 142+; *Plutarchia ecuadoriensis* S, 135+; 140+; *Oreopanax rosei* T, 138+; 254+; 135+; *Niphidium crassifolium* F, 260+; 135+; 256+; *Myricanthes myrsinoides* T, 260+; 155+; 135+; *Montacalia andicola* S, 138+; 135+; 140+; *Fuchsia loxensis* S, 258+; 260+; 144+; *Gordonia fruticosa* T, 135+; 144+; 140+; *Huperzia weberbaueri* F, 257+; 259+; 142+; 250+; 210+; *Hyeronima macrocarpa* T, 258+; 135+; 132+; *Meriania maguirei* T, 146+; 255+; 257+; *Meriania rigida* T, 138+; 144+; 140+; ; *Nasa loxensis* H, 138:r; 256:r; 207:r; *Miconia bracteolata* T, 260+; 135+; 142+; *Miconia suborbicularis* T, 254+; 135+; 257+; *Miconia crocea* S, 255+; 135+; 142+; *Hydrocotyle steyermarkii* H, 146+; 257+; *Hymenophyllum hirsutum* EF, 135+; 257+; *Hypericum laricifolium* T, 254+; 142+; *Lamourouxia virgata* S, 258+; 138+; *Weinmannia pinnata* T, 257+; 140+; *Guzmania squarrosa* E, 258+; 140+; *Geissanthus ecuadorensis* T, 138+; 149+; *Valeriana asterothrix* H, 135+; 132+; *Thibaudia floribunda* S, 149+; 142+; *Miconia cladonia* T, 260+; 257+; *Miconia radula* T, 255+; 257+; *Miconia latifolia* S, 138+; 132+; *Monnina pilosa* S, 146+; 140+; *Monnina subscandens* S, 254+; 257+; *Myricanthes fragrans* 149+; 256+; *Myricanthes rhopaloides* T, 140+; 259+; *Nectandra discolor* T, 135+; 140+; *Neurolepis nobilis* H, 146+; 135+; *Ocotea alnifolia* T, 138+; 142+; *Oreopanax avicenniifolius* T, 149+; 259+; *Pachyphyllum cristallinum* E, 138+; 140+; *Pachyphyllum hartwegii* E, 138+; 255+; *Pachyphyllum peperomioides* E, 256:r; 132:r; *Passiflora cumbalensis* L, 146+; 256+; *Peperomia rotundata* E, 146+; 144+; *Persea*

campii T, 246:+, 144:+; *Acalypha macrostachya* H, 254:+, 140:+; *Baccharis prunifolia* S, 257:+, 142:+; *Baccharis tricuneata* S, 135:+, 256:+; *Manettia pichichensis* S, 149:+, 140:+; *Blechnum fragile* EF, 149:+, 257:+; *Bomarea distichifolia* L, 135:+, 259:+; *Campyloneurum amphenonon* F, 149:+, 135:+; *Elaphoglossum erinoceum* EF, 254:r, 144:+; *Elaphoglossum minutum* F, 144:r, 132:r; *Fernandezia sanguinea* E, 254:+r 135:r; *Pityrogramma pearcei* F, 138:+, 259:+; *Plantago australis* H, 135:+, 256:+; *Polystichum lehmannii* F, 256:+, 257:+; *Pteris muricata* F, 149:+, 256:+; *Siparuna echinata* T, 257:+, 140:+; *Stelis flexuosa* E, 138:+, 140:+; *Symplocos coriacea* T, 149:+, 140:+; *Symplocos reflexa* T, 135:+, 259:+; *Terpsichore heteromorpha* EF, 138:+, 132:r; *Viburnum goudotii* T, 138:+, 256:+; *Weinmannia dryadifolia* T, 258:+, 149:+; *Weinmannia macrophylla* T, 149:+, 140:+; *Ilex gabinetensis* S, 138:+, 146:+; *Ilex hualgayoca* S, 260:+, 140:+; *Ilex myricoides* S, 255:+, 132:+; *Ilex scopulorum* S, 144:+, 259:+; *Rubus boliviensis* S, 146:+, 255:+; *Lepanthes monitor* E, 146:r, 257:r; *Lepanthes monoptera* E, 135:r, 132:r; *Bejaria subsessilis* S, 132:+; *Berberis valde aff schwerini* S, 254:+; *Calceolaria chelidonioides* H, 142:+; *Campyloneurum angustifolium* EF, 142:+; *Ceratostema loranthifolium* S, 144:+; *Coriaria ruscifolia* S, 135:+; *Elaphoglossum lloense* F, 255:r; *Elaphoglossum muscosum* EF, 257:r; *Elaphoglossum ovatum* EF, 142:r; *Elleanthus gracilis* H, 149:+; *Gunnera colombiana* H, 255:r; *Hyeronima asperifolia* T, 138:+; *Lepanthes alticola* E, 135:r; *Lepanthes hirtzii* E, 138:r; *Lepanthes yanganae* E, 259:r; *Lepanthopsis apoda* E, 140:r; *Lepanthopsis hirtzii* E, 149:r; *Macleania rupestris* S, 135:+; *Malaxis crispifolia* H, 258:r; *Masdevallia picta* E, 135:r; *Maxillaria alpestris* E, 258:r; *Maxillaria arachnites* E, 146:r; *Maxillaria densifolia* E, 140:r; *Maxillaria graminifolia* E, 146:r; *Maxillaria polyphylla* E, 256:r; *Meriania furvanthera* T, 138:+; *Arctophyllum rivettii* S, 149:+; *Miconia asperrima* T, 138:+; *Miconia corymbiformis* T, 149:+; *Miconia hexamera* T, 257:+; *Miconia ligustrina* T, 138:+; *Miconia papillosa* S, 259:+; *Miconia salicifolia* S, 142:+; *Miconia stenophylla* S, 140:+; *Monnina obtusifolia* S, 142:+; *Munnozia nivea* H, 140:+; *Mutisia alata* L, 140:+; *Myoxanthus ceratohallis* E, 146:r; *Myricanthes fimbriata* T, 138:+; *Myrsine dependens* T, 138:+; *Myrsine sodiroana* T, 140:+; *Myrteola nummularia* T, 149; *Ocotea arnottiana* T, 257:+; *Ocotea rotundata* T, 138:+; *Odontoglossum pardinum* E, 140:r; *Oenothera epilobifolia* S, 254:r; *Oncidium excavatum* H, 138:r; *Oreocallois grandiflora* S, 138:r; *Otoglossum brevifolium* E, 144:r; *Pecluma curvans* F, 257:+; *Peperomia persulcata* H, 138:+; *Persea conferta* T, 138:+; *Persea sericea* T, 146:+; *Persea weberbaueri* T, 142:+; *Platystele dodsonii* E, 142:r; *Pleurothallis aves-seriales* E, 258:r; *Pleurothallis crocodiliceps* E, 135:r; *Pleurothallis elagans* E, 140:r; *Pleurothallis laevigata* E, 132:r; *Pleurothallis laminata* E, 132:r; *Pleurothallis ligulata* E, 256:r; *Pleurothallis linguifera* E, 255:r; *Pleurothallis patateensis* E, 256:r; *Pleurothallis pulchella* E, 146:r; *Pleurothallis rubens* E, 138:r; *Pleurothallis salpingantha* E, 258:r; *Pleurothallis spiralis* E, 254:r; *Pleurothallis taxis* E, 260:r; *Polygala paniculata* H, 146:+; *Polygonum hydropteroides* H, 255:+; *Restrepopsis tubulosa* E, 144:r; *Rhynchospora hieronymi* H, 144:+; *Ribes hirtum* S, 149:+; *Ribes leptostachyum* S, 135:+; *Roupala loxensis* T, 144:+; *Rubus bogotensis* S, 149:+; *Rubus coriaceus* S, 135:+; *Rubus loxensis* S, 138:+; *Scaphosepalum dalstroemii* E, 258:r; *Spaeropteris quiniudensis* FT, 135:+; *Stelis bicornis* E, 146:+; *Tibouchina grossa* S, 138:+; *Tibouchina mollis* T, 138:+; *Tournefortia fuliginosa* T, 142:+; *Trichosalpinx chamaelepanthes* E, 135:r; *Trichosalpinx robleorum* E, 256:r; *Tristerix longibracteatus* P, 138:+; *Valeriana buxifolia* H, 258:+; *Valeriana laurifolia* H, 258:+; *Viburnum mathewsii* T, 144:+; *Vallea stipularis* T, 142:+; *Weinmannia lentiscifolia* T, 144:r; *Ilex cuscoana* S, 142:+; *Ilex ericoides* S, 254:+; *Ilex rupicola* S, 257:+; *Ilex suprema* S, 256:+; *Ilex teratopsis* S, 254:+

Rare companions *Axineetum macrophyllae* & *Chusqueetum loxensis*

Galium corymbosum H, 144:+, 208:+, 244:+, 242:+, 206:+; *Anthurium patulum* H, 244:+, 248:+, 241:+; *Podocarpus oleifolius* T, 249:+, 244:+, 242:+, 251:+; *Montocalia peruviana* S, 255:+, 208:+, 245:+; *Muehlenbeckia tiliifolia* H, 256:+, 253:+, 210:+, 247:+; *Geranium chilloense* H, 255:+, 209:+, 249:+, 201:+; *Gynoxis calyculisolvans* S, 242:+, 247:+, 243:+; *Hedyosmum sprucei* T, 242:+, 248:+, 200:+; *Persea brevipes* T, 245:+, 241:+, 243:+; *Galium hypocarpium* H, 259:+, 249:+, 244:+, 248:+; *Chusquea uniflora* H, 248:+, 241:+; *Gaultheria lanigera* S, 242:+, 207:+; *Weinmannia ovata* T, 247:+, 251:+

Rare companions *Axineetum macrophyllae*

Galium pseudotriflorum H, 208:+, 245:+; *Lomatia hirsuta* S, 209:+, 211:+; *Arenaria lanuginosa* H, 210:+; *Jungia coarctata* L, 208:+;

Rare companions *Rhynchosporetum kunthii*

Loricaria thyrsoides S, 209:+, 210:+, 202:+, 199:+, 198:+; *Cuatrecasanthus flexipappus* H, 258:+, 204:+, 246:+; *Carex lehmanniana* H, 200:+, 204:+

Column number	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8
<i>Piper narequitiensis</i>	T																											
<i>Syrrax tomentosus</i>	T																											
<i>Schefflera morototoni</i>	T																											
<i>Eugenia sp. 1</i>	T																											
<i>Eugenia sp. 2</i>	T																											
<i>Disopyros spec.</i>	T																											
<i>Nectandra globosa</i>	T																											
<i>Pseudolmedia laevia</i>	T																											
<i>Meliosma bogotana</i>	T																											
<i>Rhodostemonodaphne sp. nov.</i>	T																											
<i>Rudgata sp.</i>	T																											
<i>Cavendishia bracteata</i>	S																											
<i>Begonia urticae</i>	H																											
<i>Isachne rigens</i>	H																											
<i>Sphaeradenia horrida</i>	H																											
<i>Critoniopsis tungurahuae</i>	H																											
<i>Antidaphne viscoidea</i>	P																											
<i>Phoradendron sp.</i>	P																											
<i>Niphidium crassifolium</i>	F																											
<i>Senecium speciosum</i>	E																											
<i>Maxillaria ecuadorensis</i>	E																											
<i>Epidendrum armeniacum</i>	E																											
<i>Campyloneurum repens</i>	EF																											
<i>Campyloneurum coarctatum</i>	EF																											

T: Tree S: Shrub FT: Treefern H: Herb E: Epiphytic herb EF: Epiphytic fern P: Parasite L: Liana

Tab. 1: Alzatealia verticillatae and its sub-units.

Column number	1	2	3	4	5	6	7	8	9	10	11	12
<i>Neurolepis elata</i>	6	6	6	6	6	6	7	7	7	7	7	7
<i>Symbolanthus cadyonius</i>	4	5	6	7	8	9	0	1	2	3	4	5
<i>Peperomia harwegiana</i>	3	2	+	2	+	+	+	2	+	+	+	+
<i>Eriosorus flexuosus</i>	+	+	+	+	+	+	+	+	+	+	+	+
<i>Eriosorus rufescens</i>	+	+	+	+	+	+	+	+	+	+	+	+
<i>Bomarea nervosa</i>	+	+	+	+	+	+	+	+	+	+	+	+
<i>Columnnea strigosa</i>	+	+	+	+	+	+	+	+	+	+	+	+
<i>Blechnum fragile</i>	+	+	+	+	+	+	+	+	+	+	+	+
<i>Trichomanes capillareum</i>	+	+	+	+	+	+	+	+	+	+	+	+
D Neurolepietum elatae mezobromelietosum capituligerae	+	2	2	3	+	2	3	+	2	2	2	+
<i>Mezobromelia capituligera</i>	H	+	+	+	+	+	+	+	+	+	+	+
D Neurolepietum elatae chusqueetosum falcatae	H	+	+	+	+	+	+	+	+	+	+	+
<i>Chusquea falcata</i>	H	+	+	+	+	+	+	+	+	+	+	+
D Neurolepietum elatae cladoniotosum	3	2	+	+	+	4	4	2	4	2	2	2
<i>Cladonia</i>	3	2	+	+	+	4	4	2	4	2	2	2
D Neurolepietum elatae lycopodielleetosum cernuae	F	+	+	+	+	+	+	+	+	+	+	+
<i>Lycopodiella cernua</i>	F	+	+	+	+	+	+	+	+	+	+	+
<i>Baccharis genistelloides</i>	S	+	+	+	+	+	+	+	+	+	+	+
Neurolepietum elatae - <i>Dicranopteris flexuosa</i> facies	H	2	3	3	2	2	3	2	4	4	4	4
<i>Dicranopteris flexuosa</i>	H	2	3	3	2	2	3	2	4	4	4	4
D Purdiaeaetum nutantis rhynchosporetosum locpletis	H	+	+	+	+	+	+	+	+	+	+	+
<i>Rhynchospora locuples</i>	H	+	+	+	+	+	+	+	+	+	+	+
D Purdiaeaetum nutantis sticheretosum revolutae	F	+	+	+	+	+	+	+	+	+	+	+
<i>Sticheria revoluta</i>	F	+	+	+	+	+	+	+	+	+	+	+
D Purdiaeaetum nutantis sphagnetosum	S	+	+	+	+	+	+	+	+	+	+	+
<i>Sphagnum</i>	S	+	+	+	+	+	+	+	+	+	+	+
D Purdiaeaetum nutantis macrocarpetosum revolutae	S	+	+	+	+	+	+	+	+	+	+	+
<i>Macrocarpaea revoluta</i>	S	+	+	+	+	+	+	+	+	+	+	+
D Purdiaeaetum nutantis clusietosum magnifoliae	T	+	+	+	+	+	+	+	+	+	+	+
<i>Clusia magnifolia</i>	T	+	+	+	+	+	+	+	+	+	+	+
<i>Chamaedorea pinnatifrons</i>	T	+	+	+	+	+	+	+	+	+	+	+
D Purdiaeaetum nutantis geomometosum orbygnianae	T	+	+	+	+	+	+	+	+	+	+	+
<i>Geonoma orbygniana</i>	T	+	+	+	+	+	+	+	+	+	+	+

Tab. 3: Purdiaeaetalia nutantis – Purdiaeaion nutantis and its terminal-sub-units

Column number	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2
D Purdiaeetum nutantis geomeostomum orbignyanae	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Geonoma orbignyana</i>	T																					
D Clusietum latipedis																						
<i>Clusia latipes</i>	T	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Graffenrieda emarginata</i>	T																					
<i>Drimys granadensis</i>	T																					
<i>Freziera canescens</i>	T																					
<i>Panopsis ferruginea</i>	T																					
<i>Cornus peruviana</i>	H																					
Transition Purdiaeetalia nutantis - Alzateetalia verticillatae																						
<i>Meriania radula</i>	T																					
<i>Miconia aggregata</i>	T																					
<i>Ocotea cf.</i>	T																					
<i>Chusquea uniflora</i>	H																					
<i>Peperomia galioides</i>	H																					
<i>Peperomia glandulosa</i>	H																					
<i>Elaphoglossum tectum</i>	F																					
<i>Asplenium uniseriale</i>	F																					
<i>Diplazium macrophyllum</i>	F																					
<i>Elaphoglossum latifolium</i>	F																					
<i>Pecluma curvans</i>	F																					
<i>Polypodium thysanolepis</i>	F																					
<i>Pteris muricata</i>	F																					
<i>Pteris podophylla</i>	F																					
<i>Phoradendron trianae</i>	P																					
<i>Acanthus andreaeanus</i>	P																					
<i>Epidendrum mancum</i>	E																					
<i>Odontoglossum ramosissimum</i>	E																					
<i>Pleurothallis canaligera</i>	E																					
<i>Stelis purpurea</i>	E																					
<i>Asplenium serria</i>	EF																					
<i>Pecluma eurybasis</i>	EF																					
<i>Polypodium sessilifolium</i>	EF																					
<i>Polypodium triseriale</i>	EF																					

Tab. 4: Purdiaeetalia nutantis - sub-units of the overageing terminal community

Column number	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2
<i>Ellecanthus robustus</i>	H	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Sphaeradenia horrida</i>	H	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Mikania sysylovicci</i>	H	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Bomarea brachysepala</i>	H	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Sobralia candida</i>	H	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Hydrocotyle humboldtii</i>	H	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Spermacoce spec. 1</i>	H	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Elaphoglossum cuspidatum</i>	F	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Lycopodiella glaucescens</i>	F	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Dendrophthora densiflora</i>	P	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Dendrophthora polyantha</i>	P	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Tristerix longibracteatus</i>	P	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Bomarea dissitifolia</i>	L	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Bomarea maritima</i>	L	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Smilax benthamiana</i>	L	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Mikania spec. 2</i>	L	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Dioscorea sprucei</i>	L	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Maxillaria klugii</i>	E	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Onglossum brevifolium</i>	E	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Sphyrospermum cordifolium</i>	E	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Dryadella simula</i>	E	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Ellecanthus oellgaardii</i>	E	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Maxillaria aggregata</i>	E	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Racinaea scemanni</i>	E	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Stelis flexuosa</i>	E	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Maxillaria aurea</i>	E	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Scaphyglottis bicornis</i>	E	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Racinaea tetrantha</i>	E	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Tillandsia aquatorialis</i>	E	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Tillandsia complanata</i>	E	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Maxillaria acuminata</i>	E	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Platysole aculeata</i>	E	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Odontoglossum cristatellum</i>	E	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Pitiphyllum pitiioides</i>	E	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Tillandsia demadata</i>	E	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Tab. 4: Purdiaeion nutantis - sub-units of the overageing terminal community

Column number	T: Tree	S: Shrub	FT: Treefern	H: Herb	E: Epiphytic herb	EF: Epiphytic fern	P: Parasite	L: Liana
<i>Oncidium heteranthium</i>	1							
<i>Tillandsia confinis</i>	1							
<i>Vriesea fragrans</i>	1							
<i>Cryptocentrum lehmannii</i>	1							
<i>Rachinaea triplinata</i>	1							
<i>Pleurothallis crocodiliceps</i>	1							
<i>Pachyphyllum cristallinum</i>	1							
<i>Pleurothallis antennifera</i>	1							
<i>Pleurothallis sclerophylla</i>	1							
<i>Melpomene moniliformis</i>	1							
<i>Pleopeltis macrocarpa</i>	1							
<i>Hymenophyllum myriocarpum</i>	1							
<i>Hymenophyllum hirsutum</i>	1							
<i>Polypodium levigatum</i>	1							
<i>Hymenophyllum amabile</i>	1							
<i>Vitaria gardeniana</i>	1							
<i>Terpsichore asplenifolia</i>	1							

Tab. 4: *Purdiaeaetalia nutantis* - *Purdiaeaion nutantis* - sub-units of the overageing terminal community

Column number	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	4								
<i>Niphogeton dissecta</i>	H		
<i>Acaena ovalifolia</i>	H		
<i>Dicksonia sellowiana</i>	F		
<i>Blechnum lima</i>	F		
<i>Eriosorus aureonitens</i>	F		
<i>Sclerurus revolutus</i>	F		
<i>Tillandsia wurdackii</i>	E		
T: Tree S: Shrub FT: Treefern H: Herb E: Epiphytic herb EF: Epiphytic fern P: Parasite L: Liana																																											

Tab. 5: *Clusia elliptica* – *Weinmannialia cochensis* and its sub-units.

Column number	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5		
<i>Asplenium triphyllum</i>	F																										
Ch Neurolepietum aristatae																											
<i>Weinmannia foegeroides</i>	S	+	+	+	+						2																
<i>Miconia dodsonii</i>	S																										
<i>Neurolepis aristata</i>	H																										
<i>Chusquea leonardiorum</i>	H																										
<i>Rumex tolimensis</i>	H																										
<i>Neurolepis nana</i>	H																										
<i>Gentianella fastigiata</i>	H																										
Ch Puyon eryngioidis / Puyetum eryngioidis																											
<i>Loricaria complanata</i>	S																										
<i>Calamagrostis intermedia</i>	H																										
<i>Puya eryngioides</i>	H																										
<i>Lycopodiella cernua</i>	F																										
<i>Hyperzia hypogaea</i>	F																										
<i>Jamesonia pulchra</i>	F																										
<i>Pedicularis incurva</i>	H																										
<i>Rhynchospora Ruiziana</i>	H																										
<i>Dicksonia sellowiana</i>	F																										
<i>Halenia weddelliana</i>	H																										
<i>Grammitis paramicola</i>	F																										
<i>Lapinus semperflorens</i>	H																										
<i>Orthrosanthus chimboracensis</i>	H																										
<i>Avenaria lanuginosa</i>	H																										
<i>Cerastium mollissimum</i>	H																										
<i>Senecio chinogeton</i>	H																										
<i>Blechnum auratum</i>	H																										
<i>Valeriana convallarioides</i>	F																										
Ch Epidendretum frigidum																											
<i>Epidendrum fimbriatum</i>	H																										
<i>Epidendrum frigidum</i>	H																										
<i>Eriocaulon microcephalum</i>	H																										
<i>Epidendrum macrostachyum</i>	E																										
Epidendretum frigidum - Pitcairnia trianae facies																											
<i>Pitcairnia trianae</i>	H																										

Tab. 6: Neurolepio – Puyetalia and its sub-units.

Column number	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5								
Companions Neuroleptium laegardii - Brachyotetosum andreani																																											
<i>Vaccinium crenatum</i>	S		
<i>Muehlenbeckia tilifolia</i>	H	
<i>Ranunculus praemorsus</i>	H	
<i>Festuca cucullata</i>	H	
<i>Gentianella oellgaardii</i>	H	
<i>Gentianella polyantha</i>	H	
<i>Halenia longicaulis</i>	H	
<i>Galium corymbosum</i>	H	
<i>Lysipomea bilineata</i>	H	
<i>Lysipomea caespitosa</i>	H	
<i>Lysipomea crassomarginata</i>	H	
<i>Lachemilla orbiculata</i>	H	
<i>Bomarea uncinifolia</i>	L	
<i>Bomarea multipes</i>	L	
<i>Jungia coarctata</i>	L	
Companions Puyetum eryngioidis																																											
<i>Juncus arcticus</i>	H
<i>Juncus stipularis</i>	H	
<i>Calamagrostis incurvophylla</i>	H	
<i>Galium pseudariflorum</i>	H	
<i>Senecio tephrosoides</i>	H	
<i>Stipa ichu</i>	H	
<i>Aa denticulata</i>	H	
<i>Peperomia celsus</i>	H	
<i>Altestenia virescens</i>	H	
<i>Aa riobambae</i>	H	
<i>Huperzia arcuata</i>	F	
<i>Huperzia columnaris</i>	F	
<i>Huperzia compacta</i>	F	
<i>Huperzia brevifolia</i>	F	
<i>Huperzia affinis</i>	F	
<i>Bomarea hartwegii</i>	L	
<i>Bomarea isopetala</i>	L	
<i>Huperzia campania</i>	FE	

Tab. 6: Neurolepio – Puyetalia and its sub-units.

Vegetation unit	1	2,1	2,2	3	4	5	6,1	6,2	6,3	
Number of Relevés	11	1	15	3	3	14	5	3	3	
Cover % Treelayer	100	100	95	75	90	65	25	30	5	
Cover % Shrublayer	30	45	65	65	70	35	75	75	90	
Cover % Herblayer	15	100	20	80	15	20	90	100	60	
Mean species number	155	167	139	111	46	63	32	34	29	
Ch Alzateetalia verticillatae										
<i>Clusia magnifolia</i>	T	III	.	IV	3	3	IV	III	.	1
<i>Graffenrieda emarginata</i>	T	IV	1	V	2	3	III	IV	.	3
<i>Elaeagia karstenii</i>	T	V	.	IV	.	2	IV	.	.	.
<i>Alzatea verticillata</i>	T	III	1	IV	.	.	III	.	.	.
<i>Alchornea pearcei</i>	T	III	.	IV	.	3	IV	.	.	.
<i>Matayba</i> sp.	T	III	.	IV	.	2	IV	.	.	.
<i>Prunus opaca</i>	T	III	.	IV	.	2	IV	.	.	.
<i>Clethra revoluta</i>	T	IV	.	III	.	1	V	.	.	.
<i>Hedyosmum goudotianum</i>	T	IV	1	IV	2	1	II	.	.	.
<i>Podocarpus sprucei</i>	T	I	1	IV	2	3	II	.	.	.
<i>Alchornea grandiflora</i>	T	III	.	III	.	1	IV	.	.	.
<i>Schefflera lasiogyne</i>	T	III	1	III	1	2	III	.	.	.
<i>Ocotea</i> sp.	T	III	.	II	.	1	III	.	.	.
<i>Hyeronima moritziana</i>	T	III	.	III	.	2	II	.	.	.
<i>Inga striata</i>	T	III	.	II	.	1	III	.	.	.
<i>Schefflera dielsii</i>	T	III	.	III	.	1	II	.	.	.
<i>Hyeronima duquei</i>	T	III	1	II	.	1	II	.	.	.
<i>Nectandra cf. subullata</i>	T	III	.	II	.	1	II	.	.	.
<i>Hyeronima asperifolia</i>	T	I	.	II	.	1	II	.	.	.
<i>Nectandra laevis</i>	T	III	.	I	.	1	II	.	.	.
<i>Meliosma</i> sp.	T	IV	1	III	.	2	III	.	.	.
<i>Miconia jahni</i>	T	III	1	III	2	.	III	.	.	.
<i>Naucleopsis glabra</i>	T	III	.	III	.	2	III	.	.	.
<i>Axinea pauciflora</i>	T	III	.	III	3	1	II	II	.	.
<i>Licaria</i> sp.	T	III	.	III	.	2	III	.	.	.
<i>Nectandra</i> sp.	T	III	.	III	.	.	II	.	.	.
<i>Weinmannia fagaroides</i>	T	II	1	III	2	.	II	.	.	.
<i>Aniba muca</i>	T	III	1	III	1	2	II	.	.	.
<i>Joosia aequatoria</i>	T	II	.	III	.	1	II	.	.	.
<i>Abarema killipii</i>	T	III	1	II	.	1	III	.	.	.
<i>Myrsine coriacea</i>	T	I	.	II	1	2	II	.	.	.
<i>Byrsonima spec.</i>	T	II	.	I	.	.	III	.	.	.
<i>Eschweillera</i> sp.	T	II	.	II	.	.	II	.	.	.
<i>Guarea kunthiana</i>	T	III	.	II	.	.	II	.	.	.
<i>Aniba cf. coto</i>	T	I	1	III	.	.	II	.	.	.
<i>Psychotria tinctoria</i>	S	III	1	IV	3	1	III	I	.	2
<i>Psychotria herzogii</i>	S	III	1	IV	3	.	II	.	.	.
<i>Piper aequale</i>	S	III	1	III	3	1	III	.	.	.
<i>Palicourea stipularis</i>	S	III	1	IV	3	1	II	.	.	.
<i>Piper aduncum</i>	S	III	1	IV	.	1	II	.	.	.
<i>Heliconia burleana</i>	S	III	1	II	1	1	II	.	.	.
<i>Manettia alba</i>	S	I	.	II	1	.	III	.	.	.
<i>Agonandra excelsa</i>	H	III	.	I	.	2	II	.	.	.
<i>Anthurium pulchrum</i>	H	II	1	IV	2	2	II	I	.	.
<i>Anthurium grex-avium</i>	H	IV	1	II	1	.	III	.	.	.
<i>Anthurium rubrinervium</i>	H	II	1	II	1	1	II	I	.	.
<i>Saccoloma inaequale</i>	F	III	1	IV	2	.	II	.	.	.
<i>Pitcairnia riparia</i>	E	III	.	III	1	.	II	I	.	2
<i>Anthurium scandens</i>	E	III	1	III	2	1	II	II	.	1
<i>Peperomia cluveja</i>	E	III	.	IV	.	.	II	.	.	.
<i>Anthurium breviscapum</i>	E	III	1	IV	1	1	IV	I	.	.
<i>Anthurium dombeyanum</i>	E	III	1	IV	2	1	IV	I	1	.
<i>Anthurium incomptum</i>	E	III	1	IV	1	.	III	I	.	.
<i>Anthurium truncicola</i>	E	III	1	III	2	.	III	.	.	1
<i>Lepanthes drymocharis</i>	E	II	1	IV	3	.	II	.	.	.
<i>Lepanthes nummularia</i>	E	III	1	III	3	.	II	.	.	.
<i>Polypodium caceresii</i>	FE	IV	1	IV	2	.	III	I	.	3

T: Tree
S: Shrub
FT: Treefern
H: Herb
E: Epiphytic herb
EF: Epiphytic fern
P: Parasite
L: Liana

Tab. 7: Synoptic table Alzateetia verticillatae.

Vegetation unit	1	2,1	2,2	3	4	5	6,1	6,2	6,3
<i>Asplenium serra</i>	FE	III	1	IV	3	1	II	I	2
<i>Hymenophyllum fucoides</i>	FE	III	1	III	3	.	I	II	1
<i>Pleopeltis macrocarpa</i>	FE	V	1	IV	3	.	III	.	.
<i>Nephrolepis pectinata</i>	FE	IV	.	II	2	.	II	.	.
<i>Terpsichore dependens</i>	FE	III	1	IV	2	.	II	.	.
<i>Nephrolepis cordifolia</i>	FE	IV	1	IV	1	.	II	.	.
<i>Pecluma consimilis</i>	FE	III	1	IV	3	.	II	.	.
<i>Pecluma ptilodon</i>	FE	III	1	III	3	.	II	.	.
Ch Alzation verticillatae									
<i>Nectandra laurel</i>	T	III	1	IV	3	.	I	.	.
<i>Miconia punctata</i>	T	IV	1	III	2	.	I	.	.
<i>Ocotea cernua</i>	T	II	1	IV	3	.	I	.	.
<i>Chamaedora pinnatifrons</i>	T	III	1	IV	2	.	I	.	.
<i>Meriania rigida</i>	T	III	.	III	1	.	II	.	.
<i>Sapindus saponaria</i>	T	III	1	III	3	.	I	.	.
<i>Mauria membranifolia</i>	T	III	1	II	.	.	I	.	.
<i>Geissanthus vanderwerfii</i>	T	III	1	II	.	2	I	I	.
<i>Croton wagneri</i>	T	III	1	III	.	.	.	.	.
<i>Prunus debilis</i>	T	IV	.	II	1	1	I	.	.
<i>Licaria peckii</i>	T	III	.	II	.	1	I	.	.
<i>Persea caerulea</i>	T	III	.	III	.	.	.	.	.
<i>Miconia imitans</i>	T	III	.	II	.	.	I	.	.
<i>Licaria canella</i>	T	III	.	II	1	.	.	.	.
<i>Geonoma interrupta</i>	T	III	.	II	3	.	.	.	.
<i>Mabea elata</i>	T	III	1	II	1	.	I	.	.
<i>Mauria heterophylla</i>	T	III	.	II	1	.	I	.	.
<i>Symplocos peruviana</i>	T	IV	.	I	1	1	II	.	.
<i>Tapiria obtusa</i>	T	III	.	II	.	.	.	.	.
<i>Trichilia maynasiana</i>	T	III	.	II	.	.	I	.	.
<i>Ocotea cf. benthamiana</i>	T	II	.	II	.	.	I	.	.
<i>Guarea glabra</i>	T	III	.	II	.	.	II	.	.
<i>Weinmannia pubescens</i>	T	III	.	II	1	.	.	.	.
<i>Pouteria bangii</i>	T	III	1	II	.	.	I	.	.
<i>Prumnopytis montana</i>	T	II	.	II	1	.	.	.	.
<i>Cinchona macrocalyx</i>	T	I	.	II	.	1	I	.	.
<i>Mauria simplicifolia</i>	T	II	.	II	.	.	II	.	.
<i>Clusia latipes</i>	T	II	.	II	.	.	I	.	.
<i>Beilschmiedia olloiophylla</i>	T	I	.	II	.	1	I	.	.
<i>Beilschmiedia sulcata</i>	T	III	.	I	.	1	I	.	.
<i>Trichilia guianensis</i>	T	III	.	I	.	.	I	.	.
<i>Hyeronima oblonga</i>	T	I	.	II	.	.	I	.	.
<i>Miconia corymbiformis</i>	T	I	1	II	.	.	II	.	.
<i>Nectandra cf. crassiloba</i>	T	I	.	II	.	.	I	.	.
<i>Persea hexandra</i>	T	II	.	II	.	.	I	.	.
<i>Casearia fasciculata</i>	T	I	1	II	.	.	I	.	.
<i>Cyathea caracasana var. bolivensis</i>	FT	IV	.	III	3	2	I	.	.
<i>Psychotria caerulea</i>	S	IV	1	IV	2	.	I	.	.
<i>Piper peltatum</i>	S	IV	1	III	1	.	.	.	.
<i>Piper elongatum</i>	S	III	1	III	3	.	II	.	.
<i>Piper lacunosum</i>	S	III	.	IV	3	1	I	.	.
<i>Palicourea chloracaerulea</i>	S	III	1	III	.	.	I	1	2
<i>Palicourea amethystina</i>	S	IV	.	III	1	1	II	II	1
<i>Cavendishia loranthifolium</i>	S	II	.	III	2	.	.	.	.
<i>Psychotria hazenii</i>	S	I	.	III	1	.	.	.	.
<i>Boehmeria pavonii</i>	S	III	1	II	1	.	.	.	.
<i>Siphocampylus scandens</i>	S	I	1	III	.	.	I	.	.
<i>Pilea obtusifolia</i>	H	IV	.	III	1	.	.	.	.
<i>Pseudoechinochloa polystachya</i>	H	I	1	IV	2	.	I	.	.
<i>Dichorisandra hexandra</i>	H	III	.	III	1	.	I	1	.
<i>Dictyostegia orobanchoides</i>	H	III	1	II	1	.	I	.	.
<i>Tripogandra serrulata</i>	H	III	1	II	.	.	.	.	.
<i>Epidendrum aggregatum</i>	H	III	1	II	.	.	I	.	.
<i>Oplismenus burmannii</i>	H	II	.	III	.	1	I	.	.

Tab. 7: Synoptic table Alzateetea verticillatae.

Vegetation unit		1	2,1	2,2	3	4	5	6,1	6,2	6,3
<i>Dichorisandra bonitiana</i>	H	I	I	II	.	.	.	.	.	.
<i>Megalastrium andicola</i>	F	IV	I	III	2	.	.	.	.	.
<i>Pteris altissima</i>	F	III	I	III	3	.	I	.	.	.
<i>Pteris decurrens</i>	F	IV	.	III	3	.	I	.	.	.
<i>Thelypteris pterioidea</i>	F	IV	I	II	2	.	.	.	.	.
<i>Blechnum fragile</i>	F	III	I	III	3	.	.	.	.	.
<i>Arachnoides denticulata</i>	F	III	I	III	1	.	I	.	.	.
<i>Pteris haenkeana</i>	F	III	.	III	3	.	.	.	.	.
<i>Asplenium tabinense</i>	F	III	I	III	1	.	.	.	.	I
<i>Didymochlaena truncatula</i>	F	IV	I	III	1	.	.	.	.	.
<i>Blechnum occidentale</i>	F	III	I	III	3	.	I	.	.	.
<i>Selaginella arthritica</i>	F	III	.	III	1	.	I	.	.	.
<i>Selaginella sericea</i>	F	IV	I	III	1	.	I	.	.	.
<i>Asplenium uniseriale</i>	F	III	.	III	2	.	I	I	.	I
<i>Hypolepis nigrescens</i>	F	III	.	III	1	.	.	.	.	.
<i>Thelypteris dentata</i>	F	III	.	III	1	.	.	.	.	.
<i>Ctenitis subincisa</i>	F	III	I	II	1	.	I	.	.	.
<i>Selaginella silvestris</i>	F	II	I	III	1	.	.	.	.	.
<i>Blechnum cordatum</i>	F	III	I	II	2	.	I	I	.	.
<i>Diplazium ambiguum var. ambiguum</i>	F	III	I	II	1	.	.	.	.	.
<i>Polystichum platyphyllum</i>	F	II	I	II	2	.	.	.	.	.
<i>Diplazium pinnatifidum</i>	F	III	I	II	1	.	.	.	.	.
<i>Diplazium ambiguum</i>	F	III	.	II	.	.	.	.	.	.
<i>Diplazium ambiguum var. dissectum</i>	F	III	.	II	1	.	.	.	.	.
<i>Macrothelypteris torresiana</i>	F	III	.	I	1	.	.	.	.	.
<i>Peperomia emarginella</i>	E	IV	I	III	1	.	.	.	.	.
<i>Peperomia ecuadorensis</i>	E	IV	I	III	3	.	I	.	.	.
<i>Racinaea monticola</i>	E	III	I	III	1	.	I	.	.	.
<i>Dryadella perpusilla</i>	E	III	I	III	.	.	I	.	.	.
<i>Peperomia eburnea</i>	E	III	I	III	2	.	I	.	.	.
<i>Maxillaria arachnites</i>	E	III	.	III	2	.	I	.	.	.
<i>Racinaea tetrantha</i>	E	III	.	III	.	.	.	.	.	.
<i>Stelis nexiopus</i>	E	III	.	III	2	.	I	.	.	.
<i>Maxillaria acuminata</i>	E	III	I	II	1	.	I	.	.	.
<i>Pitiphyllum laricinum</i>	E	II	.	III	2	.	.	.	.	.
<i>Platytele acicularis</i>	E	II	.	III	3	.	I	.	.	.
<i>Vriesea appendiculata</i>	E	II	I	II	1	.	I	.	.	.
<i>Vriesea barthloti</i>	E	II	I	III	2	.	.	.	.	.
<i>Tillandsia confinis</i>	E	II	.	II	1	.	.	.	.	.
<i>Tillandsia naundorffiae</i>	E	II	.	II	.	.	.	.	.	.
<i>Guzmania killipiana</i>	E	II	.	II	.	.	.	.	.	.
<i>Racinaea multiflora</i>	E	I	I	III	.	.	.	.	.	.
<i>Racinaea eurylytra</i>	E	I	I	II	.	.	.	.	.	.
<i>Stenospermation longipetiolatum</i>	E	I	.	II	2	.	.	.	.	.
<i>Hymenophyllum polyanthes</i>	FE	IV	I	IV	3	.	II	II	.	.
<i>Hymenophyllum myriocarpum</i>	FE	IV	.	III	3	.	I	.	.	.
<i>Elaphoglossum crassipes</i>	FE	III	I	IV	3	.	.	III	I	I
<i>Asplenium auritum</i>	FE	IV	.	III	3	.	II	I	I	2
<i>Asplenium flabellulatum</i>	FE	IV	I	III	2	I	I	II	.	.
<i>Lellingeria subsesillis</i>	FE	III	I	IV	1	.	I	.	.	.
<i>Nephrolepis pendula</i>	FE	III	I	II	3	.	I	.	.	.
<i>Polypodium coriaceum</i>	FE	IV	I	III	3	.	I	.	.	.
<i>Polypodium latissimum</i>	FE	III	I	III	1	.	.	.	.	.
<i>Elaphoglossum isophyllum</i>	FE	III	I	III	2	.	I	.	.	.
<i>Elaphoglossum preselianum</i>	FE	III	I	III	1	.	.	.	.	.
<i>Asplenium harpeodes</i>	FE	III	I	III	2	.	I	I	.	.
<i>Blechnum acutum</i>	FE	III	.	III	2	.	.	.	.	.
<i>Elaphoglossum muscosum</i>	FE	III	I	III	1	.	.	.	.	.
<i>Polypodium sessilifolium</i>	FE	IV	I	III	2	.	.	.	.	.
<i>Polypodium fraxinifolium</i>	FE	III	.	III	1	.	.	.	.	.
<i>Polypodium subandinum</i>	FE	III	I	III	2	.	.	.	.	.
<i>Trichomanes cristatum</i>	FE	III	I	II	2	.	.	.	.	.
<i>Elaphoglossum ciliatum</i>	FE	III	I	III	.	.	I	.	.	.

Tab. 7: Synoptic table Alzateetea verticillatae.

Vegetation unit		1	2,1	2,2	3	4	5	6,1	6,2	6,3
<i>Vittaria gardeniana</i>	FE	IV	I	II	2	.	.	.	.	.
<i>Elaphoglossum platyphyllum</i>	FE	III	.	II	1	.	I	II	.	1
Ch Nectandro acutifoliae - Endlicherietum sericeae										
<i>Nectandra acutifolia</i>	T	V	1	III	2	.	I	.	.	.
<i>Endlicheria sericea</i>	T	IV	.	III	.	.	II	.	.	.
<i>Hirtella triandra</i>	T	III	1	II	.	.	I	.	.	.
<i>Aniba</i> sp.	T	III	.	I	.	.	II	.	.	.
<i>Tovomita weddelliana</i>	T	IV	.	.	.	.	.	.	.	.
<i>Chrysoclamys membranacea</i>	T	III	.	I	.	.	I	.	.	.
<i>Rugaea pubescens</i>	T	III	.	I	.	1	I	.	.	.
<i>Cupania americana</i>	T	III	.	.	.	.	.	.	.	.
<i>Conceveiba trigonocarpa</i>	T	III	.	I	.	.	1	.	.	.
<i>Ilex inundata</i>	T	III	.	I	.	.	II	.	.	.
<i>Zanthoxylum martinicense</i>	T	III	1	1	.	.	.	.	.	.
<i>Rugaea glabra</i>	T	III	.	I	.	.	.	.	.	.
<i>Symplocos bogotensis</i>	T	III	.	I	.	1	.	.	.	.
<i>Centronia laurifolia</i>	T	III	.	.	.	.	.	.	.	.
<i>Trichilia</i> cf. <i>moschata</i>	T	III	.	I	.	1	.	.	.	.
<i>Trichilia cipo</i>	T	III	.	I	.	.	1	.	.	.
<i>Weinmannia auriculifera</i>	T	III	.	.	.	.	.	.	.	.
<i>Calyptanthes</i> cf. <i>bipennis</i>	T	III	.	I	.	.	.	.	.	.
<i>Ficus krakovii</i>	T	III	.	.	.	1	.	.	.	.
<i>Ficus subandina</i>	T	III	1	I	.	.	I	.	.	.
<i>Miconia multispicata</i>	T	III	.	I	1	1	.	.	.	.
<i>Nectandra cissiflora</i>	T	II	1	.	.	.	.	.	.	.
<i>Miconia amazonica</i>	T	I	.	.	.	.	.	.	.	.
<i>Sloanea</i> sp.	T	III	.	I	.	.	.	.	.	.
<i>Ocotea cuneifolia</i>	T	I	.	.	.	.	.	.	.	.
<i>Leonia glycyocarpa</i>	T	I	.	.	.	.	.	.	.	.
<i>Blakea subconnata</i>	T	II	.	.	.	.	.	.	.	.
<i>Ocotea aciphylla</i>	T	I	.	.	.	.	.	.	.	.
<i>Cyathea bipinnatifida</i>	FT	IV	.	1	1	.	.	.	.	.
<i>Thelypteris amphioxpteris</i>	FT	IV	.	.	.	.	.	.	.	.
<i>Cyathea lechleri</i>	FT	III	.	.	.	.	.	.	.	.
<i>Alsophila cuspidata</i>	FT	III	.	I	.	.	.	.	.	.
<i>Cyathea bradei</i>	FT	III	.	.	.	.	.	.	.	.
<i>Cyathea divergens</i>	FT	III	.	.	.	.	.	.	.	.
<i>Cyathea microdonta</i>	FT	III	.	.	.	.	.	.	.	.
<i>Psychotria gentryi</i>	S	III	.	.	1	.	II	.	.	.
<i>Miconia nervosa</i>	S	III	.	I	1	.	.	.	.	.
<i>Centropogon capitatus</i>	S	III	.	.	.	.	.	.	.	.
<i>Clidemia hirta</i>	S	III	.	.	.	.	.	.	.	.
<i>Centropogon comosus</i>	S	III	1	.	.	.	.	.	.	.
<i>Urera baccifera</i>	S	III	.	.	.	.	.	.	.	.
<i>Piper obliquum</i>	S	III	.	.	1	.	.	.	.	.
<i>Ossaea quadrisulca</i>	S	II	.	.	.	.	.	.	.	.
<i>Miconia rigida</i>	S	II	.	.	1	.	.	.	.	.
<i>Piper obtusilimbum</i>	S	II	.	I	.	.	I	.	.	.
<i>Boehmeria ulmifolia</i>	S	II	.	.	1	.	.	.	.	.
<i>Klaprothia mentzelloides</i>	H	III	1	I	.	.	.	.	.	.
<i>Renalmia thyrsoidea</i>	H	III	1	I	.	.	.	.	.	.
<i>Boerhavia coccinea</i>	H	I	.	.	.	.	.	.	.	.
<i>Thelypteris amphioxpteris</i>	F	III	.	.	.	.	.	.	.	.
<i>Dennstaedtia cornuta</i>	F	III	.	.	.	.	.	.	.	.
<i>Blotiella lindeniana</i>	F	III	.	I	.	.	.	.	.	.
<i>Thelypteris peruviana</i>	F	III	1	I	.	.	.	.	.	.
<i>Dennstaedtia cicutaria</i>	F	III	.	.	.	.	.	.	.	.
<i>Lindsorea guianensis</i>	F	III	.	.	.	.	.	.	.	.
<i>Lonchitis hirsuta</i>	F	III	.	.	.	.	.	.	.	.
<i>Diplazium chimborazense</i>	F	III	.	I	.	.	.	.	.	.
<i>Hemidicryum marginatum</i>	F	III	.	.	.	.	.	.	.	.
<i>Lastraeopteris effusa</i>	F	III	.	.	.	.	.	.	.	.
<i>Danaea moritziana</i>	F	III	.	.	.	.	.	.	.	.

Tab. 7: Synoptic table *Alzateetea verticillatae*.

Vegetation unit	1	2,1	2,2	3	4	5	6,1	6,2	6,3
<i>Diplazium ceratolepis</i>	F	II	.	.	.	.	.	.	.
<i>Adiantum concinnum</i>	F	II	.	I	.	.	.	.	.
<i>Adiantum alarconicum</i>	F	II	.	.	.	.	.	.	.
<i>Adiantum fructuosum</i>	F	I	.	.	.	.	.	.	.
<i>Dennstaedia globulifera</i>	F	I	.	.	.	.	.	.	.
<i>Adiantum latifolium</i>	F	I	.	.	.	.	.	.	.
<i>Adiantum pulverulentum</i>	F	I	.	.	.	.	.	.	.
<i>Pitcairnia maidifolia</i>	E	III	.	.	1	.	.	.	.
<i>Satyria grandifolia</i>	E	III	.	.	1	.	.	.	.
<i>Cochlidium serrulatum</i>	E	III	.	.	.	.	.	.	.
<i>Peperomia macrostachya</i>	E	III	.	.	1	.	.	.	.
<i>Lepanthes stalactites</i>	E	II	1	.	.	.	.	.	.
<i>Caladium bicolor</i>	E	II	.	I	.	.	.	.	.
<i>Racinaea dielsii</i>	E	II	.	.	1	.	.	.	.
<i>Oliveriana brevifolia</i>	E	I	.	.	.	.	.	.	.
<i>Bolbitis lindegii</i>	FE	IV	.	I	.	.	.	.	.
<i>Oleandra pilosa</i>	FE	III	.	I	.	.	.	.	.
<i>Cheiroglossa palmata</i>	FE	III	.	.	.	.	.	.	.
<i>Elaphoglossum decorum</i>	FE	II	.	.	.	.	.	.	.
Ch Alzateetum verticillatae typicum									
<i>Elaeagia myriantha</i>	T	III	.	II	.	1	II	.	.
<i>Eugenia sp.</i>	T	III	.	III	3	.	I	.	.
<i>Hedyosmum anisodorum</i>	T	III	.	IV	1	.	I	.	.
<i>Hyeronima alchorneoides</i>	T	IV	.	II	.	.	II	.	.
<i>Clusia multiflora</i>	T	I	.	IV	1	1	III	.	.
<i>Clusia minor</i>	T	I	.	III	1	1	II	.	.
<i>Nectandra membranacea</i>	T	I	1	IV	1	.	II	.	.
<i>Miconia asplundii</i>	T	I	1	III	1	.	II	.	.
<i>Eschweilleria caudiculata</i>	T	I	1	IV	.	1	I	.	.
<i>Spondias mombin</i>	T	II	1	IV	.	.	I	.	.
<i>Ossaea bracteata</i>	T	.	1	III	1	.	I	.	.
<i>Oreopanax microflorou</i>	T	I	1	III	.	.	I	.	.
<i>Picramnia sellowii</i>	T	I	.	III	1	.	.	.	.
<i>Ocotea javitensis</i>	T	I	1	III	2	.	I	.	.
<i>Piper perareolatum</i>	T	II	1	III	1	.	I	.	.
<i>Inga edulis</i>	T	I	1	III	.	.	III	.	.
<i>Leandra subseriata</i>	T	I	1	III	2	.	I	.	.
<i>Zinowiewia australis</i>	T	.	.	II	.	.	III	.	.
<i>Myricanthes myrsinoides</i>	T	.	.	II	.	2	II	.	.
<i>Elaeagia utilis</i>	T	I	.	II	.	1	II	.	1
<i>Chamaedora linearis</i>	T	I	.	III	.	.	.	.	.
<i>Endlicheria formosa</i>	T	I	.	III	.	.	I	.	.
<i>Annona cherimola</i>	T	I	.	II	.	.	.	.	.
<i>Ilex aboroica</i>	T	I	.	II	.	1	II	.	.
<i>Vochysia aurantiaca</i>	T	I	.	II	1	.	I	.	.
<i>Stilpnophyllum oellgaardii</i>	T	I	.	II	.	.	.	.	.
<i>Symplocos coriacea</i>	T	.	1	II	.	1	I	.	.
<i>Cyathea ebeniana</i>	FT	III	1	V	3	.	II	II	2
<i>Macleania floribunda</i>	S	I	.	III	.	.	II	.	.
<i>Piper nebuligaudens</i>	S	.	1	IV	.	.	I	.	.
<i>Fuchsia lehmanni</i>	S	I	1	III	.	.	I	.	.
<i>Thibaudia floribunda</i>	S	.	1	III	.	1	I	.	.
<i>Piper scutilinbum</i>	S	I	.	II	1	.	.	.	.
<i>Utricularia jamesonii</i>	H	.	.	III	.	2	II	.	.
<i>Voyria tenella</i>	H	.	1	III	3	.	.	.	.
<i>Tradescantia zanoniana</i>	H	III	1	III	.	.	.	.	.
<i>Lasiacis divaricata</i>	H	I	.	III	.	.	.	.	.
<i>Stenospermation densiovulatum</i>	H	.	1	III	1	.	.	.	.
<i>Guzmania acuminata</i>	H	.	.	II	1	.	I	I	2
<i>Elleanthus blatteus</i>	H	I	.	II	1	.	.	.	.
<i>Lophosoria quadripinnata</i>	F	I	.	III	3	.	II	.	.
<i>Thelypteris gorresiana</i>	F	I	1	III	.	.	.	.	.
<i>Smilax mollis</i>	L	.	1	IV	2	.	.	I	.

Tab. 7: Synoptic table Alzateetum verticillatae.

Vegetation unit	1	2,1	2,2	3	4	5	6,1	6,2	6,3
<i>Smilax zarzaparilla</i>	L	.	III	.	.	.	.	.	.
<i>Banisteriopsis padifolia</i>	L	I	II	.	.	.	.	.	.
<i>Aethanhus dichotomus</i>	P	.	III	.	.	I	.	.	.
<i>Tristerix longibracteatus</i>	P	.	III	.	.	II	.	.	.
<i>Cyclanthus bipartidus</i>	E	III	1	IV	2	I	II	1	.
<i>Tillandsia stenoura</i>	E	I	.	IV	.	.	.	.	.
<i>Peperomia laxiflora</i>	E	I	1	III	1	.	.	.	.
<i>Peperomia tetraphylla</i>	E	.	1	III	2	.	.	.	.
<i>Oncidium hartwegii</i>	E	.	1	III	1	.	.	.	.
<i>Guzmania gloriosa</i>	E	.	.	III	2	.	.	.	.
<i>Epidendrum mancum</i>	E	I	1	III	1	.	II	.	.
<i>Tillandsia floribunda</i>	E	I	.	III	1	.	.	.	.
<i>Epidendrum amethystinum</i>	E	I	.	II	.	.	.	.	.
<i>Masdevallia carruthersiana</i>	E	.	1	II	.	1	I	.	.
<i>Tillandsia barbeyana</i>	E	I	.	II	.	.	.	.	.
<i>Octomeria grandiflora</i>	E	.	.	II	1	.	I	.	.
<i>Tillandsia fendleri</i>	E	I	.	II	.	.	.	.	.
<i>Racinaea schumanniana</i>	E	.	.	II	.	.	.	.	.
<i>Zygodlebia mathewsii</i>	FE	.	.	III	.	.	.	.	.
Alzateetum verticillatae - Elaphoglossum cuspidatum facies									
<i>Elaphoglossum cuspidatum</i>	F	III	1	III	1	.	I	II	1 2
Ch Alzateetum verticillatae - Dictyocaryetosum lamarckianae									
<i>Dictyocaryum lamarckianum</i>	T	.	.	I	3	.	.	II	.
<i>Chusquea dombeyana</i>	H	I	.	I	3	1	II	I	2 3
<i>Rhipidocladum harmonicum</i>	H	I	.	.	1	.	.	.	.
Transition stage Alzateetum verticillatae - Purdieaetosum nutantis									
<i>Purdiea nutans</i>	T	I	1	II	1	3	II	.	.
<i>Geonoma densa</i>	S	.	1	II	3	.	.	.	.
<i>Guzmania vanvolxemii</i>	H	.	1	II	3	1	I	.	.
<i>Guzmania diffusa</i>	H	.	.	.	1	2	I	.	.
Ch Cecropia montanae - Isertietum laevis									
<i>Cecropia montana</i>	T	I	.	I	.	.	V	.	.
<i>Isertia laevis</i>	T	I	1	III	1	.	IV	IV	1
<i>Piptocoma discolor</i>	T	I	.	I	.	.	V	.	.
<i>Tibouchina lepidota</i>	T	I	.	I	.	.	IV	II	.
<i>Vismia tomentosa</i>	T	I	1	III	2	.	V	IV	3 2
<i>Heliocarpus americanus</i>	T	I	.	I	.	.	V	.	.
<i>Coussapoa spec.</i>	T	I	.	I	.	1	IV	.	.
<i>Cecropia polyphlebia</i>	T	I	.	I	.	.	II	.	.
<i>Coussapoa villosa</i>	T	I	.	I	.	.	III	.	.
<i>Aparisthium cordatum</i>	T	II	.	II	1 1	.	III	I	1
Ch Axineo quitensis - Dicranopterretum flexuosae									
<i>Axinea quitensis</i>	T	.	1	II	.	.	V	1	1
<i>Axinea quitensis</i>	S	.	1	II	.	.	V	1	1
<i>Baccharis genistelloides</i>	S	.	.	.	.	.	V	3	3
<i>Desfontainia spinosa</i>	S	.	.	I	1	.	II	1	3
<i>Brachyotum campanulare</i>	F	.	.	.	.	.	I	3	3
<i>Epidendrum cochlidium</i>	H	.	.	.	.	.	I	1	1
<i>Dicranopteris flexuosa</i>	F	.	.	.	2	.	V	3	3
<i>Pteridium arachnoideum</i>	F	I	.	.	.	.	IV	2	3
<i>Sticherus revolutus</i>	F	.	.	.	.	.	I	1	3
<i>Epidendrum calanthum</i>	E	.	.	.	1	.	III	2	2
<i>Epidendrum catillus</i>	E	.	.	.	.	.	III	1	2
<i>Epidendrum lacustre</i>	E	.	.	.	2	.	III	1	.
<i>Sphagnum sp.</i>	.	.	.	.	.	.	IV	1	3
Ch Axineo quitensis - Dicranopterretum flexuosae typicum									
<i>Sobralia ciliata</i>	H	.	.	.	.	.	IV	.	.
<i>Sobralia fimbriata</i>	H	.	.	.	1	.	III	2	.
<i>Sticherus tomentosus</i>	F	I	.	.	.	.	IV	.	.
<i>Lycopodiella descendens</i>	F	.	.	.	.	.	IV	.	.
<i>Lycopodiella glaucescens</i>	F	.	.	.	.	.	IV	.	.

Tab. 7: Synoptic table Alzateetum verticillatae.

Vegetation unit	1	2,1	2,2	3	4	5	6,1	6,2	6,3
D Axineo quitensis - Dicranopterretum flexuosae Melinietosum muliflorae									
<i>Bejaria aestuans</i>	S	.	.	.	.	.	.	2	.
<i>Gaultheria erecta</i>	S	I	.	1	.	.	I	1	.
<i>Oreocallis grandiflora</i>	S	.	.	.	.	.	.	2	.
<i>Sobralia crocea</i>	H	.	.	1	.	.	I	3	.
<i>Sobralia candida</i>	H	.	.	2	.	.	I	1	.
<i>Melinis minutiflora</i>	H	.	.	.	.	.	.	1	.
<i>Andropogon bicornis</i>	H	.	.	.	.	.	.	1	.
<i>Andropogon leucostachyus</i>	H	.	.	.	.	.	.	1	.
<i>Sticherus melanoblastus</i>	F	.	.	1	.	.	.	3	.
Companions Alzation verticillatae									
<i>Naucleopsis ulei</i>	T	.	.	II	.	2	.	.	.
<i>Piper longipilosum</i>	T	III	.	.	.	1	.	.	.
<i>Miconia rivalis</i>	T	I	I	I	.	.	I	.	.
<i>Beilschmiedia spec.</i>	T	II	.	II	.	.	I	.	.
<i>Ocotea oblonga</i>	T	I	.	II	1	.	.	.	.
<i>Meliosma cf. herbertii</i>	T	I	.	I	.	1	.	.	.
<i>Tovomita sp.</i>	T	II	.	.	.	.	I	.	.
<i>Pleurothallis picta</i>	T	I	.	I	1	.	.	.	.
<i>Schefflera ferruginea</i>	T	I	.	I	.	.	I	.	.
<i>Sorocea trophoides</i>	T	I	.	I	.	.	.	.	.
<i>Tovomitopsis spec.</i>	T	I	.	I	.	1	.	.	.
<i>Ficus casapiensis</i>	T	II	.	I	.	.	I	.	.
<i>Inga acreana</i>	T	I	.	II	.	.	I	.	.
<i>Inga densiflora</i>	T	II	.	I	.	.	I	.	.
<i>Inga extra-nodis</i>	T	I	.	I	.	.	I	.	.
<i>Doryopteris palmata</i>	F	I	.	I	.	.	.	.	.
<i>Dioscorea sprucei</i>	L	I	.	II	.	.	I	.	.
<i>Pleurothallis derengularis</i>	E	III	.	.	2	.	.	.	.
<i>Pleurothallis rabei</i>	E	I	.	I	.	.	.	.	.
<i>Codonanthe erubescens</i>	E	I	.	I	.	2	I	.	.
<i>Tillandsia asplundii</i>	E	I	.	II	.	.	.	.	.
<i>Platystele orectoglossa</i>	E	I	1	I	1	.	.	.	.
<i>Tillandsia laminata</i>	E	I	.	I	.	.	.	.	.
<i>Maxillaria ochroleuca</i>	E	I	.	I	1	.	I	.	.
<i>Vriesea incurvata</i>	E	I	.	I	2	.	.	.	.
<i>Columnnea strigosa</i>	E	I	.	I	.	1	.	.	.
<i>Elleanthus bifarius</i>	E	I	.	I	1	.	.	1	.
<i>Anthurium grubbii</i>	E	I	.	I	.	.	.	.	.
<i>Pleurothallis pachypus</i>	E	I	.	I	1	.	.	.	.
<i>Peperomia trichopus</i>	E	I	.	I	1	.	.	.	.
<i>Rhipsalis baccifera</i>	E	I	.	I	.	.	.	.	.
Companions Nectandro acutifoliae - Endlicherietum sericea									
<i>Guatteria sp.</i>	T	III	.	.	.	.	I	.	.
<i>Conostegia centronioides</i>	T	II	.	.	.	.	.	.	.
<i>Saurauia bullata</i>	T	II	.	.	.	.	.	.	.
<i>Rhodostemonodaphne kunthiana</i>	T	II	.	.	.	.	.	.	.
<i>Lacistema cf. aggregatum</i>	T	II	.	.	.	.	I	.	.
<i>Micropholis guyanensis</i>	T	II	.	.	.	.	I	.	.
<i>Myricanthes fragrans</i>	T	I	.	.	.	.	I	.	.
<i>Cinnamomum triplinerve</i>	T	I	.	.	.	.	.	.	.
<i>Erythrina edulis</i>	T	I	.	.	.	.	.	.	.
<i>Nectandra reticulata</i>	T	I	.	.	1	.	.	.	.
<i>Laportea aestuans</i>	S	II	.	I	.	.	.	.	.
<i>Miconia poortmannii</i>	S	II	.	.	.	.	.	.	.
<i>Renalmia alpina</i>	H	I	.	.	.	.	.	.	.
<i>Costus laevis</i>	H	I	.	.	.	.	.	.	.
<i>Guzmania madisonii</i>	H	I	.	.	.	.	.	.	.
<i>Salpichlaena volubilis</i>	F	III	.	.	.	.	.	.	.
<i>Tectaria antioquiiana</i>	F	II	.	.	.	.	.	.	.
<i>Tectaria antioquiiana</i>	F	II	.	.	.	.	.	.	.
<i>Thelypteris aspidioides</i>	F	II	.	.	.	.	.	.	.
<i>Loxsomopsis pearcei</i>	F	II	.	.	.	.	.	.	.

Tab. 7: Synoptic table Alzateetea verticillatae.

Vegetation unit		1	2,1	2,2	3	4	5	6,1	6,2	6,3
<i>Thelypteris aspidioides</i>	F	II	.	.	.	.	.	.	.	.
<i>Diplazium roehmerianum</i>	F	I	.	.	.	.	.	.	.	.
<i>Diplazium tungurahuae</i>	F	I	.	.	.	.	.	.	.	.
<i>Epidendrum ferrugineum</i>	F	I	.	.	.	.	.	.	.	.
<i>Lacmella floribunda</i>	E	I	.	.	.	.	.	.	.	.
<i>Microglossa lycopodioides</i>	EF	II	.	.	.	.	.	.	.	.
Companions Alzateetum verticillatae typicum										
<i>Miconia tinifolia</i>	T	.	.	II	1	.	I	.	.	.
<i>Symplocos fuscata</i>	T	.	1	I	.	.	I	.	.	.
<i>Saurauia prainiana</i>	T	.	.	II	.	.	I	I	.	.
<i>Piper brevispicum</i>	S	I	1	I	.	.	.	.	.	.
<i>Piper hispidum</i>	S	.	.	II	.	.	.	.	.	.
<i>Disterigma acuminatum</i>	S	.	.	II	1	.	.	II	.	.
<i>Solanum ternatum</i>	H	.	1	II	.	.	.	.	.	.
<i>Solanum americanum</i>	H	.	1	II	.	.	.	.	.	.
<i>Smilax spinosa</i>	L	.	1	I	.	.	.	.	.	.
Companions Axineo quitensis - Dicranopterum flexuosae										
<i>Monochaetum lineatum</i>	S	.	.	.	1	.	.	III	1	2
<i>Cyathea straminea</i>	FT	.	.	.	.	.	.	II	1	.
<i>Rhynchospora polyphylla</i>	H	I	.	.	.	.	.	III	1	.
<i>Eragrostis tenuifolia</i>	H	.	.	.	.	.	.	II	1	.
<i>Fleischmannia obscurifolia</i>	H	.	.	.	.	.	.	.	1	1
<i>Pitcairnia trianae</i>	H	.	.	.	.	.	.	I	1	.
<i>Sticherus remotus</i>	F	.	.	.	.	.	.	III	2	1
<i>Diplopterygium bancroftii</i>	F	.	.	.	1	.	.	I	1	1
<i>Pityrogramma calomelanos</i>	F	.	.	.	1	.	.	.	.	2
<i>Sticherus rubiginosus</i>	F	.	.	.	1	.	.	.	1	1
Companions Lower Montane evergreen forests										
<i>Miconia sp.</i>	T	III	.	IV	2	2	III	IV	.	.
<i>Clethra fagifolia</i>	T	I	.	II	3	1	II	I	1	2
<i>Myrcia sp.</i>	T	II	.	III	.	2	I	.	.	.
<i>Miconia rivettii</i>	T	I	.	III	.	2	II	III	1	1
<i>Gaiadendron punctatum</i>	T	I	.	III	.	.	II	.	1	.
<i>Meriania maguirei</i>	T	I	.	II	1	.	II	.	.	.
<i>Hyeronima sp.</i>	T	I	.	II	.	2	II	.	.	.
<i>Dussia cf. tessmannii</i>	T	I	.	II	.	1	II	.	.	.
<i>Miconia obscura</i>	T	II	.	I	.	.	II	.	.	.
<i>Clusia lauriformis</i>	T	III	.	II	.	.	I	I	.	1
<i>Saurauia laxifolia</i>	T	I	1	III	.	.	I	.	.	.
<i>Guarea sp.</i>	T	I	.	II	.	1	II	.	.	.
<i>Viburnum pichichense</i>	T	I	.	II	.	.	I	III	.	.
<i>Neea sp.</i>	T	III	.	I	.	2	I	.	.	.
<i>Miconia suborbicularis</i>	T	III	1	.	.	.	II	.	.	.
<i>Myrsine latifolia</i>	T	I	.	I	.	1	II	.	.	.
<i>Guarea subandina ined.</i>	T	I	.	I	.	.	II	.	.	.
<i>Escallonia paniculata</i>	T	.	1	III	.	.	I	.	.	.
<i>Guarea purusana</i>	T	I	.	II	.	.	I	.	.	.
<i>Ladenbergia oblongifolia</i>	T	II	.	I	.	.	I	.	.	.
<i>Piper marequitensis</i>	T	II	.	I	1	.	I	.	.	.
<i>Styrax tomentosus</i>	T	I	.	I	.	1	I	.	.	.
<i>Schefflera morototoni</i>	T	I	.	I	2	1	.	.	.	.
<i>Eugenia sp. 1</i>	T	II	.	I	.	.	I	.	.	.
<i>Eugenia sp. 2</i>	T	I	.	I	.	.	II	.	.	.
<i>Disospyros spec.</i>	T	.	.	II	.	.	I	.	.	.
<i>Nectandra globosa</i>	T	I	.	I	.	.	I	.	.	.
<i>Pseudolmedia laevia</i>	T	I	.	I	.	.	I	.	.	.
<i>Meliosma bogotana</i>	T	II	.	I	.	1	II	.	.	.
<i>Rhodostemonodaphne sp. nov.</i>	T	I	.	.	.	.	II	.	.	.
<i>Rudgaea sp.</i>	T	I	.	I	.	.	I	.	.	.
<i>Cavendishia bracteata</i>	S	III	1	IV	3	.	II	I	2	.
<i>Begonia urticae</i>	H	III	.	II	.	1	I	.	.	.
<i>Isachne rigens</i>	H	I	.	II	2	.	II	.	.	.
<i>Sphaeradenia horrida</i>	H	.	1	II	2	2	I	.	.	.

Tab. 7: Synoptic table Alzateetea verticillatae.

Vegetation unit		1	2,1	2,2	3	4	5	6,1	6,2	6,3
<i>Critionopsis tungurahuae</i>	H	II	.	I	.	.	II	.	.	.
<i>Antidaphne viscoidea</i>	P	I	.	I	.	.	I	.	.	.
<i>Phoradendron sp.</i>	P	I	1	III	3	.	.	III	2	2
<i>Niphidium crassifolium</i>	E	II	1	III	1	.	I	I	.	2
<i>Semiramisia speciosa</i>	E	.	1	III	2	1	II	I	.	.
<i>Maxillaria ecuadorensis</i>	E	I	1	I	1	.	I	.	.	.
<i>Epidendrum armeniacum</i>	E	I	.	I	.	.	I	I	.	.
<i>Campyloneurum repens</i>	EF	III	1	III	1	.	II	.	.	.
<i>Campyloneurum coarctatum</i>	EF	II	.	II	1	.	.	.	.	.

Tab. 7: Synoptic table *Alzateetea verticillatae*.

Vegetation unit	1	2	3	4	5.1	5.2	6	7.1	7.2	8	9	10	11	12	13	14	15	16	17	18	
Number of Relevés	29	12	5	7	4	6	4	5	9	7	7	5	4	5	16	7	7	7	16	1	
Cover % Treelayer	25	55	20	20	20	25	30	40	45	45	55	45	75	30	45	80	40	70	45	20	
Cover % Shrublayer	40	35	50	30	20	65	10	30	35	30	30	45	35	40	45	70	50	25	45	70	
Cover % Herblayer	100	100	100	100	100	100	100	100	95	100	100	65	55	65	100	100	100	100	100	10	
Mean species number	84	86	84	84	88	84	92	100	84	90	88	100	97	89	89	68	75	90	73	95	
Ch Purdiaeaetalia nutantis																					
<i>Purdiaea nutans</i>	T	V	V	V	V	4	IV	.	4	V	V	V	V	V	4	V	.	V	V	V	V
<i>Podocarpus oleifolius</i>	T	V	V	IV	V	4	IV	.	4	V	V	V	V	III	4	V	.	V	IV	III	V
<i>Hedyosmum goudotianum</i>	T	V	V	III	V	4	V	.	4	V	V	V	V	V	4	V	.	IV	V	III	V
<i>Miconia rivettii</i>	T	V	V	IV	V	4	V	.	4	V	V	V	IV	V	4	V	.	V	IV	IV	V
<i>Graffenridia harlingii</i>	T	IV	III	III	IV	3	V	.	4	V	IV	III	V	IV	4	IV	.	IV	IV	V	IV
<i>Myrsine andina</i>	T	V	V	IV	V	3	V	.	3	IV	IV	V	IV	V	4	V	.	V	III	IV	V
<i>Weinmannia faagaroides</i>	T	V	V	V	V	4	V	.	4	V	V	IV	IV	V	4	V	.	V	II	I	V
<i>Myrica pubescens</i>	T	V	V	V	V	4	IV	.	4	V	V	V	III	V	4	V	.	V	III	III	V
<i>Clusia elliptica</i>	T	V	V	V	V	2	III	.	2	III	IV	V	V	V	2	V	.	III	IV	IV	IV
<i>Cybianthus marginatus</i>	T	V	V	V	V	4	V	.	4	V	IV	V	V	V	4	V	.	V	III	IV	V
<i>Schefflera pentandra</i>	T	V	V	V	V	4	V	.	3	V	III	V	V	V	4	V	.	V	II	V	IV
<i>Clusia ducoides</i>	T	V	V	V	III	4	V	.	3	V	IV	V	V	IV	3	IV	.	IV	V	V	IV
<i>Clusia multiflora</i>	T	IV	III	IV	IV	3	IV	.	2	IV	IV	V	IV	IV	3	V	.	IV	IV	III	IV
<i>Symplocos coriacea</i>	T	III	II	II	III	2	II	.	1	III	III	.	II	IV	.	IV	.	III	I	II	III
<i>Weinmannia elliptica</i>	T	III	III	III	I	4	I	.	1	II	III	III	III	III	.	II	.	II	II	II	III
<i>Cinchona mutisii</i>	T	II	III	II	III	.	IV	.	1	I	III	.	III	III	1	II	.	II	II	II	III
<i>Weinmannia pinnata</i>	T	III	V	IV	V	3	IV	.	3	I	IV	IV	II	I	1	II	.	I	.	III	IV
<i>Geonoma densa</i>	T	I	I	I	II	.	I	.	.	II	II	I	III	V	4	V	.	IV	I	II	.
<i>Miconia acutifolia</i>	T	II	II	I	.	2	III	.	3	II	III	III	III	.	.	.	.	I	.	IV	V
<i>Schefflera sodiroi</i>	T	II	I	II	I	2	V	.	3	II	III	IV	II	IV	.	IV	.	III	.	V	II
<i>Cyathea straminea</i>	FT	IV	IV	IV	V	4	V	.	.	IV	III	III	III	V	4	V	.	IV	III	IV	IV
<i>Purdiaea nutans</i>	S	V	V	IV	V	2	V	.	4	V	IV	V	V	V	4	IV	.	V	V	V	V
<i>Miconia rivettii</i>	S	IV	III	IV	III	2	V	.	1	IV	II	III	III	V	3	V	.	V	.	III	V
<i>Myrsine andina</i>	S	V	V	III	V	4	IV	.	4	V	V	V	V	IV	4	V	.	V	III	IV	V
<i>Guzmania diffusa</i>	S	I	.	I	I	.	II	.	1	III	IV	III	III	I	3	I	.	IV	.	I	III
<i>Clusia elliptica</i>	S	V	V	V	V	2	IV	.	2	IV	IV	V	V	V	2	V	.	IV	IV	IV	IV
<i>Disterigma acuminatum</i>	S	V	V	V	V	3	V	.	4	IV	III	V	IV	IV	4	II	.	V	IV	IV	IV
<i>Clusia multiflora</i>	S	IV	III	IV	III	3	IV	.	2	IV	IV	IV	III	III	3	V	.	IV	IV	III	IV
<i>Macleania mollis</i>	S	IV	III	III	III	4	IV	.	3	III	IV	IV	III	III	4	III	.	IV	IV	IV	III
<i>Macleania poortmannii</i>	S	II	III	II	II	2	I	.	2	IV	III	III	I	I	.	III	.	III	II	II	II
<i>Ilex spec.</i>	S	III	III	IV	II	3	III	.	2	V	II	V	V	III	2	I	.	III	IV	IV	II
<i>Baccharis macrantha</i>	S	III	III	I	.	2	III	.	1	II	III	V	III	III	1	I	.	II	IV	II	I
<i>Ceratostema loranthifolium</i>	S	I	II	.	I	.	II	.	1	I	I	.	I	III	1	.	.	II	II	I	.
<i>Disterigma pentandrum</i>	S	I	II	.	I	2	II	.	3	III	III	III	I	.	.	.	.	.	.	.	V
<i>Guzmania vanvolxemii</i>	H	IV	IV	IV	II	.	V	.	1	II	III	III	IV	V	4	II	.	V	IV	IV	III
<i>Anthurium ovatifolium</i>	H	V	IV	IV	V	1	V	.	.	II	III	III	III	III	3	I	.	IV	III	V	V
<i>Guzmania gloriosa</i>	H	I	II	.	.	.	.	.	.	II	I	.	I	I	4	I	.	I	.	.	.
<i>Guzmania acuminata</i>	H	I	III	.	II	.	.	.	.	II	.	I	II	.	1	.	.	.	.	III	II
<i>Blechnum cordatum</i>	F	III	II	II	III	3	II	.	2	III	II	I	III	I	.	II	.	III	II	I	III
<i>Lophosoria quadripinnata</i>	F	II	I	.	.	.	III	.	1	II	II	I	I	2	I	.	.	I	III	II	II
<i>Lepanthes nummularia</i>	E	I	II	I	.	2	I	.	4	IV	IV	III	III	.	3	.	.	II	.	.	V
<i>Semiramisia speciosa</i>	E	I	II	.	I	1	II	.	4	IV	III	III	V	IV	4	IV	.	II	.	III	V
<i>Masdevallia carruthersiana</i>	E	I	II	.	.	.	.	.	.	.	.	.	.	I	.	.	.	I	II	I	II
<i>Melpomene sodiroi</i>	EF	I	II	.	.	2	II	.	3	III	III	III	III	.	.	.	.	I	.	.	V
<i>Terpsichore alsopeteris</i>	EF	I	I	.	I	2	II	.	4	V	IV	III	IV	IV	3	V	.	III	.	.	V
Ch Neurolepietum elatae																					
<i>Clethra revoluta</i>	T	IV	IV	V	IV	3	IV	.	.	II	.	II	II	IV	.	.	.	.	.	.	.
<i>Geissanthus vanderwerffii</i>	T	III	IV	III	III	2	.	.	1	.	.	II	.	.	.	.	.	.	.	.	.
<i>Roupala loxensis</i>	T	III	IV	IV	IV	2	.	.	1	III	.	I	.	.	4	.	.	.	.	.	.
<i>Cyathea caracasana</i>	FT	II	III	I	III	1	II	.	1	II	I	III	II	V	1	V	.	.	.	.	.
<i>Symbolanthus calygonus</i>	S	III	II	III	IV	3	II	.	.	.	.	I	II	.	.	.	.	.	.	.	.
<i>Neurolepis elata</i>	H	V	V	V	V	4	IV	.	4	III	IV	III	V	V	4	V	.	IV	.	III	III
<i>Peperomia hartwegiana</i>	H	IV	IV	IV	V	3	II	.	.	II	III	III	II	V	1	V	.	III	.	IV	III
<i>Columnnea strigosa</i>	H	III	IV	III	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>Eriosorus flexuosus</i>	F	III	IV	III	IV	2	I	.	.	.	.	II	.	.	.	.	.	.	.	.	.
<i>Eriosorus rufescens</i>	F	II	III	I	III	.	I	.	.	I	I	II	.	.	.	.	.	.	.	.	.
<i>Bomarea nervosa</i>	L	III	II	III	III	2	.	.	1	.	.	I	.	.	.	.	.	.	.	.	.
<i>Blechnum fragile</i>	EF	IV	IV	III	IV	3	.	.	.	III	II	II	II	.	3	I	.	.	.	.	.

Tab. 8: Synoptic table Purdiaeaetalia nutantis.

Vegetation unit	1	2	3	4	5.1	5.2	6	7.1	7.2	8	9	10	11	12	13	14	15	16	17	18
<i>Trichomanes capillaceum</i>	EF	III	III	IV	III	2	II				I			I						
D Neurolepietum elatae mezobromelietosum capituligerae																				
<i>Mezobromelia capituligera</i>	H	II	V	III	I	3	II	4	III	II	V	II	IV		I					
D Neurolepietum elatae chusqueetosum falcatae																				
<i>Chusquea falcata</i>	H	I		V			II			II	I	III	II		I					
D Neurolepietum elatae cladonietosum																				
<i>Cladonia</i>	I	I		V	4	V		4	V	V	IV	V	V	4	V					
D Neurolepietum elatae lycopodiellietosum cernuae																				
<i>Lycopodiella cernua</i>	F	I			4	V		1	I		II									
<i>Baccharis genistelloides</i>	S	I			4	V		2	II	III	IV	II								
Neurolepietum elatae - Dicranopteris flexuosa facies																				
<i>Dicranopteris flexuosa</i>	F					III		4	V	I		I								
D Purdiaeaetum nutantis rhynchosporetosum locpletis																				
<i>Rhynchospora locuples</i>	H					I		1	V	V		III	IV	4						
D Purdiaeaetum nutantis sticheretosum revolutae																				
<i>Sticherus revolutus</i>	F					I		1	II		V	I		1	I					
D Purdiaeaetum nutantis sphagnetosum																				
<i>Sphagnum</i>						I			II	I		V	V							
D Purdiaeaetum nutantis macrocarpaetosum revolutae																				
<i>Macrocarpaea revoluta</i>	S					III		2	III	III	II	III	V	3		III		IV	III	II
D Purdiaeaetum nutantis clusietosum magnifoliae																				
<i>Clusia magnifolia</i>	T							1	II	I		I	I	4						
<i>Chamaedora pinnatifrons</i>	T								II	I				3						
D Purdiaeaetum nutantis geonometosum orbygniana																				
<i>Geonoma orbygniana</i>	T	II	V		III	3	I			IV	II	III	I	I	1	V		I		III
Ch Clusietum latipedis																				
<i>Clusia latipes</i>	T															III	V		I	II
<i>Graffenrieda emarginata</i>	T															I	IV			1
<i>Cornus peruviana</i>	T																			III
<i>Drimys granadensis</i>	T																			III
<i>Freziera canescens</i>	T																			III
<i>Panopsis ferruginea</i>	T																			IV
Transition Purdiaeaetalia nutantis - Alzateetalia verticillatae																				
<i>Meriania radula</i>	T																			1
<i>Miconia aggregata</i>	T																			1
<i>Ocotea cf.</i>	T																			1
<i>Chusquea uniflora</i>	H																			1
<i>Peperomia galioides</i>	H																			1
<i>Peperomia glandulosa</i>	H																			1
<i>Elaphoglossum tectum</i>	F																			1
<i>Asplenium uniseriale</i>	F																			1
<i>Diplazium macrophyllum</i>	F																			1
<i>Elaphoglossum latifolium</i>	F																			1
<i>Pecluma curvans</i>	F																			1
<i>Polypodium thyssanolepis</i>	F																			1
<i>Pteris muricata</i>	F																			1
<i>Pteris podophylla</i>	F																			1
<i>Phoradendron trianae</i>	P																			1
<i>Aetanthus andreaeus</i>	P																			1
<i>Epidendrum mancum</i>	E																			1
<i>Odontoglossum ramosissimum</i>	E																			1
<i>Stelis purpurea</i>	E																			1
<i>Pleurothallis canaligera</i>	E																			1
<i>Asplenium serra</i>	FE																			1
<i>Pecluma eurybasis</i>	FE																			1
<i>Polypodium sessilifolium</i>	FE																			1
<i>Polypodium triseriale</i>	FE																			1
Companions Purdiaeaetalia nutantis																				
<i>Axinea macrophylla</i>	T	V	V	IV	V	3	III		4	V	V	IV	IV	V	4	V		V	I	II
<i>Miconia tinifolia</i>	T	IV	V	IV	V	4	III		4	V	IV	V	III	I	3	III		II	II	IV
<i>Miconia jahnii</i>	T	III	IV		III		V		4	III	V		III	IV	4	III		IV	III	IV
<i>Schefflera acuminata</i>	T	IV	V	III	V	4	III		4	III	IV	IV	III	II	2	II			III	IV
<i>Myricanthes myrsinoides</i>	T	III	II	II	II	2	III			III	III	IV	I	I	3	II		II	III	IV
<i>Stilpnophyllum oellgaardi</i>	T	II	II	II	III	3	V		4	III	IV	III	III	V	4	IV		II	III	IV

Tab. 8: Synoptic table Purdiaeaetalia nutantis.

Vegetation unit		1	2	3	4	5.1	5.2	6	7.1	7.2	8	9	10	11	12	13	14	15	16	17	18		
<i>Schefflera ferruginea</i>	T	III	II	.	II	2	II	.	3	V	IV	I	IV	IV	4	V	.	III	I	I	III	I	I
<i>Persea mutisii</i>	T	II	III	III	II	I	II	.	1	III	II	IV	V	II	2	I	.	II	III	III	I	II	.
<i>Gaiadendron punctatum</i>	T	II	III	I	I	I	II	.	2	IV	III	III	III	I	I	III	.	II	II	III	I	III	.
<i>Weinmannia ovata</i>	T	II	III	I	I	I	III	.	1	III	II	III	II	III	1	II	.	II	III	III	I	II	1
<i>Hedyosmum translucidum</i>	T	II	II	I	III	.	.	.	1	III	II	III	II	III	1	IV	.	III	.	I	I	II	.
<i>Eschweilera spec.</i>	T	II	I	I	I	I	II	.	1	I	II	III	II	I	1	.	.	II	III	III	.	I	.
<i>Alchornea glandulosa</i>	T	II	III	II	I	I	I	.	2	III	I	III	I	.	3	I	.	II	III	III	I	I	.
<i>Ugni myricoides</i>	T	II	I	II	III	1	I	.	1	III	II	.	I	.	.	II	.	II	.	.	I	II	1
<i>Ternstroemia jelskii</i>	T	II	I	II	III	1	III	.	2	I	.	.	II	II	.	.	.	II	II	I	I	I	.
<i>Alzatea verticillata</i>	T	I	I	I	II	.	II	.	1	I	III	.	II	.	1	.	.	I	I	II	I	I	.
<i>Hedyosmum racemosum</i>	T	I	II	I	I	.	.	.	1	.	.	.	I	II	2	.	.	II	.	I	.	I	.
<i>Schradera sp.</i>	T	I	I	I	I	.	I	.	I	I	III	.	II	1	.	.	.	I	.	II	.	.	.
<i>Styrax tomentosus</i>	T	I	II	I	I	1	I	.	.	.	II	II	I	I	.	.	.	II	I	I	I	II	.
<i>Clethra fimbriata</i>	T	.	.	.	.	.	I	.	1	I	II	III	II	.	.	II	.	.	.	.	.	.	.
<i>Miconia poortmannii</i>	T	.	.	.	.	.	.	.	.	.	I	.	II	2	I	.	.	.	.	.	.	.	.
<i>Cyathea ebeniana</i>	FT	.	.	.	.	.	.	.	.	.	II	.	II	3	II	.	.	.	.	.	.	.	.
<i>Faramea flavicans</i>	S	V	V	III	V	4	IV	.	4	V	V	V	V	V	4	V	.	V	V	III	V	IV	1
<i>Disterigma alaternoides</i>	S	V	V	V	V	4	IV	.	4	V	IV	IV	V	IV	4	V	.	V	V	IV	V	IV	1
<i>Manettia pichichensis</i>	S	V	V	V	V	4	V	.	3	IV	V	V	V	IV	4	V	.	IV	III	III	V	III	1
<i>Cavendishia bracteata</i>	S	IV	V	IV	V	4	V	.	4	V	V	IV	IV	IV	4	II	.	V	III	III	V	III	1
<i>Ceratostema reginaldii</i>	S	V	V	V	III	4	V	.	4	IV	IV	V	III	V	2	III	.	III	III	IV	V	IV	1
<i>Palicourea cornigera</i>	S	III	II	III	III	2	IV	.	2	V	IV	II	V	III	3	IV	.	IV	IV	IV	III	IV	.
<i>Oreanthes sperlingii</i>	S	III	II	I	II	1	II	.	2	III	III	III	II	III	2	I	.	II	II	III	II	II	.
<i>Diogenesia floribunda</i>	S	II	III	II	III	.	.	.	1	III	.	II	III	II	2	I	.	II	I	II	II	I	.
<i>Cavendishia nobilis</i>	S	II	II	II	I	1	.	.	1	I	II	.	III	I	2	.	.	II	.	III	I	I	1
<i>Gaultheria erecta</i>	S	I	I	I	I	1	.	.	1	I	.	I	I	I	.	.	.	I	I	III	I	I	.
<i>Centropogon erythraeus</i>	S	I	II	.	I	1	.	.	.	.	.	.	.	.	.	.	.	I	I	I	.	II	.
<i>Rubus boliviensis</i>	S	III	.	.	I	.	.	.	1	.	I	.	II	I	1	.	.	I	.	II	II	I	.
<i>Pernettya prostrata</i>	S	III	.	.	II	2	.	.	1	I	I	II	I	I	1	.	.	I	.	II	I	II	.
<i>Ceratostema alatum</i>	S	.	.	.	.	.	.	.	.	.	II	I	I	I	1	.	.	II	II	III	III	I	.
<i>Rubus niveus</i>	S	.	.	.	.	I	.	.	1	I	II	.	I	.	.	.	.	.	.	.	.	.	.
<i>Piper townsendii</i>	S	.	.	.	.	I	.	.	.	.	I	.	III	V	1	II	.	.	.	.	.	.	.
<i>Sphaeradenia horrida</i>	H	V	III	III	IV	4	V	.	4	IV	V	V	V	V	3	V	.	IV	V	IV	IV	V	.
<i>Bomarea brachysepala</i>	H	II	II	II	III	2	II	.	1	III	.	I	II	II	.	V	.	II	I	.	III	I	.
<i>Sobralia candida</i>	H	III	I	II	I	1	I	.	3	I	.	.	II	II	2	.	.	II	I	II	.	.	.
<i>Spermacoce spec. 1</i>	H	I	I	I	I	1	.	.	.	.	II	.	I	II	1	.	.	I	.	II	.	I	.
<i>Muehlenbeckia tilifolia</i>	H	III	IV	IV	IV	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>Ruellia puri</i>	H	.	.	.	.	.	.	.	.	.	I	I	.	I	1	II	.	.	.	.	.	.	.
<i>Lycopodiella glaucescens</i>	F	II	II	III	I	4	II	.	2	III	II	III	III	II	1	IV	.	III	III	II	I	II	.
<i>Bomarea martiana</i>	L	V	V	IV	V	3	III	.	2	IV	V	V	V	V	4	IV	.	V	III	IV	V	V	1
<i>Smilax benthamiana</i>	L	III	III	II	IV	4	V	.	3	V	III	III	V	II	2	II	.	IV	IV	IV	III	III	1
<i>Bomarea dissitifolia</i>	L	III	III	III	II	2	III	.	3	V	II	III	IV	III	4	IV	.	IV	III	IV	II	II	.
<i>Dioscorea sprucei</i>	L	II	III	III	I	1	II	.	3	III	III	I	II	I	2	II	.	II	II	IV	II	II	.
<i>Mikania syszlowiczii</i>	L	II	II	I	I	1	I	.	1	III	III	IV	III	II	2	I	.	II	III	III	II	III	.
<i>Mikania spec. 2</i>	L	I	I	II	I	1	.	.	2	I	.	.	II	I	2	.	.	I	I	II	.	.	.
<i>Dendrophthora densiflora</i>	P	V	V	II	V	4	III	.	4	V	V	V	V	IV	4	III	.	V	IV	IV	V	IV	1
<i>Dendrophthora polyantha</i>	P	V	V	V	4	V	.	.	4	IV	IV	V	V	V	2	IV	.	IV	IV	III	IV	III	1
<i>Tristerix longebracteatus</i>	P	V	V	V	V	2	V	.	4	V	IV	V	V	V	2	V	.	V	I	II	V	III	1
<i>Maxillaria klugii</i>	E	V	V	IV	V	4	V	.	3	IV	V	V	V	V	4	IV	.	V	V	III	V	IV	1
<i>Elleanthus robustus</i>	E	V	V	III	V	4	V	.	3	V	V	V	IV	IV	4	V	.	V	V	III	IV	IV	1
<i>Otoglossum brevifolium</i>	E	IV	V	V	V	4	V	.	4	V	IV	V	V	V	4	IV	.	V	III	IV	V	IV	1
<i>Sphyrospermum cordifolium</i>	E	V	V	V	V	4	V	.	4	V	V	V	IV	V	2	IV	.	IV	III	IV	V	IV	.
<i>Dryadella simula</i>	E	V	V	IV	V	4	V	.	3	V	III	V	III	V	2	IV	.	V	V	II	V	IV	1
<i>Elleanthus oellgaardii</i>	E	V	V	II	V	4	V	.	4	IV	IV	V	III	IV	3	V	.	V	IV	IV	IV	IV	1
<i>Maxillaria aggregata</i>	E	V	IV	IV	IV	3	V	.	4	V	V	V	V	IV	4	V	.	V	III	III	V	III	.
<i>Thibaudia floribunda</i>	E	V	V	III	V	4	V	.	4	IV	V	V	V	V	4	III	.	V	III	II	IV	IV	.
<i>Racinaea seemannii</i>	E	IV	V	V	V	4	V	.	4	V	V	V	V	III	4	V	.	IV	III	III	IV	III	.
<i>Stelis flexuosa</i>	E	V	V	V	V	4	V	.	3	V	V	IV	IV	IV	4	III	.	V	III	III	V	III	1
<i>Maxillaria aurea</i>	E	V	V	V	IV	3	V	.	4	V	V	IV	V	V	4	II	.	IV	V	III	IV	IV	.
<i>Scaphyglottis bicornis</i>	E	V	V	III	V	4	III	.	4	V	V	V	IV	IV	3	V	.	IV	II	III	IV	III	1
<i>Racinaea tetrantha</i>	E	V	V	V	V	4	V	.	4	V	V	V	III	IV	4	III	.	IV	II	III	V	III	1
<i>Elleanthus gracilis</i>	E	V	V	V	III	4	V	.	4	V	IV	V	IV	II	3	V	.	V	V	IV	III	III	.
<i>Tillandsia aequatorialis</i>	E	V	V	III	V	4	V	.	2	IV	V	III	III	IV	4	V	.	IV	III	III	V	III	.
<i>Tillandsia complanata</i>	E	V	V	IV	V	4	V	.	3	IV	V	V	III	V	2	V	.	IV	II	III	V	III	.

Tab. 8: Synoptic table Purdiaeaetalia nutantis.

Vegetation unit	1	2	3	4	5.1	5.2	6	7.1	7.2	8	9	10	11	12	13	14	15	16	17	18	
<i>Maxillaria acuminata</i>	E	V	IV	IV	III	4	V	V	V	III	III	4	IV	.	IV	III	IV	III	IV	1	
<i>Platystele aculeata</i>	E	IV	IV	V	V	3	IV	.	4	V	V	V	IV	IV	4	III	.	IV	III	III	IV
<i>Odontoglossum cristatellum</i>	E	II	II	II	.	1	V	.	4	IV	IV	IV	IV	IV	3	IV	.	V	II	II	V
<i>Pitiphyllum pinioides</i>	E	IV	V	III	V	2	V	.	3	III	V	IV	III	V	4	IV	.	V	II	III	V
<i>Tillandsia denudata</i>	E	V	V	IV	V	3	IV	.	4	IV	IV	IV	IV	II	3	IV	.	II	II	I	V
<i>Oncidium heteranthum</i>	E	IV	V	III	V	4	IV	.	4	IV	V	V	IV	III	4	II	.	I	III	III	V
<i>Tillandsia confinis</i>	E	IV	V	IV	V	4	IV	.	4	V	III	IV	III	I	3	I	.	II	III	IV	V
<i>Vriesea fragans</i>	E	IV	V	IV	V	4	IV	.	4	V	III	V	IV	IV	3	.	.	III	IV	III	V
<i>Cryptocentrum lehmannii</i>	E	II	II	I	.	1	III	.	2	III	II	III	.	I	.	I	.	II	.	II	II
<i>Racinaea tripinnata</i>	E	I	.	II	.	.	III	.	1	.	.	I	II	IV	.	II	.	III	.	.	II
<i>Pleurothallis crocodiliceps</i>	E	I	II	I	.	.	III	.	3	I	I	I	.	.	.	.	.	II	.	II	I
<i>Eugenia spec.</i>	E	III	II	.	.	.	I	.	.	I	II	.	.	I	.	I	.	I	I	I	.
<i>Pachyphyllum cristallinum</i>	E	I	I	I	.	1	I	.	.	II	I	.	.	.	.	.	.	II	I	.	I
<i>Pleurothallis antennifera</i>	E	.	.	.	.	.	I	.	2	.	.	II	.	I	1	.	.	1	I	III	III
<i>Pleurothallis sclerophylla</i>	E	.	.	.	.	.	III	.	.	I	I	I	.	.	.	.	.	II	II	I	III
<i>Guzmania candelabrum</i>	E	.	.	.	.	.	.	.	II	.	I	III	I	1	I	.	.	.	.	.	.
<i>Stelis pusilla</i>	E	.	.	.	.	.	.	.	II	II	.	I	II	1	II	.	.	.	.	.	.
<i>Melpomene moniliformis</i>	FE	V	V	V	V	4	IV	.	4	V	V	V	V	V	4	V	.	V	V	IV	V
<i>Pleopeltis macrocarpa</i>	EF	V	V	V	V	4	V	.	4	V	IV	V	V	V	4	V	.	V	III	I	V
<i>Hymenophyllum myriocarpum</i>	FE	IV	V	IV	IV	2	V	.	4	V	V	V	III	V	4	V	.	IV	IV	IV	V
<i>Elaphoglossum cuspidatum</i>	FE	IV	IV	I	II	2	V	.	2	III	III	II	III	III	3	II	.	III	IV	III	III
<i>Polypodium levigatum</i>	FE	I	I	II	I	.	.	.	1	I	II	.	I	.	2	.	.	II	.	III	.
<i>Hymenophyllum amabile</i>	FE	I	I	.	.	.	.	.	1	.	.	I	III	.	.	.	.	I	.	III	I
<i>Vittaria gardeniana</i>	FE	.	.	.	.	.	I	.	1	I	II	.	II	.	.	.	.	1	.	II	III
<i>Terpsichore asplenifolia</i>	FE	.	.	.	.	.	I	.	.	I	I	II	I	I	.	.	.	II	II	I	I
<i>Asplenium aurinum</i>	FE	.	.	.	.	.	I	.	1	.	I	.	II	.	1	.	.	.	.	.	.

T: Tree S: Shrub FT: Treefern H: Herb E: Epiphytic herb EF: Epiphytic fern P: Parasite L: Liana

Tab. 8: Synoptic table *Purdiaeaetalia nutantis*.

Vegetation unit	1	2	3	3A	4
Number of Relevés	15	6	4	7	10
Cover % Shrublayer	100	100	65	60	50
Cover % Herblayer	30	30	25	60	60
Mean species number	78	32	29	27	27
Ch Clusio ellipticae - Weinmannietalia/-ion cochensis					
<i>Clusia elliptica</i>	T	V	III	3	V
<i>Geonoma weberbaueri</i>	T	V	I	1	III
<i>Weinmannia cochensis</i>	T	V	V	2	IV
<i>Weinmannia fagaroides</i>	T	V	I	1	III
<i>Hedyosmum luteyui</i>	T	V	.	4	III
<i>Clethra ovalifolia</i>	T	V	V	2	III
<i>Disterigma acuminatum</i>	S	V	III	2	V
<i>Baccharis genistelloides</i>	S	V	III	3	III
<i>Miconia bullata</i>	S	V	I	1	II
<i>Paepalanthus meridensis</i>	H	V	V	2	I
<i>Peperomia hartwegiana</i>	H	V	I	2	III
Ch Clusio ellipticae - Weinmannietum cochensis					
<i>Geissanthus vanderwerffii</i>	T	III	.	.	.
<i>Weinmannia reticulata</i>	T	III	.	.	.
<i>Freziera canescens</i>	T	III	.	.	.
<i>Myrica pubescens</i>	T	III	.	.	.
<i>Weinmannia elliptica</i>	T	III	.	.	.
<i>Cybianthus magnus</i>	T	III	I	.	.
<i>Ocotea infrafoveolata</i>	T	III	.	.	.
<i>Panopsis ferruginea</i>	T	III	.	.	.
<i>Hedyosmum scabrum</i>	T	II	I	1	.
<i>Hyeronima duquei</i>	T	II	.	.	.
<i>Hypericum decandrum</i>	T	II	.	.	.
<i>Miconia theaezans</i>	T	II	.	.	.
<i>Schefflera acuminata</i>	T	II	.	.	.
<i>Freziera karsteniana</i>	T	II	.	.	.
<i>Hedyosmum racemosum</i>	T	II	.	.	.
<i>Persea bullata</i>	T	II	.	.	.
<i>Myrsine andina</i>	T	III	.	.	.
<i>Cinchona nutzii</i>	T	II	.	.	.
<i>Geonoma orbignyana</i>	T	II	.	.	.
<i>Hyeronima moritziana</i>	T	II	.	.	.
<i>Drimys granadensis</i>	T	I	.	.	.
<i>Cyathea brevistipes</i>	FT	II	.	.	.
<i>Brachyotum confertum</i>	S	IV	.	.	.
<i>Gynoxis cuicochensis</i>	S	IV	.	.	.
<i>Oreocallis mucronata</i>	S	II	.	.	.
<i>Arctophyllum setosum</i>	S	III	I	1	I
<i>Gynoxis laurifolia</i>	S	III	.	.	.
<i>Baccharis latifolia</i>	S	III	.	.	.
<i>Brachyotum setosum</i>	S	III	.	1	.
<i>Pernettya prostrata</i>	S	III	I	.	I
<i>Hesperomeles ferruginea</i>	S	II	.	.	.
<i>Ribes andicola</i>	S	II	.	.	.
<i>Ilex rimbachii</i>	S	II	.	.	.
<i>Ceratostema reginaldii</i>	S	II	.	.	.
<i>Baccharis macrantha</i>	S	II	.	.	.
<i>Desfontainia spinosa</i>	S	II	I	.	.
<i>Ribes ecuadorensis</i>	S	II	.	.	.
<i>Rhamnus granulosa</i>	S	II	.	.	.
<i>Berberis beauverdiana</i>	S	I	.	.	.
<i>Berberis lutea</i>	S	I	.	.	.
<i>Neurolepis laegaardii</i>	H	V	I	2	I
<i>Pitcairnia trianae</i>	H	V	.	.	.
<i>Calceolaria fusca</i>	H	IV	I	.	.
<i>Valeriana microphylla</i>	H	IV	.	.	.
<i>Hydrocotyle humboldtii</i>	H	III	.	.	I
<i>Luzula gigantea</i>	H	III	.	.	.
<i>Gunnera magellanica</i>	H	II	.	.	.
Vegetation unit					
<i>Elaphoglossum tectum</i>	F	III	.	.	.
<i>Blechnum divergens</i>	F	II	.	.	.
<i>Eriosorus cheilanthoides</i>	F	II	I	.	.
<i>Eriosorus rufescens</i>	F	II	I	.	.
<i>Antidaphne andina</i>	P	III	I	.	I
<i>Bomarea dissitifolia</i>	L	III	.	1	I
<i>Racinaea seemanii</i>	E	IV	.	.	.
<i>Racinaea tripinnata</i>	E	III	.	.	.
<i>Maxillaria klugii</i>	E	III	I	.	.
<i>Disterigma empetrifolium</i>	E	III	.	.	.
<i>Disterigma codonanthum</i>	E	II	.	.	.
<i>Melpomene moniliformis</i>	FE	IV	.	.	.
<i>Melpomene sodiroi</i>	FE	IV	.	.	.
<i>Terpsichore alsopeteris</i>	FE	III	.	.	.
<i>Hymenophyllum dependens</i>	FE	II	.	.	.
<i>Terpsichore dependens</i>	FE	II	.	.	.
<i>Hymenophyllum amabile</i>	FE	II	.	.	.
Ch Axineetum macrophyllae					
<i>Axinea macrophylla</i>	T	.	V	.	.
<i>Arctophyllum vernicosum</i>	S	.	IV	.	I
<i>Vaccinium floribundum</i>	S	I	IV	1	I
<i>Brachyotum andreanum</i>	S	I	IV	.	I
<i>Gaultheria glomerata</i>	S	I	IV	1	.
<i>Brachyotum fraternum</i>	S	I	III	.	I
<i>Vaccinium crenatum</i>	S	.	II	.	.
<i>Valeriana plantaginea</i>	H	I	IV	1	I
<i>Arracacia xanthorrhiza</i>	H	I	III	.	I
<i>Epidendrum fimbriatum</i>	H	.	III	.	.
<i>Epidendrum macrostachyum</i>	E	.	IV	.	.
<i>Mezobromelia fulgens</i>	E	.	IV	.	.
Ch Chusqueetum loxensis					
<i>Cybianthus marginatus</i>	T	.	I	3	II
<i>Chusquea loxensis</i>	H	.	I	3	V
<i>Calamagrostis intermedia</i>	H	I	II	2	II
<i>Castilleja fissifolia</i>	H	I	III	1	III
<i>Epidendrum frigidum</i>	H	.	I	.	II
Ch Rhynchosporium kunthii					
<i>Disterigma alaternoides</i>	S	.	.	.	I
<i>Rhynchospora kunthii</i>	H	I	.	.	I
<i>Eriocaulon microcephalum</i>	H	.	.	.	V
<i>Valeriana rigida</i>	H	.	.	.	IV
<i>Xyris subulata</i>	H	.	.	.	IV
<i>Puya nitida</i>	H	I	.	.	V
<i>Pinguicula calytrata</i>	H	.	.	.	III
<i>Orithrophium repens</i>	H	.	.	.	II
<i>Rhynchospora rugosa</i>	H	.	.	.	II
<i>Lysimachia andina</i>	H	.	.	.	I
<i>Bomarea brachysepala</i>	H	.	I	1	I
<i>Paepalanthus celsus</i>	H	.	.	.	I
<i>Lycopodiella alopecuroides</i>	F	I	I	.	III
<i>Blechnum loxense</i>	F	I	.	.	II
Companions Clusio ellipticae - Weinmannietum cochensis					
<i>Myrsine manglilla</i>	T	III	.	.	.
<i>Ocotea sericea</i>	T	II	.	.	.
<i>Weinmannia pubescens</i>	T	II	.	.	.
<i>Myrica parvifolia</i>	T	II	.	.	.
<i>Miconia media</i>	T	II	.	.	.
<i>Hedyosmum goudotianum</i>	T	II	.	.	.
<i>Clethra fimbriata</i>	T	II	.	.	.
<i>Clusia alata</i>	T	II	.	.	.
<i>Clusia ducooides</i>	T	II	.	.	.
<i>Escallonia paniculata</i>	T	II	.	.	.
<i>Cybianthus pastensis</i>	T	II	.	.	.

Tab. 9: Synoptic table Clusio ellipticae – Weinmannietalia cochensis.

Vegetation unit		1	2	3	3A	4
<i>Eriosorus flexuosus</i>	F	III	.	.	.	.
<i>Meriania radula</i>	S	I	.	.	.	.
<i>Miconia aspergillaris</i>	S	II	II	.	.	.
<i>Miconia jahnii</i>	S	II	.	.	.	.
<i>Oreopanax andreas</i>	S	II	.	.	.	.
<i>Persea ferruginea</i>	S	II	.	.	.	.
<i>Pitiphyllum pinioides</i>	S	II	.	.	.	.
<i>Prunus opaca</i>	S	II	.	.	.	.
<i>Gynoxis buxifolia</i>	S	III	I	.	.	.
<i>Ceratostema alatum</i>	S	II	.	.	.	.
<i>Arctophyllum filiforme</i>	S	II	.	.	.	.
<i>Arctophyllum cuspidatum</i>	S	II	.	.	I	I
<i>Baccharis buxifolia</i>	S	II	I	1	.	.
<i>Baccharis nitida</i>	S	II	.	.	I	I
<i>Bejaria aestuans</i>	S	I	.	.	.	.
<i>Bejaria resinosa</i>	S	I	.	.	.	.
<i>Brachyotum fictum</i>	S	I	.	.	.	.
<i>Brachyotum gracilescens</i>	S	I	.	.	.	.
<i>Brachyotum rugosum</i>	S	I	.	.	.	.
<i>Gaultheria foliosa</i>	S	II	.	.	I	.
<i>Oxalis subintegra</i>	H	II	.	.	.	.
<i>Calceolaria tripartita</i>	H	II	.	.	.	.
<i>Geum peruvianum</i>	H	II	.	.	I	I
<i>Gunnera pilosa</i>	H	II	.	.	.	.
<i>Epidendrum loxense</i>	H	II	.	.	I	.
<i>Epilobium denticulatum</i>	H	II	.	.	.	.
<i>Acalypha andina</i>	H	II	.	.	.	.
<i>Acalypha diversifolia</i>	H	I	.	.	.	.
<i>Calceolaria calycina</i>	H	I	.	.	.	.
<i>Chusquea scandens</i>	H	I	.	.	.	.
<i>Utricularia uniflora</i>	H	II	I	.	.	.
<i>Valeriana bracteata</i>	H	II	.	.	.	.
<i>Valeriana pilosa</i>	H	II	.	.	.	.
<i>Elaphoglossum lindenii</i>	F	I	.	.	.	.
<i>Bomarea nervosa</i>	L	I	.	.	.	.
<i>Bomarea setacea</i>	L	I	.	.	.	.
<i>Stelis pusilla</i>	E	III	.	.	.	.
<i>Lepanthes flexuosa</i>	E	II	I	.	.	.
<i>Sphyrospermum cordifolium</i>	E	II	.	.	.	.
<i>Hymenophyllum trichophyllum</i>	EF	II	.	.	.	.
<i>Lellingeria major</i>	EF	II	.	.	.	.
Companions Axineetum macrophyllae and Chusqueetum loxensis						
<i>Graffenridia harlingii</i>	T	.	I	3	.	.
<i>Themistoclesia epiphytica</i>	S	.	IV	2	I	I
<i>Hesperomeles obtusifolia</i>	S	.	I	1	II	.
<i>Geranium diffusum</i>	H	.	I	1	.	.
<i>Geranium siboldioides</i>	H	.	III	1	III	I
<i>Chusquea falcata</i>	H	.	.	2	II	I
<i>Oxalis lotoides</i>	H	.	I	2	II	.
<i>Bartsia crisafullii</i>	H	I	I	2	II	I
<i>Chusquea tessellata</i>	H	.	I	1	IV	.
<i>Chusquea leonardiorum</i>	H	I	I	4	I	I
<i>Chusquea neurophylla</i>	H	I	.	2	II	.
<i>Bartsia melampyroides</i>	H	.	I	2	II	.
<i>Chusquea perligulata</i>	H	.	I	.	III	I
<i>Castilleja ecuadorensis</i>	H	I	I	1	II	.
<i>Muehlenbeckia tamnifolia</i>	H	I	II	1	I	.
<i>Lycopodium jussiae</i>	F	I	III	1	IV	I
<i>Blechnum auratum</i>	F	.	I	1	II	.
<i>Bomarea uncifolia</i>	L	.	I	1	I	I

T: Tree S: Shrub FT: Treefern H: Herb E: Epiphytic herb EF: Epiphytic fern P: Parasite L: Liana

Vegetation unit		1	2	3	3A	4
<i>Elaeagia ecuadorensis</i>	T	I	.	.	.	.
Companions Clusio ellipticae - Weinmannietalia/ion cochensis						
<i>Hypericum aciculare</i>		I	V	2	III	II
<i>Miconia dodsonii</i>		I	.	2	II	II
<i>Miconia tinifolia</i>		I	.	1	II	II
<i>Clethra revoluta</i>		I	.	.	I	I
<i>Gaiadendron punctatum</i>		I	I	.	II	I
<i>Gaultheria reticulata</i>		II	I	1	I	.
<i>Miconia poortmannii</i>		II	II	.	I	.
<i>Brachyotum campanulare</i>		I	V	2	II	III
<i>Disterigma pentandrum</i>		I	V	2	V	II
<i>Ilex andicola</i>		I	I	1	II	III
<i>Gaultheria erecta</i>		I	II	2	II	III
<i>Hieracium frigidum</i>		I	I	1	II	III
<i>Neonelsonia acuminata</i>		II	I	2	II	I
<i>Sibthorpia repens</i>		II	III	1	I	I
<i>Niphogeton dissecta</i>		II	II	.	I	I
<i>Acaena ovalifolia</i>		I	III	.	I	I
<i>Dicksonia sellowiana</i>		II	II	1	.	I
<i>Blechnum lima</i>		II	I	2	II	V
<i>Eriosorus aureonitens</i>		II	II	2	I	IV
<i>Sticherus revolutus</i>		I	V	3	II	III
<i>Tillandsia wurdackii</i>		.	II	3	IV	III

Tab. 9: Synoptic table *Clusio ellipticae* – *Weinmannietalia cochensis*.

Vegetation unit	1	2	3	4	5	6,1	6,2	7	
Number of Relevés	3	8	5	5	15	3	3	3	
Cover % Shrublayer	30	25	35	15	15	15	5	25	
Cover % Herblayer	80	95	95	100	100	100	95	95	
Mean species number	27	24	34	21	34	31	25	28	
Ch Neurolepio - Puyetalia									
<i>Baccharis genistelloides</i>	S	3	V	.	IV	3	3	.	
<i>Vaccinium floribundum</i>	S	1	IV	III	III	IV	2	1	
<i>Pernettya prostrata</i>	S	1	III	III	III	III	.	.	
<i>Chuquiraga jussieui</i>	S	.	II	III	I	II	.	.	
<i>Diplostegium empetrifolium</i>	S	.	II	III	II	I	.	1	
<i>Gaultheria glomerata</i>	S	.	III	II	.	I	1	2	
<i>Gaultheria amoena</i>	S	.	II	.	I	II	.	.	
<i>Orthrophium peruvianum</i>	H	1	III	III	II	III	2	1	
<i>Bomarea uncinifolia</i>	H	2	IV	III	I	III	1	2	
<i>Castilleja fissifolia</i>	H	.	III	II	I	III	1	.	
<i>Eryngium humile</i>	H	1	II	III	I	IV	3	1	
<i>Geranium sibbaldioides</i>	H	2	II	IV	I	III	1	1	
<i>Hieracium frigidum</i>	H	1	IV	II	II	III	1	2	
<i>Bomarea brachysepala</i>	H	1	IV	II	I	III	2	2	
<i>Galium hypocarpium</i>	H	2	III	III	II	II	.	1	
<i>Arracacia xanthorrhiza</i>	H	1	II	II	I	III	2	1	
<i>Gregia mulfordii</i>	H	2	III	II	.	II	2	2	
<i>Bidens andicola</i>	H	.	III	III	I	III	.	1	
<i>Gentianella rapunculoides</i>	H	.	III	II	I	II	.	1	
<i>Hypochaeris radicata</i>	H	.	III	I	.	II	1	.	
<i>Cystopteris fragilis</i>	F	1	III	III	II	II	2	1	
Ch Neurolepio/-ietum laegaardii / -typicum									
<i>Brachyotum campanulare</i>	S	.	V	V	.	.	.	.
<i>Clethra fagifolia</i>	S	.	III	IV	I	.	.	.	
<i>Lomatia hirsuta</i>	S	.	III	III	II	.	.	.	
<i>Montacalia peruviana</i>	S	1	III	I	.	.	.	.
<i>Neurolepis laegaardii</i>	H	3	V	V	.	I	.	.	
<i>Paepalanthus meridensis</i>	H	3	V	I	.	I	2	.	
<i>Lachemilla nivalis</i>	H	1	III	IV	II	I	.	.	
<i>Chusquea tessellata</i>	H	1	II	III	II	.	.	.	
<i>Calceolaria nivalis</i>	H	1	IV	.	.	.	.	.
<i>Castilleja ecuadorensis</i>	H	.	III	II	I	I	.	.	
<i>Sticherus lechleri</i>	F	3	V	I	.	I	.	.	
<i>Lycopodium jussiae</i>	F	1	III	IV	I	I	.	.	
Ch Neurolepietum laegaardii - Geonometum weberbaueri									
<i>Geonoma weberbaueri</i>	S	3	.	.	.	.	.	2
<i>Miconia theazans</i>	S	3	.	.	.	.	.	.
<i>Mezobromelia fulgens</i>	E	3	.	.	.	.	.	.
D Neurolepietum laegaardii typicum									
<i>Hypericum decandrum</i>	T	.	III	I	.	2	1	.	
<i>Brachyotum andreanum</i>	S	1	III	.	.	.	.	.
<i>Lysimachia andina</i>	H	.	III	.	.	.	.	1
<i>Fuchsia steyermarkii</i>	H	.	III	.	.	.	.	.
<i>Sisyrinchium tinctorum</i>	H	1	II	I	.	.	.	.
<i>Neurolepis weberbaueri</i>	H	1	III	.	.	.	.	.
<i>Huperzia reflexa</i>	F	1	II	I	.	.	.	.
Ch Gynoxion cucochensis									
<i>Weinmannia cochensis</i>	T	.	III	V	V	I	.	.	
<i>Gynoxis cucochensis</i>	S	.	I	V	V	I	.	.	
<i>Disterigma acuminatum</i>	S	.	.	V	III	I	.	.	
<i>Miconia bullata</i>	S	.	I	V	V	.	.	.	
<i>Clusia elliptica</i>	S	3	.	III	IV	.	.	3	
<i>Chusquea perligulata</i>	H	1	.	II	IV	.	.	.	
<i>Lycopodium vestitum</i>	F	.	I	IV	IV	I	.	.	
Gynoxietum cucochensis									
<i>Miconia ledifolia</i>	S	.	.	IV	.	.	.	.
<i>Chusquea loxensis</i>	H	.	.	V	.	.	.	.
<i>Asplenium triphyllum</i>	F	.	I	III	.	.	.	.
Vegetation unit									
Ch Neurolepietum aristatae		1	2	3	4	5	6,1	6,2	7
<i>Weinmannia fagaroides</i>	S	3	III	V	V	I	.	.	
<i>Miconia dodsonii</i>	H	.	.	.	IV	.	.	.	
<i>Neurolepis aristata</i>	H	.	.	I	V	.	.	.	
<i>Chusquea leonardiorum</i>	H	.	.	.	V	.	.	.	
<i>Rumex tolimensis</i>	H	.	.	.	III	.	.	1	
<i>Neurolepis nana</i>	H	.	.	.	III	.	.	.	
<i>Gentianella fastigiata</i>	H	.	.	.	II	.	.	.	
Ch Puyetum eryngioides									
<i>Loricaria complanata</i>	S	.	.	.	III	2	2	.	
<i>Calamagrostis intermedia</i>	H	.	.	.	V	3	2	.	
<i>Puya eryngioides</i>	H	.	.	.	V	3	2	.	
<i>Lycopodiella cernua</i>	F	2	.	I	.	V	3	1	
<i>Huperzia hypogaea</i>	F	.	.	.	IV	2	2	.	
<i>Jamesonia pulchra</i>	F	.	II	I	.	IV	3	2	
<i>Pedicularis incurva</i>	H	.	II	.	III	2	1	.	
<i>Rhynchospora ruiziana</i>	H	.	.	.	V	3	.	.	
<i>Dicksonia sellowiana</i>	F	.	.	.	IV	3	.	.	
<i>Halenia weddeliana</i>	H	.	.	.	I	III	1	.	
<i>Grammitis paramicola</i>	F	1	I	.	IV	.	.	.	
<i>Lupinus semperflorens</i>	H	.	.	.	III	.	.	.	
<i>Orthrosantus chimboracensis</i>	H	1	I	.	III	.	.	.	
<i>Arenaria lanuginosa</i>	H	.	.	.	III	.	.	.	
<i>Cerastium mollissimum</i>	H	.	.	.	II	1	.	.	
<i>Senecio chinogeton</i>	H	.	.	I	I	II	.	.	
<i>Blechnum auratum</i>	F	.	II	.	I	.	.	.	
<i>Valeriana convallarioides</i>	H	.	.	I	II	.	.	.	
Ch Epidendretum frigidiae /-typicum									
<i>Epidendrum fimbriatum</i>	H	.	.	.	.	3	3	.
<i>Epidendrum frigidum</i>	H	.	.	.	.	3	3	.
<i>Eriocaulon microcephalum</i>	H	.	.	.	.	3	3	.
<i>Epidendrum macrostachyum</i>	E	.	.	.	.	3	3	.
Epidendretum frigidiae - Pitcairnia trianae facies									
<i>Pitcairnia trianae</i>	H	3	.	.	.	3	.	.	
D Epidendretum frigidiae -typicum									
<i>Loricaria thuyoides</i>	S	.	.	.	I	.	3	.	
<i>Dorobaea pimpinellifolia</i>	H	.	.	.	IV	3	3	.	
<i>Neurolepis asymmetrica</i>	H	2	IV	III	.	.	3	.	
<i>Lycopodium thyoideis</i>	F	3	.	.	I	.	3	.	
Ch Puyetum nitidae									
<i>Brachyotum fraternum</i>	S	.	.	I	I	.	.	3	
<i>Puya nitida</i>	H	.	III	I	IV	3	3	3	
<i>Xyris revoluta</i>	H	.	.	.	.	.	.	3
<i>Disticha acicularis</i>	H	.	.	.	.	.	.	3
<i>Isoetes ecuadoriensis</i>	H	.	.	.	.	.	.	3
<i>Isolepis inundata</i>	H	.	.	.	.	.	.	3
<i>Azorella biloba</i>	H	.	.	.	.	.	.	3
<i>Ortrophium mucidum</i>	H	.	I	.	.	.	.	3
<i>Plantago rigida</i>	H	.	.	I	.	.	.	3	
<i>Valeriana rigida</i>	H	.	.	.	I	.	.	3	
<i>Xenophyllum humile</i>	H	.	.	.	.	.	.	3
<i>Azorella aretioides</i>	H	.	.	.	.	.	.	2
<i>Gentiana sedifolia</i>	H	.	.	.	.	.	.	2
<i>Pinguicula calyptata</i>	H	.	.	.	.	.	.	2
<i>Rostkovia magellanica</i>	H	.	.	I	.	.	.	2	
<i>Scirpus rigidus</i>	H	.	.	.	.	.	.	2
<i>Ranunculus peruvianus</i>	H	.	.	.	.	.	.	2
<i>Oreobolus goeppingeri</i>	H	.	.	.	.	.	.	2
<i>Juncus microcephalus</i>	H	.	.	.	I	1	1	2	
<i>Tofieldia falcata</i>	H	.	I	.	.	.	.	1
<i>Tofieldia sessiliflora</i>	H	.	.	.	I	.	.	2	
<i>Ranunculus gusmanii</i>	H	.	.	.	.	.	.	2
<i>Hydrocotyle tamalomaensis</i>	H	.	.	.	.	.	.	1
<i>Oreobolus ecuadorensis</i>	H	.	.	.	.	.	.	2

Tab. 10: Synoptic table Neurolepio – Puyetalia.

Vegetation unit	1	2	3	4	5	6,1	6,2	7
Companions Neurolepio/-ietum laeгаardii								
<i>Bromus pitensis</i>	H	I	I	III	.	.	.	.
<i>Muehlenbeckia tamnifolia</i>	H	.	II	III	II	.	.	.
<i>Gentianella cerastioides</i>	H	.	II	I	.	.	.	.
<i>Lachemilla pectinata</i>	H	.	.	III	.	.	.	.
Companions Neurolepietum laeгаardii - Brachyotetosum andreani								
<i>Vaccinium crenatum</i>	S	.	II	.	.	.	.	.
<i>Muehlenbeckia tilifolia</i>	H	.	I	I	I	.	.	.
<i>Ranunculus praemorsus</i>	H	.	III	.	.	.	.	.
<i>Festuca cucullata</i>	H	.	II	.	.	.	.	.
<i>Gentianella oellgaardii</i>	H	.	II	.	.	.	.	.
<i>Gentianella polyantha</i>	H	.	I	.	.	.	.	.
<i>Halenia longicaulis</i>	H	.	II	.	.	.	.	.
<i>Galium corymbosum</i>	H	.	I	I	.	.	.	.
<i>Lysipomea bilineata</i>	H	.	I	.	.	.	.	.
<i>Lysipomea caespitosa</i>	H	.	I	.	.	.	.	.
<i>Lysipomea crassomarginata</i>	H	.	I	.	.	.	.	.
<i>Lachemilla orbiculata</i>	H	.	I	.	.	.	.	.
<i>Bomarea uncinifolia</i>	L	1	III	.	.	.	.	.
<i>Bomarea multipes</i>	L	1	II	I	.	.	.	.
<i>Jungia coarctata</i>	L	1	II	.	.	.	.	.
Companions Puyetum eryngioidis								
<i>Juncus arcticus</i>	H	.	II	.	II	1	.	.
<i>Juncus stipularis</i>	H	.	.	.	II	.	.	.
<i>Calamagrostis incurvophylla</i>	H	.	.	I	II	.	.	.
<i>Galium pseudotriflorum</i>	H	.	.	.	II	.	.	.
<i>Senecio tephrosoides</i>	H	.	.	.	II	.	.	.
<i>Stipa ichu</i>	H	.	.	.	I	.	.	.
<i>Aa denticulata</i>	H	.	I	.	I	.	.	.
<i>Altesteinia virescens</i>	H	.	.	.	I	.	.	.
<i>Aa riobambae</i>	H	.	.	.	I	.	.	.
<i>Paepalanthus celsus</i>	H	.	.	.	I	.	.	.
<i>Huperzia arcuata</i>	H	.	.	.	I	1	.	.
<i>Huperzia columnaris</i>	F	.	I	.	I	.	.	.
<i>Huperzia compacta</i>	F	.	.	.	I	.	.	.
<i>Huperzia brevifolia</i>	F	.	.	.	I	.	.	.
<i>Huperzia affinis</i>	FE	.	.	.	I	1	.	.
<i>Bomarea hartwegii</i>	L	.	.	.	.	1	.	.
<i>Bomarea isopetala</i>	L	.	.	.	.	.	1	.
<i>Huperzia campania</i>	F	.	.	.	I	.	.	.
Companiony Puyetum / Epidendretum								
<i>Gaultheria lanigera</i>	S	.	.	.	II	.	.	.
<i>Gaultheria tomentosa</i>	S	.	.	.	II	.	2	.
<i>Chrysactinium acaule</i>	H	.	.	.	III	1	1	2
<i>Oritrophium repens</i>	H	.	.	.	II	2	1	2
<i>Lysipomea lariciana</i>	H	.	.	.	III	.	1	2
<i>Hypochoeris sessilifolia</i>	H	.	I	.	II	.	2	2
<i>Juncus capillaceus</i>	H	.	.	.	II	1	1	1
<i>Bartsia crisafullii</i>	H	.	II	.	I	II	1	.
<i>Anthoxanthum odoratum</i>	H	1	I	.	II	2	.	1
<i>Lycopodiella alopecuroides</i>	F	.	.	.	II	3	1	2

Vegetation unit	1	2	3	4	5	6,1	6,2	7
<i>Ophioglossum crotalophoroides</i>	F	.	.	.	.	.	.	2
Companions Neurolepio - Puyetalia								
<i>Carex lehmanniana</i>	.	1	II	III	.	I	1	.
<i>Bartsia melampyroides</i>	.	1	III	.	I	I	.	.
<i>Juncus ecuadoriensis</i>	.	.	III	I	I	I	1	1
<i>Cynoglossum amabile</i>	.	1	II	I	.	I	.	.
<i>Werneria nubigena</i>	.	.	I	I	.	I	.	1
<i>Geranium chilloense</i>	.	1	I	I	I	I	.	.
<i>Geranium diffusum</i>	.	1	II	I	.	I	.	.
<i>Rhynchospora paniculata</i>	.	.	III	.	I	I	.	.
<i>Hydrocotyle bonplandii</i>	.	.	II	.	.	I	1	.
<i>Hydrocotyle hitchcockii</i>	.	1	II	I	.	I	.	.
<i>Lysipomea oellgaardii</i>	.	.	I	.	.	I	.	.
<i>Juncus imbricatus</i>	.	1	.	.	.	.	.	.
<i>Woodсия montevidensis</i>	.	1	II	.	.	I	.	.
<i>Huperzia kuestneri</i>	.	.	I	.	.	.	.	.
<i>Huperzia loxensis</i>	I	I	.	.
<i>Huperzia weberbaueri</i>	I	.	.
<i>Huperzia capellae</i>	.	.	I	.	.	I	.	.
<i>Bomarea torta</i>	.	.	I	.	.	I	.	.
<i>Bomarea longipes</i>	.	1	.	.	I	.	.	.

T: Tree S: Shrub FT: Treefern H: Herb E: Epiphytic herb EF: Epiphytic fern P: Parasite L: Liana

Tab. 10: Synoptic table Neurolepio – Puyetalia.

