

# First Community in Abandoned Pasture Lands or Crops in Eastern Cuba's Rainforest over Metamorphic Rocks

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**Abstract:** *Miconio prasinae*–*Cyatheion arboreae* alliance is described. Although it has five associations, we address three in this work, corresponding to immediate, secondary and early successional communities in abandoned pasture lands or crops in submountains rainforest over metamorphic rocks. The objective of this work is to study the first communities in used and abandoned fields, because they are of a great importance in the understanding of the vegetation's evolution and for management purposes. In the submontane forest on the metamorphic complex, the destruction of mature vegetation produces important losses in climatic biodiversity and transcendental changes in ecosystem composition. The change in soil use, especially the transformation to pastureland, has favored the development of herbaceous and shrubby plant communities. This study is not only of practical relevance in describing the associations of the pine forests the plant associations and the study of the ecological conditions in which they develop, but its results can be used as a working tool in the environmental management and silviculture for the restoration of degraded areas. The study of diverse Cuban vegetation types suggests that the methodology of Zurich Montpellier's school is more effective as compared to other authors because its syntaxa is good to recognize and is able to transform in a forest typology. The main species are pioneers heliophilous with a type of "r" selection.

**Keywords:** Ecological Succession, Secondary Communities, Sierra del Purial, Eastern Cuba

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## 1. Introduction

Although there are some works about succession in Cuban forest [8, 15, 16]; there was not enough those made on mountain areas [18].

In submountain rainforest over metamorphic complex [18] destruction of maturity vegetation produce important loses in climatic biodiversity and transcendental changes in ecosystemic composition. In a similar ecosystem Caluff [4] and Sanchez-Ruiz [22, 23] had quantify heavy losses of pteridological and spiders diversity with the change of use of soils, getting the maximum with pasturelands transformation.

The objective of this work is to study the evolution of first communities in used and abandoned fields in the submountain rainforest ecotopes over metamorphic complex in rainiest areas of Cuban archipelago.

## 2. Methodology

### *Natural conditions of the studied area.*

The area is inside the more rainy territory of Cuban archipelago, between 2 500 to 3 000 mm [13] regularity distributed. Geology is represented by Sierra del Purial Formation [7], composed by different kind of schist, intermediate tuffs between other rocks. Relief is very dissected with slopes between 35 and 45° rarely less. Soil is ferrallitic red and leached red-brown colour [14], frequently little deep, over ferrallitic weathering crust.

### *Sampling methodology*

According to Braun Blanquet [3] methodology phytocoenological inventories (lists, stands, samples, relevés), with a minimum area of 625 m<sup>2</sup> [18] were made. In addition, observations of the ecotope (slope; exposition; altitude; general, nano and micro relief) were made in the

place of the samples and their surroundings.

For the characteristic combination of the associations, the species with degrees of presence IV and V [24] were used, and for the subassociations and variants the differential combinations.

Weber *et al.* [25] was followed for the categorization and the name of syntaxa. Completed scientific names (genus, species and author) are observed in Tables and Acevedo-Rodríguez & Strong [1], sometime amended by Greuter & Rankin Rodríguez [10, 11], Borhidi *et al.* [2] and Sanchez [20, 21]. Collected specimens are in Herbarium BSC.

### 3. Results

In this work the subsequent phytosociological arrangement was made:

*Clase Clidemio - Cyatheetea arboreae* Reyes *clas. nov.*

Holotypus: Andropogono-Coccocypsetalia lanceolati Reyes *ord. nov.*

Herbaceous and secondary scrub, constituted by the immediate and early secondary communities that develop in abandoned fields and slopes that are produced in the construction of the roads in areas of the submountain and mountain rainforests (sometimes known as cloud forests in the Antilles), it is generally rich in ferns.

The climate is tropical, with rainfall between 1 200 and 3 500 mm. It was studied in rainforest ecotopes in Nipe Sagua Baracoa and Sierra Maestra, observed in the Central Mountain Range of the Dominican Republic and similar types of vegetation were described from the mountains of Puerto Rico.

Character species. Strongly associated: *Cyathea arborea*, *Gleichenella pectinata*, *Sticherus bifidus*, *Lycopodiella cernua*, *Nephrolepis brownii*, *N. biserrata*, *Miconia umbellata*, *Clidemia hirta*, *Pitirogramma calomelanus*, *Rhytidophyllum exsertum*, favorably associated: *Myrsine coriacea*, *Desmodium triflorum*, *D. canum*, *D. axillare*, *Tibouchina longifolia*, *Spermacoce laevis*, *Andropogon virginicus*, *A. bicornis*, *Piper aduncum*, *Pluchea carolinensis*, *Miconia prasina*, *Phaius tankervilleae*, *Homolepis glutinosa*, *Coccocypselum lanceolatum* and *Mikania spp.*

This class has two orders that distinguish the two mountain massif of Eastern Cuba:

- 1) Andropogono-Coccocypsetalia lanceolati (in Sierra Maestra),
- 2) Clidemio-Cyatheetalia arboreae (in metamorphic rocks of Sagua Baracoa).

In this work is only described the order corresponding to

Sagua Baracoa.

*Clidemio-Cyatheetalia arboreae* Reyes *ord. nov.*

Holotypus: *Miconio prasinae-Cyatheion arboreae* all. *nov.*

Secondary scrub- and grasslands, constitute by immediate and early secondary communities developed in abandoned fields and pasture lands, and in produced talus (roadbanks) as a result of road built in ecotopes of rainforest over metamorphic rocks, it is generally rich in ferns. Weather is warm, tropical, with rainfall levels for about 1 200 to 3 500 mm.

Composition - characteristics species. *Cyathea horrida*, *C. arborea*, *Sticherus bifidus*, *Lycopodiella cernua*, *Tibouchina longifolia*, *Pitirogramma calomelanus*, *Nephrolepis brownii*, *N. biserrata*, *Miconia prasina*, *Piper aduncum*, *P. arboreum*, *Clidemia hirta*, *C. umbellata*, *Urena lobata*, *Desmodium triflorum*, *D. canum*, *Spermacoce laevis*, *Elephantopus scaber*, *Andropogon virginicus*, *A. bicornis*, *Bidens pilosa*, *Gleichenella pectinata*, *Rhytidophyllum exsertum*, *Pluchea carolinensis* and *Blechnum occidentale*.

Studied alliances:

- 1) *Miconio prasinae-Cyatheion arboreae*,
- 2) *Tibouchina longifoliae-Sticherion bifidi*.

In this work we only will study *Miconio prasinae-Cyatheion arboreae* alliance.

*Miconio prasinae-Cyatheion arboreae* Reyes *all. nov.*

Holotypus: *Clidemio-Cyatheetum arboreae* *ass. nov.*

Secondary scrub- and grasslands, constitute by immediate and early secondary communities developed in abandoned fields and pasture lands, as in talus (roadbanks) as a result of road built in ecotopes of rainforest over metamorphic rocks, it is generally rich in ferns. Weather is warm, tropical, with rainfall levels for about 1 200 to 3 500 mm.

Composition – characteristics species. Strongly associated: *Cyathea horrida*, favorably associated: *Cyathea arborea*, *Blechnum occidentale*, *Nephrolepis brownii*, *Miconia prasina*, *Piper aduncum*, *P. arboreum*, *Clidemia hirta*, *Urena lobata*, *Desmodium triflorum*, *D. canum*, *Spermacoce laevis* and *Elephantopus scaber*.

From five associations in these alliance we only will study three in this work.

Studied associations in this work:

- 1) *Neurolaeno lobatae-Lantinetum camarae*,
- 2) *Ureno lobatae-Miconietum prasinae*,
- 3) *Cyatheetum horrido arboreae*.

*Neurolaeno lobatae-Lantinetum camarae* Reyes *ass. nov.*  
Table 1, holotypus inv. 1.

**Table 1.** *Neurolaeno lobatae - Lantinetum camarae*. Presen=presence.

N. order	1	2	Presen
Altitude (mosl)	450	460	
Inclination (degrees)	60	20	
Exposition	N	NW	
E <sub>2</sub> - Shrub layer (covers %)	10	.	
E <sub>1</sub> - Herbaceous layer (%)	90	100	
N. species	41	35	38
Characteristics			
E <sub>2,1</sub> - <i>Lantana camara</i> L.	1.1	2.2	2(1-2)

N. order	1	2	Presen
<i>Clidemia umbellata</i> (Mill.) L. O. Wms.	1.1	+2	2(+1)
<i>Calyptronoma occidentalis</i> (Sw.) H. E. Moore	+1	+1	2(+)
E <sub>1</sub> - <i>Neurolaena lobata</i> (L.) R. Br. ex Cass.	3.2	3.2	2(3)
<i>Cyathea arborea</i> (L.) J. Sm.	1.2	r.1	2(r-1)
<i>Chromolaena odorata</i> (L.) R. Br.	1.1	+1	2(+1)
<i>Tibouchina longifolia</i> (Vahl) Baillon	1.1	+1	2(+1)
<i>Urena lobata</i> L.	1.1	+1	2(+1)
<i>Casearia sylvestris</i> Sw. var. <i>sylvestris</i>	+1	+1	2(+)
<i>Clidemia hirta</i> (L.) D. Don	1.1	+1	2(+1)
<i>Miconia prasina</i> (Sw.) DC.	r.1	+1	2(r-+)
<i>Pluchea carolinensis</i> (Jacq.) G. Don in Sweet.	+1	+1	2(+)
<i>Psidium guajava</i> L.	+1	r.1	2(r-+)
<i>Elephantopus scaber</i> L.	+1	+1	2(+)
<i>Coccocypselum herbaceum</i> Aubl.	r.1	1.2	2(r-1)
<i>Phaius tankervilleae</i> (Banks) Blume	r.1	r.1	2(r)
<i>Polygala leptocaulis</i> T. & G.	1.1	+1	2(+1)
<i>Stachytarpheta cayennensis</i> (L. C. Rich.) Vahl	+1	2.2	2(+2)
<i>Spermacoce laevis</i> Lam.	1.2	3.2	2(1-3)
<i>Rhynchospora colorata</i> (L.) H. Pfeiff.	r.2	2.2	2(r-2)
<i>Sida rhombifolia</i> L.	+1	3.2	2(+3)
<i>Pityrogramma calomelanus</i> (L.) Link	r.2	+2	2(r-+)
<i>Nephrolepis biserrata</i> (Sw.) Schott	+2	+2	2(+)
<i>Lygodium volubile</i> Sw.	r.1	r.1	2(r)
<i>Odontosoria aculeata</i> (L.) J. Sm.	+1	+1	2(+)

In addition. Inv. 1. *Zanthoxylum martinicense* (Lam.) DC. +1, *Guarea guidonia* (L.) Sleumer +1, *Solanum nigrum* L. +1, *Rhytidophyllum exsertum* Griseb. +1, *Desmodium canum* (J. F. Gmel.) Schinz & Thell. 1.1, *D. triflorum* (L.) P. DC. +1, *Miconia* sp. r.1, *Andropogon bicornis* L. +2, *Scleria secans* (L.) Britt. +2, *Lycopodiella cernua* (L.) Pic. Serm. +2, *Ludwigia octovalvis* (Jacq.) Raven r.1, *Cupania americana* L. +1, *Alchornea latifolia* Sw. +1, *Machaerina cubensis* (Kuk.) T. Koyama r.2, *Trema micranthum* (L.) Blume r.1, *Vernonia* sp. +1; Inv. 2. *Guettarda* sp. +1, *Triumfetta semitriloba* Jacq. +1, *Citharexylum fruticosum* L. r.1, *Solanum torvum* Sw. r.1, *Piper peltata* (L.) Miq. r.1, *Panicum* sp. 1.2, *Emilia sonchifolia* (L.) DC. r.1, *Andropogon virginicus* L. r.2, *Bactris cubensis* Burret (+1), *Adiantum pyramidale* (L.) Wild. +2.

In this phytocoenose is observed a pioneering group of heliophilous (sun-loving) species, synantropic much of them, that are absent in much of the advanced successional stages, between they: *Lantana camara*, *Neurolaena lobata*, *Chromolaena odorata*, *Polygala leptocaulis*, *Stachytarpheta cayennensis*, *Rhynchospora colorata*, *Solanum nigrum*, *S. torvum*, *Andropogon bicornis*, *A. virginicus*, *Ludwigia octovalvis*, *Emilia sonchifolia*, *Sida rhombifolia*, and other species (Table 1). Was study 12.02.2004 (N20°17.2', W74°43').

Ureno lobatae-Miconietum prasinae Reyes ass. nov. Table 2, holotypus inv. 1.

This early community is found in very relatively small

slopes to the areas (22 degrees) and in the superior part of the south slope of the hill, soils are ferralitics red, sometime leached soils with clay and loam, generally lacking gravels in the profile, internal drainage is good.

This pasture land has a dense shrublike-herbaceous layer with 100% cover, in the more developed areas there are some isolated specimens of *Byrsonima tetraphylla* and *Eugenia pinetorum* that reach eight meters.

More abundant specie is *Miconia prasina*, sometime abundant are *Nephrolepis brownii*, *Elephantopus scaber* and *Spermacoce laevis*, the rest with less cover (Table 2). Was characterized 13-15.02.2004 (N20°17.2', W74°43.4').

Table 2. Ureno lobatae-Miconietum prasinae.

N. order	1	2	3	4	5	Presen
Altitude (mosl)	580	590	540	540	560	
Inclination (degrees)	20	20	12	20	45	
Exposition	WSW	WSW	NW	W	SSW	
E <sub>3</sub> - Canopy layer (covers %)	.	.	20	.	30	
E <sub>2</sub> - Shrub layer (%)	80	100	85	.	90	
E <sub>1</sub> - Herbaceous layer (%)	85	20	100	100	95	
N. species	21	20	24	28	36	25.8
Characteristics						
E <sub>2,1</sub> - <i>Miconia prasina</i> (Sw.) DC.	4.4	5.5	5.5	4.3	5.5	5(4-5)
E <sub>1</sub> - <i>Urena lobata</i> L.	1.1	+1	1.1	1.1	+1	5(+1)
<i>Clidemia hirta</i> (L.) D. Don	1.1	r.1	r.1	1.1	+1	5(r-1)
<i>Spermacoce laevis</i> Lam.	r.1	r.1	1.1	3.2	+1	5(r-3)
<i>Elephantopus scaber</i> L.	r.1	+1	1.1	3.2	1.1	5(r-3)
<i>Nephrolepis brownii</i> (Desv.) Hovenk. & Miyam.	4.3	+2	4.4	+2	+2	5(+4)
E <sub>2,1</sub> - <i>Cupania americana</i> L.	r.1	r.1	r.1	.	2.1	4(r-2)
E <sub>1</sub> - <i>Desmodium axillare</i> (Sw.) P. DC.	1.2	.	1.2	+1	+1	4(+1)
<i>Axonopus compressus</i> (Sw.) Beauv.	+2	1.2	1.2	r.2	.	4(r-1)

N. order	1	2	3	4	5	Presen
L- <i>Mikania micrantha</i> Kunth	+1	r.1	r.1	r.1	.	4(r+)
Accompaniers						
E <sub>2,1</sub> - <i>Psidium guajava</i> L.	r.1	.	.	+1	1.1	3(r-1)
E <sub>1</sub> - <i>Guarea guidonia</i> (L.) Sleumer	r.1	.	r.1	.	+1	3(r+)
<i>Triunfetta semitriloba</i> Jacq.	r.1	.	+1	+1	.	3(r+)
<i>Tibouchina longifolia</i> (Vahl) Baillon	.	r.1	.	+1	r.1	3(r+)
<i>Stachytarpheta cayennensis</i> (L. C. Rich.) Vahl	r.1	r.1	.	1.1	.	3(r-1)
<i>Scleria secans</i> (L.) Britt.	1.2	+2	2.2	.	.	3(+2)
<i>Lycopodiella cernua</i> (L.) Pic. Serm.	1.2	.	.	1.1	+1	3(+1)
<i>Desmodium triflorum</i> (L.) P. DC.	.	r.2	.	+2	+2	3(r+)
<i>Opismenus setarius</i> (Lam.) R. & S.	.	+2	1.2	.	1.2	3(+1)
<i>Scleria lithosperma</i> (L.) Sw.	.	r.2	.	2.2	3.2	3(r-3)
<i>Spathoglottis plicata</i> Blume	.	r.2	r.1	.	+1	3(r+)
<i>Blechnum occidentale</i> L.	.	r.2	2.2	.	4.3	3(r-4)
E <sub>2,1</sub> - <i>Piper aduncum</i> L.	.	.	.	2.1	r.1	2(r-2)
E <sub>1</sub> - <i>Piper umbellatum</i> L.	.	r.1	.	r.1	.	2(r)
<i>Andropogon bicornis</i> L.	+2	.	.	2.2	.	2(+2)
<i>Hyptis verticillata</i> Jacq.	.	.	.	r.1	r.1	2(r)
<i>Desmodium canum</i> (J. F. Gmel.) Schinz & Thell.	.	.	.	1.2	+2	2(+1)
<i>Cyathea horrida</i> L.	r.2	r.2	.	.	.	2(r)
L- <i>Turbina corymbosa</i> (L.) Hall.	r.1	r.1	.	.	.	2(r)

In addition. Inv. 1. *Coccocypselum herbaceum* Aubl. +2, *Passiflora suberosa* L. r.1; Inv. 2. *Gleichenella pectinata* (Willd.) Ching 2.2; Inv. 3. *Bactris cubensis* Burret r.1, *Schefflera morototoni* (Aubl.) Mag., Stey. & Frodin r.1, *Calyptronoma occidentale* (Sw.) H. E. Moore +1, *Buchenavia tetraphylla* (Aubl.) R. A. Howard (+1), *Telypteris reticulata* (L.) Proctor r.2, *Guazuma ulmifolia* Lam. r.1, *Zyzygium jambos* (L.) Alston r.1, *Pisonia aculeata* L. r.1; Inv. 4. *Chromolaena odorata* (L.) King & Robins. 1.1, *Vernonia cinerea* (L.) Less. r.1, *Sida rhombifolia* L. r.1, *Canavalia* sp. r.1, *Clidemia umbellata* (Mill.) L. O. Wms. r.1, *Mimosa pudica* L. +1, *Spiranthes lanceolata* (Aubl.) León r.1; Inv. 5. *Sapium jamaicense* Sw. +1, *Chrysophyllum oliviforme* L. 1.1, *Cecropia peltata* L. +1, *Cyathea arborea* (L.) J. Sm. +1, *Clusia rosea* Jacq. 1.2, *Spondias mombin* L. +1, *Alchornea latifolia* Sw. r.1, *Rhytidophyllum exsertum* Griseb. 1.1, *Eugenia pinetorum* Urb. +1, *Phaius tankervilleae* (Banks) Blume r.1, *Macrotelypteris torresiana* (Gaudich.) Ching r.2, *Adiantum* sp. +2, *Guzmania monostachia* (L.) Rusby ex Mez +2, *Solanum antillarum* O. E. Schulz. r.1, *Vitis tiliifolia* H. & B. 1.1, *Lygodium volubile* Sw. r.1.

*Cyatheetum horrido arboreae* Reyes ass. nov. Table 3, holotypus inv. 1.

This phytocoenose represent an early community formed for the abandonment of a pasture land and a crop field respectively in northern expositions. Nowadays constitute a Homeostasis I and beginning of Fiera II also, in which mainly *Cyathea arborea* constitute a dominant layer between 7 and 10 m high.

It is developed over a yellow and leached ferrallitic soil, loamed and with gravels, in which is observed a dense rootlets (rhizoids) of the tree fern before mentioned in the first 4 or 5 cm of the profile, at 10 cm deep this rhizoids are not found. The humus layers are absent, principally fronds of dominant fern are observed; is considered that moreover of a fast decomposition, because of the big slope the formed

humus will be drag for the intensity of rainfalls.

In the inventory 2 is observed that trees break the *Cyathea arborea* layer and interact between them, beginning the stage knowing as Fiera II. The species here present are: *Ficus membranacea*, *Cupania glabra*, *C. americana*, *Cecropia peltata*, *Cordia sulcata*, *Guarea guidonia*, *Casearia sylvestris* subsp. *syvestris*, *Zanthoxylum martinicense* and *Spondias mombin*.

The shrub layer is very variable in its cover the more prominent specie is *Miconia prasina* and in the second inventor also *Calyptronoma occidentale*, and the rest have less cover. The herbaceous layer is the more floral diverse, the majority of species are scarcely (Table 3). In the 15.02.2004 (N20°17', W74°43.4') was study.

Table 3. *Cyatheetum horrido arboreae*.

N. order	1	2	Presen
Altitude (mosl)	480	300	
Inclination (degrees)	40	50	
Exposition	NNW	NNE	
E <sub>3</sub> - Canopy layer (%)	60	70	
E <sub>2</sub> - Shrub layer (%)	10	60	
E <sub>1</sub> - Herbaceous layer (%)	80	50	
N. species	26	39	32.5
Characteristics			
E <sub>3,2</sub> - <i>Cyathea arborea</i> (L.) J. Sm.	4.4	3.2	2(3-4)
<i>Cordia sulcata</i> DC.	+1	+1	2(+)
E <sub>3,2,1</sub> - <i>Cupania americana</i> L.	+1	1.1	2(+1)
E <sub>3,1</sub> - <i>Casearia sylvestris</i> Sw. subsp. <i>syvestris</i>	+1	+1	2(+)
E <sub>2,1</sub> - <i>Miconia prasina</i> (Sw.) DC.	3.2	3.1	2(3)
<i>Cyathea horrida</i> (L.) Sm.	1.1	1.1	2(1)
<i>Calyptronoma occidentale</i> (Sw.) H. E. Moore	r.1	2.1	2(r-2)
<i>Rhytidophyllum exsertum</i> Urb.	+1	+1	2(+)

N. order	1	2	Presen
E <sub>2</sub> - <i>Chrysophyllum argenteum</i> Jacq.	+1	1.1	2(+1)
E <sub>1</sub> - <i>Dendropanax arboreus</i> Dcne. & Planch.	r.1	+1	2(r+)
<i>Phaius tankervilleae</i> (Banks) Blume	+1	+1	2(+)
<i>Piper arboreum</i> Aubl.	r.1	+1	2(r+)
<i>Clidemia hirta</i> (L.) D. Don	r.1	+1	2(r+)
<i>Danaea elliptica</i> Sm.	r.1	+1	2(r+)
Ep- <i>Columnnea cubensis</i> (Urb.) Britt.	+1	+1	2(+)

In addition. Inv. 1. *Panicum* sp. 3.2, *Scleria melaleuca* Reichb. +2, *Coccocypselum herbaceum* Aubl. r.1, *Neurolaena lobata* (L.) R. Br. r.1, *Miconia* sp. r.1, *Hemidictyum marginatum* (L.) C. Presl r.1, *Diplazium unilobum* (Poir.) Hieron. r.2, *Adiantum pyramidale* (L.) Wild. +2, *Lygodium volubile* Sw. +1, *Platygyne* sp. +1, *Pentalinon luteum* (L.) Hansen & Wunderlin r.1; Inv. 2. *Ficus membranacea* C. Wr. +1, *Cupania glabra* Sw. 2.1, *Guarea guidonia* (L.) Sleumer +1, *Cecropia peltata* L.+1, *Zanthoxylum martinicense* (Lam.) DC. +1, *Spondias mombin* L. +1, *Piper aduncum* L. +1, *Psychotria grandis* Sw. +1, *Pavonia fruticosa* (Mill.) Fawcett & Rendle +1, *Desmodium canum* (J. F. Gmel.) Schinz & Thell. r.1, *D. triflorum* (L.) P. DC. 2.1, *Costus cylindricus* Jacq. +1, *Conostegia xalapensis* D. Don +1, *Elephantopus scaber* L. r.1, *Tibouchina longifolia* (Vahl) Baillon +1, *Begonia wrightiana* A. DC. +1, *Schefflera morototoni* (Aubl.) Mag., Stey. & Frodin +1, *Commelina* sp. r.1, *Tournefortia bicolor* Sw. +1, *Gesneria* sp. +1, *Rhynchospora colorata* (L.) H. Pfeiff. r.2, *Urena lobata* L. r.1, *Passiflora sexflora* A. Juss. +1, *Psychotria Greeneana* Urb. r.1.

## 4. Discussion

In the syntaxa evolution of submountain rainforest over metamorphic rocks [19], when a secondary stage (field or pasture land) is cut, burn and late abandoned it will conform a immediate secondary community like *Neurolaena lobatae* - *Lantana camarae* association.

Result very interesting to observe how during these first stages of the serie the majority of species are of herbaceous type, frequently with ferns dominance. However with the succession advanced process (immediat, early and late communities) obviously the structural complexity grow (Table 3).

Its consolidate the concept that in this first stages of the serie almost the totality of species are heliophilous mainly with a type of "r" selection [9, 19] and only exceptionally arboreal elements of mature rainforest are found [18].

It is confirmed that in the studied area, due the great levels of precipitations and its relatively uniformity, in the Homeostasis I a differentiation of associations is produced as a function of exposure. The elements of the north exposure develop a dominant community of *Cyathea arborea*, while those that evolutioned in south exposure *Miconia prasina* is the predominant. This is also a coincidence with the importance of this exposition for the cultivation of arum (*Xanthosoma sagittifolium* Schott.); R. Ruiz (com. pers.) said that arum cultivate in north exposure putrefy, while in south exposure has a normal develop.

It is to important to emphasize how in the developed communities with tree ferns predominance its rhizoids conform a dense layer that protect the soil against the erosion, which is a coincidence that soft roots predominate in this first stages [5, 6]. This communities are very similar to the humid forest of México where *Cyatheaceae* are very distinguished elements [17].

It is outstanding that in the Fiera II beginning for be located in the surrounded of a mature forest the seeds rain function have a great efficiency to arboreal species enter. Is also considered that in this stages the majority of biomass found as stems and leaves, frequently is not woody [12].

## 5. Conclusions

When a secondary succession developed, in the first stages, communities are represented mainly by herbaceous pioneers heliophilous with a type "r" selection that are also generalist species. We also observed that in the Homeostasis I, with a small arboreal layer, the exposition defines the dominant species in the canopy in these places with leached ferrallitic soil originating from metamorphic rocks with 2,500 to 3,000 mm annual rainfall. It is also considered that canopy species entry is produced in the surroundings of the forest as a result of seeds rain.

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