

Tibouchino longifoliae-Sticherion bifidi alliance in rainforest on metamorphic rocks

Abstract

By using Braun Blanquet methodology *Tibouchino longifoliae* - *Sticherion bifidi* was studied restricted to the banks made with bulldozer during the build of roads in Sierra del Purial and Maquey geological formations rocks in the more rainy zone of the Cuban archipelago. Generally it is found between 30 to 80 degrees slopes over schists banks of ferralitic soils. They are secondary meadow, composed for the immediate secondary communities generally rich in ferns, the greatest number of species that make up this alliance are heliophilous. Three associations were found *Nephrolepido biserratae* - *Bidentetum pilosi*, *Pitirogrammo calomelani* - *Rhytidophylletum exserti* and *Stichero bifidi* - *Gleichenelletum pectinatae* that are subassociations and variants. Weather is tropical with rainfalls between 1200 and 2500 mm.

Keywords: Secondary succession, phytocoenoses, rainforest zones. Eastern Cuba

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Orlando J Reyes, Félix Acosta Cantillo, Pedro Bergues Garrido

Eastern Center of Ecosystems and Biodiversity (BIOECO),
Ministry of Science, Technology and Environment, Cuba

Correspondence: Orlando J Reyes, Eastern Center of Ecosystems and Biodiversity (BIOECO), Ministry of Science, Technology and Environment, José A. Saco Nr. 601, esq. Barnada, CP 90 100. Tel 22626568, Santiago de Cuba, Cuba, Email joe@bioeco.cu

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Introduction

The secondary succession realize's when in the place a evolve ecosystem hatte (exist), following destructions or abandonment of pastures and farms with good ecotopes for the next community with high evolutions needs develops.¹⁻³

Secondary succession occurs when there was already an evolved ecosystem in place, which is destroyed, leaving a developed edaphotope capable of allowing the growth of elements with high needs.¹⁻³

When a cross section is produced by a bulldozer for the circulation plat in a mountain area a bank as result is produced where layers of existing soils or rocks of the place are exposed. Resulting in a difficult soil conditions for the plants development depending principally of the easily disgregation or the degree of weathering in present rocks.

The big part of the studied area belongs to the Sierra del Purial geological formation⁴ and the more rainy zone of Cuban archipelago,⁵ coinciding with the submountain rainforest over metamorphic rocks.⁶

The objective of this work is to study the phytocoenoses developed over the before described banks.

Methodology

Natural conditions of the studied area

The area is inside the more rainy territory of Cuban archipelago, between 2500 to 3000 mm regularity distributed. Geology is represented by Sierra del Purial Formation, composed by different kind of schist, intermediate tuffs between other rocks. Relief is much dissected with slopes between 35 and 45° rarely less.

Soil is ferralitic red and leached red-brown colour, frequently little deep, over ferralitic weathering crust.⁷

Sampling methodology

According to Braun Blanquet methodology⁸ phytocoenological inventories (lists, stands, samples, relevés), with a minimum area of 100 m² were made, according to banks form, the samples were more long than width. In addition, observations of the oecotope (soils and rocks conditions; 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 V⁹ were used, and for the subassociations and variants the differential combinations.

Weber et al.¹⁰ was followed for the categorization and the name of syntaxa. Completed scientific names (genus, species and author) are observed in Tables and¹¹ sometime amended by¹²⁻¹⁶ collected specimens are in Herbarium BSC.

Results

According to exponed phytocoenoses the following community organization is found:

a) *Class Clidemio - Cyatheetea arborea* Reyes 2021

(Holotypus: *Clidemio* - *Cyatheetalia arborea* Reyes 2021).

Studied alliance in this work: *Tibouchino longifoliae* - *Sticherion bifidi*.

b) Alliance: *Tibouchino longifoliae* - *Sticherion bifidi* Reyes all. nov

(Holotypus: *Pitirogrammo calomelani* - *Rhytidophylletum villosuli* ass. nov.)

Secondary meadow, composed for the immediate secondary communities developed on produced banks as results of roads build in submountain rainforest areas over metamorphic rocks generally rich in ferns. Weather is tropical with rainfalls between 1200 and 2500 mm.

Composition - Characteristics species: *Sticherus bifidus*, *Gleichenella pectinata*, *Pitirogramma calomelanus*, *Lycopodiella cernua*, *Nephrolepis biserrata*, *Tibouchina longifolia*, *Clidemia umbellata*, *Andropogon virginicus*, *A. bicornis*, *Bidens pilosus*, *Rhytidophyllum exsertum*, *Pluchea carolinensis* and *Mikania micrantha*.

Studied associations:

- Nephrolepido biserratae* - *Bidentetum pilosi*,
- Pitirogrammo calomelani* - *Rhytidophylletum exserti*,
- Stichero bifidi* - *Gleichenelletum pectinatae*.

a) *Nephrolepido biserratae - Bidentetum pilosi* Reyes ass. nov.

(Table 1, holotypus inv. 1.)

This immediate secondary community is present in the bank made by the employed bulldozer for road build, as a result there's a practically vertical rock wall where is too difficult the growth of plants. This community is developed over exposed cross on Maquey's formation, formed by stratified and fissured layers, sometimes with terrigenous zones with a strong acid react.

Inclination of these banks varying between 45 to 85 degrees, mainly

between 70 and 85, not permitting the develop and accumulation of soils, so the plants are fixed to the fissures and more weathered areas. Altitude is for about 400 mosl and exposition is variable, mainly north. Rain is between 1200 and 1400 mm.

This association with 32,7 species average present a relatively single structure, due its topographic position only have an herbaceous layer between, 0,50 and 1,50 m high, cover fluctuate for 70 to 100 %. Frequently mossy layer is observed between 20 and 80 %, composed by diverse mosses species. Characteristic combination is observed in Table 1.

Table 1 *Nephrolepido biserratae - Bidentetum pilosi* in banks of roads

Variants	<i>Lycopodiella cernua</i>		<i>Pteris longifolia</i>		<i>Macropitium lathyroides</i>		
	1	2	3	4	5	6	7
N. order	1	2	3	4	5	6	7
Altitude (mosl)	390	390	380	400	390	400	400
Inclination of banks (degrees)	85	85	80	70	50	85	45
Exposition	NE	NE	NE	N	SW	SE	N
E ₁ - Herbaceous layer (coverage %)	90	80	70	90	90	85	100
Moss layer (%)	80	40	.	20	20	.	80
N. species	31	27	31	40	29	32	39
Characteristics							
E ₁ - <i>Piper aduncum</i> L.	l	l	l	l	.	+	2
<i>Nephrolepis biserrata</i> (Sw.) Schott	2	3	3	.	l	+	+
<i>Bidens pilosus</i> L.	+	.	2	2	2	4	+
<i>Chromolaena odorata</i> (L.) King & Robins.	+	+	+	.	3	3	+
<i>Desmodium axillare</i> (Sw.) P.DC.	l	+	l	2	l	+	+
<i>Urena lobata</i> L.	r	r	.	+	2	r	+
<i>Spermacoce laevis</i> Lam.	r	r	r	r	r	+	+
<i>Paspalum notatum</i> Flüggé	r	+	r	l	+	+	+
<i>Andropogon virginicus</i> L.	.	r	+	2	+	+	+
<i>Mimosa pudica</i> L.	r	r	r	r	r	+	+
<i>Mikania micrantha</i> Kunth	r	+	.	+	r	+	+
<i>Andropogon bicornis</i> L.	l	.	3	.	+	+	3
<i>Tibouchina longifolia</i> (Vahl) Baillon	l	+	+	+	.	.	+
<i>Phyla nodiflora</i> (L.) Greene	r	r	r	r	.	2	.
<i>Emilia sonchifolia</i> (L.) DC.	r	.	+	+	.	r	r
<i>Desmodium canum</i> (J.F.Gmel.) Schinz & Thell.	r	.	+	.	l	r	+
<i>Ipomoea alba</i> L.	r	.	.	r	r	r	r
<i>Lycopodiella cernua</i> (L.) Pic.-Serm.	4	3	.	.	.	.	.
<i>Sticherus bifidus</i> (Willd.) Ching	l	2	.	.	.	.	.
<i>Clidemia hirta</i> (L.) D. Don	r	+	.	.	r	.	.
<i>Pitirogramma calomelanus</i> Link	l	l	l	.	.	.	.
<i>Elephanthopus mollis</i> Kunth	r	r	.	.	.	.	.
<i>Pteris longifolia</i> L.	.	.	2	+	.	.	.
<i>Desmodium triflorum</i> (L.) P.DC.	.	.	l	+	.	.	.
<i>Leptilon pusillum</i> (Nutt.) Britt.	.	.	r	r	.	.	.
<i>Macropitium lathyroides</i> (L.) Urb.	.	.	.	.	r	r	r
<i>Crotalaria incana</i> L.	.	.	.	.	r	r	r
<i>Stachytarpheta jamaicensis</i> (L.) Vahl	.	.	.	.	r	r	+
<i>Sida rhombifolia</i> L.	.	.	.	r	r	r	r
<i>Bothriochloa pertusa</i> (L.) A. Camus	.	.	.	.	l	.	2
<i>Chamaesyce hyssopifolia</i> (L.) Small	.	.	.	.	r	r	.
Accompaniers							
<i>Desmodium</i> sp.	+	.	l	+	.	.	+.l
<i>Miconia prasina</i> (Sw.) DC.	+	l	r	.	r	.	.
<i>Lantana camara</i> L.	.	r	.	r	r	.	r

Table I Continued...

Variants	<i>Lycopodiella cernua</i>	<i>Pteris longifolia</i>	<i>Macroptilium lathyroides</i>
<i>Wissadula periplocifolia</i> (L.) Presl	r	.	r
<i>Erythrina poeppigiana</i> (Walp.) O.F. Cook	r	r	.
<i>Triunfetta semitriloba</i> Jacq.	r	.	r
<i>Centrosema virginianum</i> (L.) Benth.	.	+	2
<i>Serjania diversifolia</i> (Jacq.) Radlk.	.	.	r
<i>Thelypteris kunthii</i> (Desv.) Morton	r	r	.
<i>Chamaesyce berteriana</i> (Balbis) Millsp.	r	r	.
<i>Tournefortia hirsutissima</i> L.	r	.	.
<i>Pluchea carolinensis</i> (Jacq.) D. Don	.	+	.
<i>Eupatorium</i> sp.	.	+	+
<i>Rhytidophyllum acuña</i> Morton.	.	.	4
<i>Adiantum trapeziforme</i> L.	.	.	2
<i>Euphorbia heterophylla</i> L.	.	.	r
<i>Anemia coriacea</i> Griseb.	.	.	l
<i>Sida acuta</i> Burm.	.	.	r
<i>Passiflora sexflora</i> A. Juss.	.	.	r
<i>Cissus verticillata</i> D.H. Nicolson & C. Jarvis	.	.	+

Three variants are found:

- i. *Lycopodiella cernua*,
- ii. *Pteris longifolia*,
- iii. *Macroptilium lathyroides*.

Differential combinations are good defined in Table 1. The 17-19.02.2004 was characterized (central part of the studied area N20022,4', W75017,4')

In addition to Table 1. Inv. 1. *Anemia adiantifolia* (L.) Sw. r, *Cissampelos pareira* L. r; Inv. 2. *Cyathea arborea* J. Sm. +, *Solanum americanum* Mill. r, *S. torvum* Sw. r, *Allophyllus cominia* (L.) Sw. r (juv. = juvenile), *Sapium laurifolium* (A. Rich.) Griseb. r (juv.), *Clitoria ternatea* L. r; Inv. 3. *Phaius tankervilleae* (Banks) Blume r, *Weddellia rugosa* Greenm. r, *Laurentia longiflora* (L.) Peterm. r, *Pteris grandifolia* L. r, *Centrosema plumieri* (Turp.) Benth. r, *Echites umbellata* Jacq. r; Inv. 4. *Piper richardianum* C. DC. r, *Lithacne pauciflora* (Sw.) Beauv. r, *Cedrela odorata* L. r (juv.), *Cecropia peltata* L.+ (juv.), *Piper peltatum* L. r, *Zanthoxylum martinicense* (Lam.) DC. r (juv.), *Desmanthus virgatus* Willd. r, *Inga vera* Willd. r (juv.), *Beilschmiedia pendula* (Sw.) Benth. & Hook. r (juv.), *Guarea guidonia* (L.) Sleumer r (juv.), *Corchorus siliquosus* L. r; Inv. 5. *Scleria secans* (L.) Britt. r, *Gouania lupuloides* (L.) Urb. r, *Thumbergia fragans* Roxb. r; Inv. 6. *Schyzachyrium gracile* (Spreng.) Nash r, *Bothriochloa pertusa* (L.) A. Camus r, *Melochia nodiflora* L. r, *Echites umbellata* Jacq. r, *Tragia volubilis* L. r; Inv. 7. *Ricinus communis* L. r, *Psidium guajava* L. r, *Indigofera jamaicensis* Spreng. r, *Chamaecrista pedicellaris* (DC.) Britton subsp. *pedicellaris* r, *Clusia rosea* Jacq. r (juv.), *Chamaecrista diphylla* (L.) Greene r, *Vernonia* sp. r.1, *Chaptalia* sp. r.

b) Pityrogrammo calomelani - Rhytidophylletum exserti Reyes ass. nov

(Table 2 holotypus inv. 1.)

This immediate and secondary community is developed over generally new bank it is present over for about four or five years made although sometimes is present other oldest (slope for de 60 to 80 degrees). Always located over weathered schists of Sierra del Purial formation, conforming a rocky habitat; nevertheless, for be a friable rock due the high alteration and have many fissures

where disintegration in small fragments occurs, forming a relatively acceptable habitat for these species. Exposition are dissimilar although north and west are preferred. Altitude variation is small, between 450 and 540 mosl.

Structure of the community is generally single; presenting a moss layer (E0) that covers for 30 to 100 % of surface and other herbaceous (E1) that in youngest places have between 20 and 30 cm high and in oldest get for about 1,5 m.

This association with 18, 3 species average is relatively homogeneous. Characteristic combination is observed in Table 2. It was studied between 19 and 21.02.2004 (central part of the studied area N20017, 2', W74043').

Two subassociations are present:

- i. Pityrogrammo - Rhytidophylletum exserti cyatheetosum arboreae,
- ii. Pityrogrammo - Rhytidophylletum exserti typicum.

Differences between both are mainly expositional and in the quantity of received rain.

i. Pityrogrammo - Rhytidophylletum exserti cyatheetosum arboreae Reyes subass. nov.

(Table 2, typus inv. 7.)

Is developed preferably in northwest expositions, although occasionally in other directions and is richer than the other subassociations with an average of 20.7 species.

Two variants are found: *Piper peltatum* and *Lycopodiella cernua*.

The first is found in northwest expositions. In the second the said expositions are varying, altitude is some high; also is chronologically older than the before variant and as the cover of the herbaceous layer is highest here.

ii. Pityrogrammo - Rhytidophylletum exserti typicum Reyes subass. nov.

(Table 2, typus inv. 1.)

It takes up north and best expositions and for to be located at Viento Frio zone less rain is received (about 2500 mm) than the before

exposed subassociation. Is more poor in species than the previous phytocoenose with an average of 14.2. Positively only the difference *Trema micranthum*, however various observed species are missing (Table 2).

In addition to Table 2. Inv. 1. *Bletia purpurea* (Lam.) DC. r; Inv. 2. *Hyparrhenia rufa* (Nees) Stapf. +, *Vernonia sp.* +.1; Inv. 5. *Mimosa pudica* L. +, *Asteraceae* +; Inv. 6. *Phytolaca icosandra* L. r, *Talipariti elatum* (Sw.) Fryxell r, *Rhynchospora colorata* (L.) H. Pfeiff. +; Inv. 8. *Solanum nigrum* L. r, *Begonia wrightiana* A. DC. r, *Cyperus sp.* 1; Inv. 9. *Solanum torvum* Sw. r, *Momordica charantia* L. r, *Emilia sp.*

+, *Asteraceae* 2; Inv. 10. *Bletia purpurea* (Lam.) DC. r, *Rhynchospora colorata* (L.) H. Pfeiff. r, *Solanum erianthum* D. Don r, *Phaius tankervilleae* (Banks) Blume r, *Homolepis glutinosa* (Sw.) Zuloaga & Soderstr. r, *Epidendrum nocturnum* Jacq. r, *Odontosoria aculeata* (L.) J. Sm. r; Inv. 11. *Solanum nigrum* L. r, *Miconia prasina* (Sw.) DC. r, *Sticherus bifidus* (Willd.) Ching 3, *Coccocypselum herbaceum* Aubl. +, *Mimosa pudica* L. +, *Odontosoria aculeata* (L.) J. Sm. +; Inv. 12. *Machaerina cubensis* (Kuk.) T. Koyama 1, *Blechnum occidentale* L. r, *Sida rhombifolia* L. r, *Conostegia xalapensis* (Bonpl.) D. Don 2, *Panicum sp.* r, *Asteraceae* +.

Table 2 *Pityrogramma calomelani* - *Rhytidophyllum exserti* in banks of Vía Mulata

Subassociations Variants	Typicum					Cyatheetosum arborea						
						Piper peltatum				Lycopodiella cernua		
	1	2	3	4	5	6	7	8	9	10	11	12
N. order	1	2	3	4	5	6	7	8	9	10	11	12
Altitude (mosl)	450	450	450	540	460	450	480	480	480	480	520	540
Inclination of banks (degrees)	80	80	80	30	60	45	80	80	80	45	80	60
Exposition	N	N	N	W	W	N	NW	NW	NW	E	S	W
E ₁ -Herbaceous layer (%)	30	10	40	90	50	40	50	80	50	100	70	90
N. species	12	14	12	16	17	16	19	18	21	26	21	25
Characteristics												
E ₁ - <i>Pityrogramma calomelanus</i> (L.) Link	1	1	1	+	2	2	3	3	1	r	r	.
<i>Rhytidophyllum exsertum</i> Urb.	2	1	3	3	+	1	r	+	1	2	r	1
<i>Nephrolepis biserrata</i> (Sw.) Schott	2	1	2	3	2	1	2	3	1	1	+	1
<i>Andropogon virginicus</i> L.	+	+	+	1	1	+	+	+	+	4	1	1
<i>Piper aduncum</i> L.	1	r	+	2	2	r	+	+	2	r	r	.
<i>Neurolaena lobata</i> (L.) R. Br.	+	+	+	+	.	+	+	+	+	+	r	r
<i>Tibouchina longifolia</i> (Vahl) Baillon	+	+	1	1	1	1	1	1	2	+	+	r1
<i>Clidemia umbellata</i> (Mill.) L.O.Wms.	+	+	+	r	.	+	r	.	+	1	+	3
<i>Spermacoce laevis</i> Lam.	r	r	+	.	1	.	+	+	+	+	1	1
<i>Pluchea carolinensis</i> (Jacq.) D. Don	+	r	.	+	+	.	+	+	r	r	.	+
<i>Mikania micrantha</i> Kunth	+	.	+	+	+	2	+	+	+	.	.	+
Subassociations	Typicum					Cyatheetosum arborea						
<i>Cyathea arborea</i> (L.) J. Sm.	.	.	.	.	.	1	+	1	1	2	2	2
<i>Clidemia hirta</i> (L.) D. Don	.	.	.	.	.	.	r	+	+	.	+	1
<i>Emilia sonchifolia</i> (L.) DC.	.	.	.	.	.	r	+	.	.	r	.	r
<i>Piper peltatum</i> L.	.	.	.	.	.	r	r	+	+	.	.	.
<i>Desmodium canum</i> (J.F. Gmel.) Schinz & Thell.	.	+	.	.	.	.	.	.	.	1	+	2
<i>Polygala leptocaulis</i> F. & C.	.	.	.	r	.	.	.	.	.	r	r	r
<i>Lycopodiella cernua</i> (L.) Pic.-Serm.	.	.	.	.	.	.	.	.	.	2	1	2
<i>Trema micrantha</i> (L.) Blume	.	r	r	r	+	.	.	.	.	+	.	.
Accompaniers												
<i>Andropogon bicornis</i> L.	.	.	.	+	r	.	r	+	1	+	+	.
<i>Desmodium triflorum</i> (L.) P. DC.	.	.	1	.	+	.	+	.	.	+	.	+
<i>Chromolaena odorata</i> (L.) King & Robins.	.	.	.	r	+	1	+	.	.	r	.	.
<i>Cecropia peltata</i> L.	.	.	.	.	.	.	r	+	+	.	.	.
<i>Stachytarpheta jamaicensis</i> (L.) Vahl	.	.	.	.	r	.	.	.	.	.	r	+
<i>Andropogon gracilis</i> Spreng.	.	.	.	.	1	.	.	.	.	+	.	r

c) *Stichero bifidi* - *Gleichenelletum pectinatae* Reyes ass. nov.

(Table 3, holotypus inv. 3.)

This early community occupied relatively old banks (for about 30 years), with red and leached ferralitic soils with its corresponding ferralitic weathering crust. It is absent in schists rocks banks where other association is developed. Generally it is found between 30 to 60 degrees slopes, exceptionally big or less. Expositions are variable.

This phytocoenose with 18, 3 species average is structurally single, forming a compact mass of *Gleichenella pectinata* and *Sticherus bifidus* of 40 to 80 cm high, that totally covers the place and make very difficult to walk; and also it make difficult soil light penetration, for this reasons the majority of the rest of species (with the exception of *Lycopodiella cernua*) are scarcely and dispersed in the area. The characteristic combination is observed in Table 3. Was analyzed between 21 to 25.02.2004 (central part of studied territory N20016, 2', W74044, 7').

Two subassociations are present:

i. *Stichero bifidi* - *Gleichenelletum pectinatae clethretosum cubensis*,

ii. *Stichero bifidi* - *Gleichenelletum pectinatae clidemietosum hirtae*.

Dissimilarities between both are principally of altitude.

i. *Stichero bifidi* - *Gleichenelletum pectinatae clethretosum cubensis* Reyes subass. nov.

(Table 3, typus inv. 3.)

This phytocoenoses is found in altitude greater than 700 mosl. Differential combination can be test in Table 3.

There are two variants with less floristics differences, although with expositional differences; and for that it's considered that should be distinguish, these are: *Homolepis glutinosa* and *Tipica*. First is found in diverse exposition and second in southwest direction.

ii. *Stichero bifidi* - *Gleichenelletum pectinatae clidemietosum hirtae* Reyes subass. nov.

(Table 3, typus inv. 9.)

Is found in altitude between 450 to 560 mosl and in variable expositions.

In addition to Table 3. Inv. 1. *Mikania reticulata* Wr. r, *Pentalinon luteum* (L.) Hansen & Wunderlin r, *Dicranopteris flexuosa* (Shrader) Under. +, *Lyonia* sp. +; Inv. 2. *Miconia* sp. r, *Coccoloba* sp. r; Inv. 3. *Rhynchospora pruinosa* Griseb. r, *Clusia tetrastigma* Vesque r, *Miconia echinata* (Griseb.) Judd & al. +; Inv. 4. *Lepidaploa wrightii* (Sch. Bip.) H. Rob. r, *Blechnum lineatum* (Sw.) C. Chr. r; Inv. 5. *Cyathea parvula* (Jenm.) Domin r; Inv. 6. *Tabebuia dubia* (Wr. ex Sauv.) Britt. ex Seibert. r, *Miconia* sp. r. Inv. 7. *Mesechites* sp. r.1, *Lyonia* sp. r; Inv. 8. *Byrsonima crassifolia* (L.) Kunth r, *Pitirogramma calomelanus* (L.) Link +, *Chromolaena odorata* (L.) King & Robins. r, *Desmodium triflorum* (L.) P. DC. +, *Pluchea carolinensis* (Jacq.) D. Don r. Inv. 11. *Miconia jashaferi* Majure & Judd +, *Philodendron lacerum* (Jacq.) Schott r.

Table 3 *Stichero bifidi* - *Gleichenelletum pectinatae* in Via Mulata banks

Subassociations	<i>Clethretosum cubensis</i>						<i>Clidemietosum hirtae</i>					
	<i>Homolepis glutinosa</i>			<i>Tipica</i>								
N. order	1	2	3	4	5	6	7	8	9	10	11	
Altitude (mosl)	800	810	800	750	710	720	820	560	460	450	460	
Inclination of banks (degrees)	30	30	30	20	30	30	45	50	50	80	80	
Exposition	WNW	SE	SSE	N	S	SSW	SW	SSW	E	NNE	W	
E ₁ -Herbaceous layer (%)	100	100	100	100	100	100	100	100	100	60	100	
N. species	18	17	21	24	18	14	16	20	16	19	24	
Characteristics												
E ₁ - <i>Gleichenella pectinata</i> (Willd.) Ching	4	4	4	3	3	5	5	4	5	+	+	
<i>Stichero bifidus</i> (Willd.) Ching	.	1	+	1	3	1	+	+	2	+	4	
<i>Lycopodiella cernua</i> (L.) Pic.-Serm.	2	2	3	2	1	2	1	2	2	3	3	
<i>Andropogon virginicus</i> L.	+	+	+	1	1	+	+	2	r	+	+	
<i>A. bicornis</i> L.	1	+	1	1	+	+	1	+	r	.	1	
<i>Coccocypselum herbaceum</i> Aubl.	.	r	r	r	r	+	r	+	+	.	1	
<i>Nephrolepis biserrata</i> (Sw.) Schott	+	+	1	1	.	.	r	+	+	3	1	
<i>Clidemia umbellata</i> (Mill.) L.O.Wms.	1	+	+	+	.	.	+	+	.	+	1	
<i>Clethra cubensis</i> A. Rich.	+	+	1	+	+	+	+	.	.	.	.
Subassociations	<i>Clethretosum cubensis</i>						<i>Clidemietosum hirtae</i>					
<i>Epidendrum</i> sp.	.	+	.	+	+	+	+	.	.	.	.
<i>Rapanea guianensis</i> Aubl.	r	r	+	+	+	.	+	.	.	.	.
<i>Vanilla palmarum</i> Salzman ex Lindl.	.	+	r	r	1	1	+	.	.	.	.
<i>Homolepis glutinosa</i> (Sw.) Zuloaga & Soderstr.	+	r	r	r	.	.	.	.	.	.	.
<i>Conostegia xalapensis</i> (Bonpl.) D. Don	r	.	r	r	r	.	.	.	.	.	.
<i>Clidemia hirta</i> (L.) D. Don	.	.	.	.	.	.	.	+	+	+	+
<i>Rhytidophyllum exsertum</i> Urb.	.	.	.	.	.	.	.	.	r	+	1
<i>Elephantopus mollis</i> Kunth	.	.	.	.	.	.	.	.	r	+	r
Accompaniers												
<i>Cyathea arborea</i> (L.) J. Sm.	+	.	+	.	1	.	.	.	.	1	+
<i>Mikania micrantha</i> Kunth	r	r	.	.	.	.	.	r	.	r	r
<i>Tibouchina longifolia</i> (Vahl) Baillon	r	.	.	r	.	.	.	+	.	+	+	
<i>Andropogon gracilis</i> Spreng.	.	.	.	.	+	+	.	+	.	.	+
<i>Machaerina cubensis</i> (Kuk.) T. Koyama	.	1	.	.	1	r	.	.	.	+	.	
<i>Panicum</i> sp.	r	.	.	r	.	.	.	r	.	+	.	
<i>Miconia prasina</i> (Sw.) DC.	.	.	+	r	+	.	.	.	.	.	1
<i>Stachytarpheta jamaicensis</i> (L.) Vahl	r	.	.	r	.	.	.	.	+	.	r
<i>Psidium guajava</i> L.	.	.	+	.	.	.	r	.	1	.	.	

Table 3 Continued...

Subassociations Variants	Clethretosum cubensis				Clidemietosum hirtae						
	Homolepis glutinosa		Típica								
<i>Bletia purpurea</i> (Lam.) DC.	.	.	.	r	r	.	.	r	.	.	.
<i>Clusia rosea</i> Jacq.	.	.	.	+	r	.	.	.	.	.	+
<i>Spermacoce laevis</i> Lam.	.	.	.	r	.	.	.	.	.	+	.
<i>Urena lobata</i> L.	r	r	.
<i>Neurolaena lobata</i> (L.) R. Br.	r	.	.	.	.	.	.	r	.	.	.
<i>Polygala leptocaulis</i> F. & G.	r	r
<i>Piper aduncum</i> L.	r	.	+	.	r
<i>Desmodium canum</i> (J. F. Gmel.) Schinz & Thell.	+	r	.
<i>Odontosoria aculeata</i> (L.) J. Sm.	.	.	r	.	.	.	.	.	.	+	.
<i>O. scandens</i> (Desv.) C. Christ.	.	r	.	.	.	.	r	.	.	.	.

Discussion

Tibouchino longifoliae - Sticherion bifidi alliance, make up for the first successional stages in the banks made for the road build over schists or ferrallitics soils Sierra del Purial and Maquey geological formations,⁴ principally in Cuba's great rainfall areas. For that according with the characteristics of these habitats mainly thing for its colonization is the rain of seeds.¹⁷

In more rainfall areas in the first geological formation two kind of different phytocoenoses are observed, developed over schists banks and the observed over ferrallitics soils, dissimilarities are floristics and also structural.

The majority of species that make up this alliance are heliophilous that remain due the difficult of site conditions, constituted for a bank, habitat that remain its characteristics because of the big inclination with a surfe where is observed the less evolved layers of the profil. It's considered that in the formation of these communities plants characteristics are influence (capacity of reach, colonize and remain according to their biological conditions).¹⁸

Conclusion

In the banks resulted for road build in Sierra del Purial and Maquey formations areas *Tibouchino longifoliae - Sticherion bifidi* alliance is developed with three associations with subassociations and variants, they occupies different habitats as rocks or ferrallitics soils. Weather is tropical with rainfalls between 1200 and 3500 mm.

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Conflicts of interest

The author declares there are no conflicts of interest.

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