Knowledge for a Better Conservation: Syntaxonomic Review of Caribbean Pine Forests (Cuba, Hispaniola)

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Abstract: A phytosociological review is carried out of the pine forest formations on the islands of Cuba and Hispaniola (Caribbean), due to the diversity of soils and environments. We collected 10 plant associations belonging to the class Byrsonima-Pinetea caribaea growing on siliceous, calcareous and sandy substrates and 21 associations on special, serpentine and ophite substrates and on ultramafic rocks belonging to the class Caseario cassinertis-Pinetea cubensis, exclusive to Cuba; while the association of pine forests on serpentinaes in Hispaniola is included in the class Phylantho orbicularis-Neobracetea valenzuelanae with a Caribbean distribution. The comparative phytosociological and statistical study reveals phytosociological anomalies in the inclusion of various syntaxa, and in the description of other syntaxa according to the International Code of Phytosociological Nomenclature (ICPN). We therefore propose a change in status for several of the subassociations described: subass. rietosum repandae; syn. var. con lex repanda; subass. schmidtottietosum shaferi; syn. var. with Schmidottia shaferi; subass. acrosynanthetosum trachyphylli; syn. var. with Acrosyntanthus trachyphyllus; subass. psychotrietosum grandis; var. con Psychotria grandis; subass. notodonietosum roigi; syn. var. with Notodon roigi. We also propose a nomen novum: jaquinietosum oxyphyllae Reyes & Acosta 2012 ex Cano et al. hoc loco.

Keywords: Association; Biodiversity; Endemisms; Pinewoods; Pinus; Phytosociology; Vegetation

1. Introduction

From the bioclimatic standpoint, the thermotype in the Antilles ranges from the infratropical to the supratropical (the latter only in Hispaniola) [1]. The temperature in the supratropical thermotype drops to 0°C in winter. The dominant thermotypes are the infra-, thermo- and mesotropical, and the ombrotypes ranges between the semiardi and the hyperhumid. This study of Cuban pine forests is conducted in the infra-, thermo- and mesotropical thermotypes and in rainy environments with rainfalls of between 1300-2000 mm. The ombrotypes ranges from the lower subhumid to the upper humid, in agreement with Rivas-Martínez et al. [2] and Cano et al. [3] on the island of Hispaniola, in sites with a dominance of broadleaved forest; however, in areas with steep slopes or special substrates where there is a water deficit, the pine forest should be considered edaphotherophilous [4-6].

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Regarding biogeography, we have followed the work of Rivas-Martínez et al. [7], which establishes three biogeographical provinces: Florida, Cuba and the Antilles, all part of the Caribbean-Mesoamerican Region. When studying the distribution of Melastomataceae in Central America and the distribution of 2050 endemic species on the island of Hispaniola, Cano et al. [8-10] established the superprovince of the Western Antilles in which they include Cuba, Jamaica and the Florida peninsula. They maintain the biogeographical province of Florida with the sectors defined by Rivas-Martínez et al. [7] and the province of Cuba with two subprovinces: the Cuban subprovince, with three biogeographic sectors (Eastern, Central and Western), and the Jamaican subprovince, with the Jamaican sector. The superprovince of the Central-Eastern Antilles is established for the rest of the islands (Hispaniola, Puerto Rico and the Lesser Antilles) and the Eastern Antilles biogeographic province is created for Puerto Rico and the Lesser Antilles. The island of Hispaniola is considered a biogeographical province with two biogeographical subprovinces: the Central subprovince (Central sector) with acid substrates and over 500 endemic species, and the Caribbean-Atlantic subprovince with basic substrates and six biogeographic sectors with 19 district areas, which are subsequently studied by Cano Ortiz et al. [11]. For the biogeographic study we have taken into consideration several factors, the geology of the territory, endemic species, distribution and origin of the flora, as well as the existing plant communities and their catenal contacts. [8-10]

Solid knowledge about flora and vegetation provides a valuable basis for the implementation of biodiversity management and conservation measures [12-14]. The gaps of knowledge, both in native and alien species, are still today the subject of interest by numerous scholars around the world [15-18]. If flora checklists provide new, complete and updated information about the presence of plant taxa in a given geographic area at small or large scale, syntaxonomical studies allow to review, improve and update knowledge on species composition of different plant communities that occupy several habitats in the world.

Pine forests are habitats widespread in the world, very important for providing ecosystem services and for their ecological role [19]. If some of them are well known and studied under different points of view, others less. It is the case of the Caribbean pine forests of Cuba and Hispaniola.

For the study of the pine forests in the Caribbean, the phytosociological method was used, since the existing studies in Hispaniola and Cuba are of this type. Thus we highlight the different plant associations, which constitute habitats of special protection due to the high rate of endemism.

On the northern or windward face of the mountains, there is a predominance of broadleaved or rainforest of Magnolia, Prestoea, Ocotea, Podocarpus, Cyathea (Ocoteo-Cytilletea racemiflorae Borhidi 1996) [20], while the pine forest is on the Caribbean or leeward face at low altitudes above the sea of clouds. The genus Pinus comes from North America and reached the Greater Antilles via the Florida migratory route. Cuba is the location of Pinus caribaea Morelet, P. tropicalis Morelet [Syn: Pinus cubensis Griseb. & Carab. var. terthrocarpa Griseb.] and, according to some authors, P. cubensis Griseb. & Carab. (endemic) [Syn: Pinus maestensis Bisse; P. occidentalis Sw. var. cubensis (Griseb.) Silva]. However, following the criterion of Borhidi [21,22] and Lopez Almirall [23], we maintain the taxon P. maestensis Bisse. Some authors also cite P. occidentalis var. cubensis in Cuba. In Hispaniola there is a dominance of P. occidentalis (endemic) and in a disperse manner P. caribaea. Only P. caribaea is located in Puerto Rico, where it forms different types of forest. Other plant communities developing exclusively in Hispaniola are the hemiophriphlyte grass scrublands in the supratropical bioclimatic belt, dominated by Danthonia domingensis Hack. & Pilg., a plant that is endemic to the Cordillera Central and that coexists with the endemic plant Deschampsia domingensis Hitchcock & Ekman, occupying the open areas left by the pine forest of P. occidentalis, described by Cano et al. [24] as Dendropemom phycnophylli-Pinetum occidentalis Cano, Velóz, & Cano-Ortiz 2011. Several researchers have studied the
flora and vegetation of the two largest islands in the Caribbean, Cuba and Hispaniola, in recent decades [25-35].

The statistical study of the several pine forest vegetation units with the rank of association, subassociation and variant reveals anomalies as to the veracity of the syntaxa according to the International Code of Phytosociological Nomenclature (ICPN) [36]. Borhidi [21,22] proposed including the pine forests growing on sandy soils derived from andesites in rainy sites in the order Pinetalia occidentalis-maestrensis Borhidi 1991, and assigns this order to the class Ocoteo-Cyrilettea racemiflorae Borhidi 1996; whereas Cano et al. [37] includes the mixed pine forests on rainy sites in the order Pinetalia tropicalis-caribaeae Samek & Borhidi in Borhidi 1996. It is currently necessary to maintain the order Pinetalia occidentalis-maestrensis that contains the alliances Pinion maestrensis Borhidi 1996 and Cyrillo nepensis-Pinion cubensis Borhidi & Muñiz in Borhidi 1996. Both orders are included in the class Byrsonimo crassifoliae-Pinetea caribaeae Samek & Borhidi in Borhidi 1996, which represents the pure and mixed pine forests in the lower-lying regions and hills of Central America, Cuba, Hispaniola, Puerto Rico, Bahamas and Florida. These forests grow on acid to neutral soils, sometimes slightly basic, derived from white sands, slate, sandstone and occasionally limestone.

The aim of this study is to review the different syntaxa of pine forests on the islands of Cuba and Hispaniola, since most of these forests growth on special substrates, in which there is a high number of endemic plants. Thanks to this, it will be possible to act all the necessary actions to protect plants and habitats in these two islands.

2. Materials and Methods

The high mountains in Cuba that developed over millions of years were the Sierra Maestra, Sierra Escambray (Guamuhaya), Sierra Turquino at 1974 m a.s.l., and Pico Cuba at 1972 m a.s.l. The highest altitudes in Hispaniola are the Cordillera Central with Pico Duarte (3175 m a.s.l.), Pico del Yaque (3125 m a.s.l.), la Rosilla (2860 m a.s.l.), Cordillera Septentrional with Pico Diego de Ocampo (1229 m a.s.l.), and other mountain ranges such as Bahoruco, Hotte and La Selle, Cordillera Oriental. Finally, in Puerto Rico, the Cordillera Central with altitudes below 1500 m a.s.l. [21]. The Cordillera Central (Hispaniola) has a siliceous character and dates from the Cretaceous era-period, and is the highest point in the whole Caribbean. The climate in all the Antilles is tropical with frequent and abundant rains on the oceanic face, sometimes exceeding 3,000 mm, and low rainfall on the Caribbean face, at up to 200 mm. The mean temperature is 24 °C, and all the islands are subjected to hurricane winds with speeds of over 200 km/h [21, 22].

We studied the plant associations in the pine forest on the islands of Cuba and Hispaniola (Figure 1), with 180 relevés corresponding to associations, subassociations, variants and subvariants. A statistical treatment was performed on 706 species distributed in the associations present on the two islands. The flora of these syntaxa is a consequence of the 4 migratory routes and of the speciation that has occurred throughout history due to the isolation of the species. The 181 relevés correspond to the associations and subassociations described. All the samples are located on the islands of Cuba and Dominican Republic.
Sampling plots and phytosociological inventories follow the signatist method of Zürich-Montpellier school of Braun-Blanquet [38] and collected in current works [39]. The plot size and the sampling method carried out by the different authors is correct, according to current phytosociology [38]. Regarding the syntaxonomic review, we have taken into account the main current phytosociology studies [40-42] and the ICPN [36]. To differentiate some syntaxa from others, a synthetic table was made, in which the floristic differences are clearly observed, likewise we established the Jaccard distance between the typus of the syntaxa to see their similarity / dissimilarity. Regarding the choice of characteristic species and companions, the concepts of current phytosociology are taken into consideration: for this we consider the ecological niche of the species, distribution area, bioclimate, status, plant dynamics as well as catenal contacts.

Ordination analyses are applied (cluster, DCA) to establish the syntaxonomical differences between associations, subassociations and ecological variants. The statistical packages PAST (PAleontological STatistics)© and CAP3 (Community Analysis Package III)© were used for this study. Special reference is made to the type relevés. The types for each association were selected out of the total relevés, and a comparative table was compiled to establish the floristic differences between them.

The cluster and DCA analysis helps us to establish the different groups, the use of the types of each association and subassociation allows us to see the proximity between the groups, and if there really are substantial differences to maintain these phytosociological groups, with the established statistical information, together with the phytosociological analysis and the use of the international code of nomenclature, we establish the proposed syntaxes.

The following plant associations have been described by us [16] for the island of Hispaniola, and by Borhidi [21,22] and Reyes & Acosta [27] for Cuba: Clethrao-Pinetum maestrensis (CLP), Paepalantho-Pinetum tropicalis (PAP), Byrsonimo pinetorum-Pinetum tropicalis-caribaeae (BYP), Querco-Pinetum caribaeae (QUP), Anemio coriacea-Pinetum cubensis (ACP), Euphorbio helenae-Pinetum cubensis (EHP), Agavo shaferi-Pinetum cubensis (ASP), Dracaeno-
Pinetum cubensis (DCP), Deodaripom phycophylli-Pinetum occidentalis (DP), Cocotirino scopari-Pinetum occidentalis (CP), Leptogono buchi-Pinetum occidentalis (LP), Panico-Pinetum cubensis subass. typicum var. Evolulus sericeus (PP), Panico-Pinetum cubensis subass. lyonetosum affinis var. Sida linifolia (PP), Panico-Pinetum cubensis subass. lyonetosum affinis var. Cecropia petala-Baccharis shaferi var. Vaccinium cubense (PP), Cococyselos herbaceous-Pinetum cubensis subass. typicum var. Bonnetia cubensis var. Dichanopteris flexuosa (CSP), Cococyselos herbaceous-Pinetum cubensis subass. ilicetosum repandae var. de Cinnamonum elongatum var. de Suberanthus stellatus and subass. Schmidttottiums shaferi (CP), Schimdtottio shaferi-Pinetum cubensis var. Guettarda monocarpa subvar. Euphorbia helenea subvar. Eugenia asperifolia (SP), Schimdtottio shaferi-Pinetum cubensis subass. shaferetosum platyphyllae subass. acrosynanthosum trachyphylli (SP), Acrosynantho trachyphylli-Pinetum cubensis subass. typicum subass. ossaetosum shaferi subass. psychotrietosum grandis (AP), Protio fraganti-Pinetum cubensis subass. myrcetosum subass. notodonetosum roigii (PPF), Anthaenantio-Pinetum cubensis var. tipica var. Baccharis scoparioides (ANP), Anthaenantio-Pinetum cubensis subass. euphorbietosum var. tipica var. Aristolochia lindeniana-Rhynchospora crispa (ANP), Anthaenantio-Pinetum cubensis var. Ossaea paucifolia subvar. tipica subvar. Baccharis shaferi-Rajania nipensis var. Evolulus sericus-Polygala saginoides subvar. tipica subvar., Arthrostylidium capillifolium (ANP), Anthaenantio-Pinetum cubensis subass. grisebachiabthesosum nipensis var. Gochnatia shaferi subvar. Cocolobia refexa subvar. Clerodendrum nipense (ANP), Arthrostylidio-Pinetum cubensis subass. typicum var. tipica var. Cynanchum brachystephamanum, subass. annonetosum sclerophyllea var. tipica var. Eugenia mensurenensis subass. xylosnetosum buxfolioli (AR), Phyllantho mirifico-Pinetum cubensis (PHP), Phyllantho mirifico-Pinetum cubensis subass. pitcairnietosum cubensis (PHP) (Table 1).

| Associations | No. of relevés |
|--------------|---------------|
| DP: Deodaripom phycophylli-Pinetum occidentalis (1DP-4DP) | 4 |
| CLP: Clethro-Pinetum maestensis (13CLP1-17CLP5) | 5 |
| PAP: Paepalantho-Pinetum tropicalis (18PAP1) | 1 |
| BYP: Byrsonimo pinetorum-Pinetum tropicalis-caribaeae (19BYP1-23BYP5) | 5 |
| QUP: Quercio-Pinetum caribaeae (24QUP) | 1 |
| ACP: Anemio coriaceae-Pinetum cubensis (25ACP) | 1 |
| EHP: Euphorbio helenea-Pinetum cubensis (26EHP) | 1 |
| ASP: Agave shaferi-Pinetum cubensis (27ASP) | 1 |
| CP: Cocotirino scopari-Pinetum occidentalis (5CP1-8CP4) | 4 |
| LP: Leptogono buchi-Pinetum occidentalis (9LP1-12LP4) | 4 |
| PP: Panico-Pinetum cubensis (29PP-67PP) | 39 |
| CSP: Cococyselos herbaceous-Pinetum cubensis (68CP-84CP) | 17 |
| SP: Schimdtottio shaferi-Pinetum cubensis (85SP-100SP) | 16 |
| AP: Acrosynantho trachyphylli-Pinetum cubensis (101AP-107AP) | 7 |
| PPF: Protio fraganti-Pinetum cubensis (108PPF-117PPF) | 10 |
| ANP: Anthaenantio-Pinetum cubensis (118ANP-160ANP) | 43 |
| ARP: Arthrostylidio-Pinetum cubensis (161ARP-172ARP) | 12 |
| PHP: Phyllantho mirifico-Pinetum cubensis (173PHP-181PHP) | 9 |
| **Total relevés** | **180** |

3. Results

The study of Caribbean pine forests reveals two major groups. 1) Pine forest growing on ferritic, ophiolite, serpentine and pyroxenite soils, and included in the phytosociological class *Caseario crassnervis-Pinetea cubensis* Borhidi & Muñiz in Borhidi 1996; and 2) the
second group of pine forests growing on siliceous and limestone substrates, and calcareous sands, which must be included in the class *Byrsonimo crassifoliae-Pinetea caribaeae*. The cluster analysis perfectly separates the Cuban pine forests from the pine forests on the island of Hispaniola (DP, CP and LP); a certain number of syntaxa described by Reyes & Acosta [27] are very close to the group extracted from Borhidi [22] (Figure 2).

The dendrogram in Figure 2 shows the separation of the different types of pine forests, some being clearly separated, while others are close to each other. Several different groups appear in the cluster to which the inventories studied belong. The inventories of associations collected and described by Borhidi [22] belonging to: *Paepalantho seslerioidis-Pinetum tropicalis* (PAP), *Querco-Pinetum caribaeae* Borhidi & Capote in Borhidi (1991) (QUP), *Anemio coriacea-Pinetum cubensis* (ACP), *Euphorbio helenae-Pinetum cubensis* (EHCP), *Agavo shaferi-Pinetum cubensis* (ASP) and *Dracaeo-Pinetum cubensis* (DCP) comprise a single group, and *Clethra-Pinetum maestrensis* (CLP) and *Byrsonimo pinetorum-Pinetum tropicalis* (BTP) are separated and constitute separate groups. Concerning the associations, subassociations and variants described by Reyes & Acosta [27], some syntaxa are perfectly separated, whereas in others the separation is not clear. The association *Anthaenantio-Pinetum cubensis* (ANP) forms a homogeneous group in the cluster, and is very close to *Arthrostylidio-Pinetum cubensis* (ARP). The group formed by this last syntaxon includes the *typus* for the association and for the subassociations *annonetosum sclerophyllae* and *xylosmetosum buxifolii*. Both associations are localized in Sierra de Nipe. ANP is in the south of Sierra de Nipe, with precipitations ranging 1300-1500 mm and on ferritic soils with high rainfall. ARP is located in the most highlands of the Sierra de Nipe between 600-995 m a.s.l. on an ultramorphic rocky surface and steep slopes, with precipitations that oscillate over 1500 mm. To a large extent both associations share common floristic elements.

The association *Panico-Pinetum cubensis* (PP) constitutes a clearly differentiated group containing three subgroups, two of which correspond to the relevés in the association, and the subassociation *lynetosum affinis*. The third subgroup comprises the relevés (59-67) representing the variant with *Vaccinium cubense* Griseb.

This association is located in rainy areas of the northern area of the Sierra de Nipe on dark ferritic soils, with rainfall of 1500 mm, in north-northeast orientations with rainfall exceeding 1800 mm. It is enriched in *Lyonia affinis* Urb., which together other species acts as a differential against the type association: for this reason, the authors have established the *lynetosum affinis* subassociation.

The following associations belong to group in the cluster: *Coccoecypselo herbacei-Pinetum cubensis* (CP) and the two subassociations *ilecetosum repandae* and *schmidtottietosum shaferi*. In this case, both subassociations form a single group that is separated from the relevés in the association. The pine forest association CP is located in the west of Cabillas del Toa, between 400-740 m a.s.l. and consequently in a thermotropical environment, on ultramafic ferritic substrates and with high rainfall over 1800 mm, the upper subhumid ombrotype being.

The same occurs with *Acrosynantha trachyphylli-Pinetum cubensis* (AP) and its subassociations *annonetosum sclerophyllae* and *psychotrietosum grandis*, in which the three *typus* belong to the same group. AP is present on ophiolite rocks and red ferrit soils, between 400-600 m a.s.l. and with high precipitations, close to 3000 mm: bioclimatically it is found in the thermotropical and in the humid ombrotype.

This is also the case of the subassociations *shaferetosum platyphylli* and *acrosynanthosum trachyphylli* in the association *Schmidtottio shaferi-Pinetum cubensis* (SP), *myrizetosum* and *notodontetosum roigii* in *Protio fraganti-Pinetum cubensis* (PP), and *pitcairnetosum cubensis* in *Phyllanthe mirifico-Pinetum cubensis* (PHP).

The associations SP, PFP and PHP constitute a group in the cluster. SP corresponds to the pine forests of the ophiolitic massif of Moa Baracao on ultramafic substrates, with red ferritic soils: a pine forests that growth between 600-700 m a.s.l. and in environments
with rainfall close to 1800 mm, being the upper subhumid thermotropical bioclimate. The association PFP is located at low altitude, below 300 m a.s.l., in ultramafic substrates, interacting above 300 m a.s.l. with the cloud forest. Rainfall is variable, but ranges between 1500-2000 mm. PFP bioclimatically is framed in the upper subhumid thermotropical. Finally, PHP it is a pine forest that also growth on ultramafic materials, in steep reliefs with slopes between 15-30%, and at altitudes between 600-700 m a.s.l., with rainfalls close to 1800 mm, being the upper subhumid thermotropical bioclimate.

All these associations are located on special substrates, have a common flora, but also present a high richness in endemic species, which act as differentiating species between them [15].
Figure 2. Dendrogram for pine forests on the islands of Cuba and Española. Typus inventories. 1DP1: Dendropemon pycnophylli-Pinetum occidentalis (1DP1-4DP4). PAP: Paepalanths-Pinetum tropicalis (18PAP). QUP: Querco-Pinetum caribaeae (24QUP). ACP: Anemio coriaceae-Pinetum cubensis (25ACP). EHP: Euphorbio heleneae-Pinetum cubensis (26EHP). ASP: Agave shaferi-Pinetum cubensis (27ASP). DCP: Draceno-Pinetum cubensis (28DCP). 16CLP: Clethro-Pinetum maestrensis (13CLP-17CLP). 21BYP: Byrsonimo pinetorum-Pinetum tropicalis-caribaeae (19BYP-23BYP). 6CP2: Coccolinio scopari-Pinetum occidentalis (5CP1-8CP4). 12LP4: Leptogono buchi-Pinetum occidentalis (9LP1-12LP4). 121ANP: Anthraenanths-Pinetum cubensis subass. grisebachianthetosum nipensis. 163ARP: Arthrostylidio-Pinetum cubensis (161ARP-172ARP). 166ARP: Arthrostylidio-Pinetum cubensis subass. annonetosum sclerophyllae. 171ARP: Arthrostylidio-Pinetum cubensis subass. xylosmetrosum buxifoli. 32PP: Panico-Pinetum cubensis (29PP-67PP). 53PP: Panico-Pinetum cubensis subass. lyonetosum affinis. 75CSP: Coccolypsio herbacei-Pinetum cubensis subass. ilecetosum repandae. 82CSP: Coccolypsio herbacei-Pinetum cubensis subass. schmidtottietosum shaferi. 101AP: Acrosynanhtio trachyphylli-Pinetum cubensis (101AP-107AP). 104AP: Acrosynanhtio trachyphylli-Pinetum cubensis subass. ossacetosum shaferi. 113PFP: Acrosynanhtio trachyphylli-Pinetum cubensis subass. psychotrietosum grandis. 88SP: Schmidotio shaferi-Pinetum cubensis (85SP-100SP). 96SP: Schmidotio shaferi-Pinetum cubensis subass. shaferetosum platyphyllae. 99SP: Schmidotio shaferi-Pinetum cubensis subass. acrosynanhtetosum trachyphylli. 111PFP: Protio fraganti-Pinetum cubensis (108PFP-117PFP). 113PFP: Protio fraganti-Pinetum cubensis subass. myricetosum. 116PFP: Protio fraganti-Pinetum cubensis subass. notodnetosum roigii. 173PHP: Phyllantho mirifico-Pinetum cubensis (173PHP-181PHP). 180PHP: Phyllantho mirifico-Pinetum cubensis subass. pitcairnietosum cubensis.
In the syntaxonomic review carried out, we have taken into consideration the syntaxa described by various authors, with a range of association, subassociation, variants and subvariants. We started from 18 associations (180 inventories), for the islands of Cuba and Hispaniola. However, Reyes & Acosta [27] accept 21 syntaxa with association rank, 11 subassociations and 22 variants and subvariants, although they didn’t provide inventories of all syntaxa. In this review, we accept for Cuba 31 associations described by various authors and that comply with the ICPN [36], 8 subassociations and 4 variants. For Hispaniola we only have 3 associations described by us in previous works.

In both cases, pine forests occupy large areas of Cuba and Hispaniola, with human actions that cause a decrease of these ecosystems in areas of the Caribbean and elsewhere on the planet [43, 44]. If we add to this phenomenon changes in rainfalls and temperatures due to climate change [45, 46], we obtain plant communities that substitute these forests, some of these being invasive communities. It is the case of *Prosopis juliflora* (Sw.) DC. that it is invasive in much of the world [47]. However, the resilience of *Pinus* species is high [48]. These pine forests located on different types of substrates, represent habitats of interest due to their high rate of endemic species, either because they are located on special substrates or because of the mountain effect, since the mountains present an increase in endemics when climbing in altitude [24, 49].

We include two orders and six alliances with ten plant associations in the class *Byrsonimo crassifoliae-Pinetea caribaeae*. The forests of *Pinus occidentalis* on the island of Hispaniola have a different biogeographical distribution and floristic composition from that of the pine forests of Cuba; for this reason, they form separate groups in the DECORANA statistical analyses (Figure 3). In Hispaniola, Cano et al. [24] described three plant associations for three different environments. *Coccotrino scopari-Pinetum occidentalis* (CP) growth on calcareous substrates in the Sierra de Bahoruco. *Dendropemon phycnophylli-Pinetum occidentalis* (DP) covers large extensions on siliceous substrates in the Cordillera Central, with both associations growing at altitudes above the sea of clouds. Finally, *Leptogono buchii-Pinetum occidentalis* (LP), located on serpentines in the northeast of the island of Hispaniola (Dajabón). The alliance *Rondeletio christii-Pinion occidentalis* was described for these pine forests on serpentines on the island of Hispaniola, and assigned to the order *Ariadno shaferi-Phyllanthetalia orbicularis* Borhidi & Muñiz in Borhidi 1996 and to the class *Phyllantho orbicularis-Neobracetea valenzuelanae* Borhidi & Muñiz in Borhidi 1996, representing sclerophyllous heaths in submontane areas in western Cuba. These plant communities on serpentines on the island of Hispaniola were not included by their authors in the class *Caseario crassinervis-Pinetea cubensis* Borhidi & Muñiz in Borhidi 1996, due to their marked floristic difference from Cuban serpentinicolous vegetation, as can be seen in the synthetic table we provide (Appendix A, Table A1). There are significant ecological, biogeographical and floristic differences between the three pine forest associations described for the island of Hispaniola, and which clearly separate the three syntaxa, as can be seen in the table prepared with the *typus* (Appendix A, Table A2).
Figure 3. DECORANA ordination analysis showing how the associations described by Reyes & Acosta form a compact group, which shows that the syntaxa described by these authors are very close from the floristic and ecological point of view, since they grow on special substrates Borhidi 1991 and Reyes & Acosta 2012: Cuban Pine Forests. Cano et al. 2011: Pine Forests of the Dominican Republic.

4. Discussion

Borhidi [13,14] includes the alliances Acoelorapho-Pinion tropicalis Samek in Borhidi et al. 1979, Blechno serrulati-Acoeloraphion wrightii Hadac and Hadacová 1971, Neomazaeo-Pinion caribaeae Borhidi 1991, and for Hispaniola Cano et al. [24] propose the alliance Ilici tuerckheimi-Pinion occidentalis Cano et al. 2011, which contains two of the abovementioned associations CP and DP. The associations published by Samek [50,51] for the island of Pinones, (PAP) Paepalantho seslerioidis-Pinetum tropicalis and Roigello-Pinetum tropicalis (Samek 1969) Borhidi 1996, were compiled by Borhidi [22,37] and included in the alliance Acoelorapho-Pinion tropicalis. In our analysis the association Byrsonimo pinetorum-Pinetum tropicalis-caribaeae (BYP) published by Borhidi [22] is perfectly separated from the previous ones, which is to be expected as it was published for rainier sites in western Cuba and included in the alliance Blechno serrulati-Acoelorraphion wrightii. This same author published the alliance Neomazaeo-Pinion caribaeae for the pine forests on rocky serpentine substrates in the Sierra de Cajalbana, where he includes three associations published by Samek [51], although two of them with a new name. Agavo cajalbanensi-Pinetum caribaeae, Guettardo-Pinetum caribaeae and Neomazaeo-Pinetum caribaeae are associations that are typified by Borhidi based on the relevés of Samek. Borhidi [22,37] published the alliance Pachyantho poirettii-Pinion caribaeae for the mixed forests of Pinus caribaea and Quercus oleoides subsp. sagraeana, subordinating it to the order Pinetalia tropicalis-caribaeae. He creates for this alliance the association Querco-Pinetum caribaeae for slates and sandstones in the Sierra de los Organos and the Sierra del Rosario. Due to its mixed forest characteristics, this alliance must be included in the order Pinetalia occidentalis-maestrensis. The alliance Cyrillo nipensis-Pinion cubensis described for rainy environments on ferritc soils and serpentines in northeast Cuba, with the association Cyrillo nipensis-Pinetum cubensis described in Toa River, Sierra de Maguey and Cupeyal, have been included in the order Podocarpo-Sloanetalia cutatellifolii Borhidi & Muñiz in Borhidi 1996, which consists of epiphyte-rich vegetation in rainy environments. Based on its floristic and physiognomic characteristics, this alliance
should be in the order *Pinetalia occidentalis-maestrensis*, which also includes the alliance *Pinion maestrensis*, with the association *Clethro cubensis-Pinetum maestrensis* described for olistrotrrophic soils in the rainy mountains of the Sierra Maestra; this association is clearly differentiated from the rest of the syntaxa in the study due to its floristic, ecological and biogeographical composition. All the relevés, including the *typus*, are separated in an independent group, as can be seen in the general cluster in Figure 2.

All the Cuban pine forests growing on ultramafic, serpentine, serpentinised peridotites and ferritic acid soils were included by Borhidi et al. [35] and Borhidi [22,37] in the class *Caseario crassinervis-Pinetea cubensis* Borhidi & Muñiz in Borhidi 1996, representing pine forests growing on ferritic acid soils derived from serpentes and very rich in endemics. The order *Pinetalia cubensis* Borhidi & Muñiz in Borhidi 1996 is created for this class, and includes the alliances *Andropogono-Pinion cubensis* to group the montane mesophilic pine forests growing on serpentine laterites, and *Guettardo ferrugineae-Pinion cubensis* to include the xeric pine forests on serpentines in eastern Cuba. The first alliance initially proposed by Borhidi comprised the associations *Rhynchosporo cernuae-Pinetum cubensis* Borhidi 1996 for decapitated ferritic substrates in Sierra de Nipe, and *Shafero-Pinetum cubensis* Borhidi & Muñiz 1996 for Sierra de Maguey. The following associations have been proposed for the second alliance *Anemio coriaceae-Pinetum cubensis* (ACP), *Euphorbio helenae-Pinetum cubensis* (EHP), (ASP): *Agao shaferi-Pinetum cubensis* (ASP) and *Draceno-Pinetum cubensis* (DCP), which were typified by Borhidi [22]. In our analysis these last four associations are grouped in the cluster, separated from the rest of the associations published by Reyes & Acosta [27], which denotes the strength of this alliance. These last authors do not recognise the alliance *Andropogono-Pinion cubensis*, which is recognised by Galán de Mera & Orellana [52], but they do accept the alliance *Guettardo ferrugineae-Pinion cubensis*, for which they propose various subassociations: *Caseario crassinervis-Pinenion cubensis, Garcenio-Pinenion cubensis, Dracano-Pinenion cubensis*. They include in these subassociations several new associations and the four associations mentioned previously ACP, EHP, ASP, and DCP. The subassociation *Draceno cubensis-Pinenion cubensis* Reyes in Reyes & Acosta 2012 is incorrect in virtue of article 27 [36], as it actually corresponds to a *status novo* under article 51 [36], and hence should be cited as *Draceno cubensis-Pinenion cubensis* (Borhidi 1991) Reyes in Reyes & Acosta 2012, with *Draceno-Pinetum cubensis* Borhidi 1991 as the basionym. These same authors create the alliance *Bactri cubensis-Pinenion cubensis* Reyes in Reyes & Acosta 2012, with two subassociations: *Panico-Pinenion cubensis* Reyes in Reyes & Acosta 2012 and *Cyrillo nipensis-Pinenion cubensis* Reyes in Reyes & Acosta 2012 for the ultramafic substrates in the Sierras de Nipe, Cuchillas and Baracoa, overlooking the fact that Borhidi et al. [35] and Borhidi [22,37] had previously described the alliance *Cyrillo nipensis-Pinion cubensis* with the association *Cyrillo nipensis-Pinetum cubensis* Borhidi & Muñiz 1991 for the serpentine substrates in eastern Cuba. The subassociation proposed by Reyes and Acosta should be synonymized to the one described by Borhidi (art. 2b [36]).

Reyes & Acosta [27] include 21 syntaxa with association rank, for which they propose eight new pine forest associations, one new status, and one new combination, in addition to nine new subassociations and two new combinations. The statistical analysis and the synthetic tables for the 180 relevés corresponding to the associations and subassociations included in the different subassociations and alliances show no substantial differences in some cases. The relevés in the association *Anthenanuito-Pinetum cubensis* created as a new combination, and for which two new combinations are in turn created with the rank of subassociation *euphorbiotosum* and subassociation *grisebachianthetosum nipensis*, form a clearly characterized and homogeneous group. In this case the association has been typified: Samek’s relevé 39 [53,54] is adopted as the type for *euphorbiotosum*, and for the subassociation *grisebachianthetosum nipensis*, the type relevé of the cluster (141ANP) is relevé 4 Table 14 of Reyes & Acosta [27]. Unfortunately, this last subassociation is incorrectly named, as the taxon *Grisebachianthus nipensis* also belongs to the type relevé of the association ARP, which leads to misinterpretation according to articles 26, 36 and 39 of the ICPN.
[36], as it is a syntaxon that only presents the endemisms Lobelia oxyphylla and Jacquinia robusta as differential in regard to the rest of the type. We therefore propose: jaquinietosum robustae subass. nova. The association Arthrostyledio-Pinetum cubensis represents a homogeneous group in the cluster in Figure 2 together with the subassociations annonetosum sclerophyllae and xylosnetosum buxifolii, which does not occur in the DECORANA ordination analyses. An analysis of the synthetic table shows floristic differences between ANP and ARP; however, the Jaccard distance is similar between both associations. The type of the association ARP and the types of its two subassociations show a close Jaccard distance given the similarity between the three syntaxa, and particularly between the type for the association and the type for the subassociation annonetosum sclerophyllae; however floristic differences can be seen in the table of type relevés, which together with the different ecology they present allows us to maintain both subassociations. The association Panico-Pinetum cubensis (PP) has been described for the altiplano in the Sierra de Nipe. The cluster analysis for the relevés forms a very homogeneous group, in which the association is differentiated from the subassociation lyonetosum affinis. However, in the Detrended Correspondence Analysis (DCA) the relevés tend to be intermixed with those of ANP and ARP, which is to be expected as they have a certain floristic similarity with these associations, and the Jaccard distance is similar between them (Table 2).
Table 2. Jaccard similarity analysis for the associations studied.

|       | 1DP | 6CP | 12LP | 32PP | 53PP | 75CSP | 80CSP | 82CSP | 88SP | 96SP | 99SP | 101AP | 104AP | 107AP | 111PFP | 113PFP | 116PFP | 121ANP | 163ARP | 166ARP | 171ARP | 173PHP | 180PHP |
|-------|-----|-----|------|------|------|-------|-------|-------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1DP   |     |     |      |      |      |       |       |       |      |      |      |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 6CP   | 0.02|     |      |      |      |       |       |       |      |      |      |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 12LP  | 0.04| 0.23|      |      |      |       |       |       |      |      |      |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 32PP  | 0   | 0.04|      |      |      |       |       |       |      |      |      |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 53PP  | 0.02| 0.06| 0.03 |      |      |       |       |       |      |      |      |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 75CSP | 0.02| 0.03| 0.04 | 0.18 |      |       |       |       |      |      |      |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 80CSP | 0.02| 0.02| 0.04 | 0.13 | 0.18 | 0.42  |       |       |      |      |      |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 82CSP | 0.02| 0.02| 0.04 | 0.08 | 0.11 | 0.4   | 0.53  |       |      |      |      |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 88SP  | 0.02| 0.01| 0.03 | 0.11 | 0.15 | 0.37  | 0.39  | 0.27  |      |      |      |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 96SP  | 0.02| 0   | 0.02 | 0.1  | 0.13 | 0.28  | 0.32  | 0.3   | 0.51 |      |      |       |       |       |       |       |       |       |       |       |       |       |       |
| 99SP  | 0.02| 0.01| 0.03 | 0.12 | 0.16 | 0.36  | 0.31  | 0.36  | 0.45 | 0.42 |      |       |       |       |       |       |       |       |       |       |       |       |       |
| 101AP | 0   | 0   | 0.09 | 0.06 | 0.22 | 0.3   | 0.25  | 0.34  | 0.29 | 0.31 |      |       |       |       |       |       |       |       |       |       |       |       |       |
| 104AP | 0.02| 0   | 0.05 | 0.08 | 0.2  | 0.25  | 0.28  | 0.19  | 0.16 | 0.23 | 0.43 |      |       |       |       |       |       |       |       |       |       |       |       |
| 107AP | 0   | 0.01| 0.02 | 0.1  | 0.23 | 0.2   | 0.25  | 0.17  | 0.26 | 0.35 | 0.47 |      |       |       |       |       |       |       |       |       |       |       |       |
| 111PFP| 0   | 0.01| 0.02 | 0.12 | 0.13 | 0.35  | 0.36  | 0.46  | 0.35 | 0.33 | 0.33 | 0.2  | 0.17 |      |       |       |       |       |       |       |       |       |       |
| 113PFP| 0   | 0.01| 0.01 | 0.08 | 0.12 | 0.3   | 0.26  | 0.41  | 0.29 | 0.31 | 0.23 | 0.15 | 0.12 | 0.58 |      |       |       |       |       |       |       |       |
| 116PFP| 0   | 0.01| 0.02 | 0.09 | 0.12 | 0.26  | 0.3   | 0.24  | 0.48 | 0.23 | 0.32 | 0.33 | 0.22 | 0.18 | 0.49 | 0.57 |      |       |       |       |       |       |       |
| 121ANP| 0   | 0.04| 0.02 | 0.2  | 0.1  | 0.12  | 0.08  | 0.2   | 0.14 | 0.13 | 0.09 | 0.04 | 0.04 | 0.16 | 0.17 | 0.18 |      |       |       |       |       |       |       |
| 163ARP| 0   | 0.03| 0.04 | 0.12 | 0.15 | 0.16  | 0.18  | 0.12  | 0.25 | 0.14 | 0.14 | 0.13 | 0.08 | 0.08 | 0.21 | 0.19 | 0.21 | 0.32 |      |       |       |       |
| 166ARP| 0   | 0.02| 0.03 | 0.2  | 0.15 | 0.13  | 0.16  | 0.11  | 0.17 | 0.1  | 0.12 | 0.09 | 0.07 | 0.07 | 0.19 | 0.15 | 0.16 | 0.34 | 0.59 |      |       |       |
| 171ARP| 0   | 0.03| 0.03 | 0.1  | 0.09 | 0.16  | 0.2   | 0.16  | 0.21 | 0.13 | 0.11 | 0.15 | 0.11 | 0.12 | 0.26 | 0.19 | 0.2  | 0.27 | 0.56 | 0.51 |      |       |
| 173PHP| 0   | 0   | 0.07 | 0.08 | 0.19 | 0.23  | 0.13  | 0.3   | 0.17 | 0.16 | 0.17 | 0.09 | 0.09 | 0.22 | 0.2  | 0.24 | 0.15 | 0.29 | 0.18 | 0.22 |      |       |
Coccocypselo herbacei-Pinetum cubensis is an association described by its authors for the territories in Cuchillas de Toa at an altitude of 400-700 m asl – and therefore with a thermodomical character – growing on ultramafic substrates and dark red ferritic soils. For this association, its authors describe two subassociations in addition to the type subassociation: ilicetosum repandae and schmidtottietosum shaferi. The ordination analysis for the general cluster in Figure 2 shows a group with all the relevés corresponding to CSP, with two subgroups, one of which contains the typus relevé of the association (75CSP) corresponding to relevé 8 Table 4 Reyes & Acosta [27]; the other subgroup contains the typus for the two subassociations. Both type relevés are floristically and ecologically very close, and appear to be more a case of ecotones with neighboring associations, as stated by their authors for the subassociation ilicetosum repandae in regard to the contact with the submontane tropical and subtropical moist forest, as it happens in Hispaniola [20]. Schmidottietosum shaferi has been characterized by species with a broad distribution, all of which are native, and which have even been used as characteristic plants for both subassociations with the rank of genus, without specifying the species. Schmidottia shaferi has been used as a characteristic for the suballiance Cyrillo nipensis-Pinenion cubensis, and also gives the name to the subassociation. Schmidottia shaferi belongs to various associations (Tables A1 and A2), and has been used to name Schmidottio shaferi-Pinetum cubensis, an association that is very close to the previous one in terms of its floristic similarity, as can be seen in the various ordinations we performed and in the table of typus. For this last association, Schmidottio shaferi-Pinetum cubensis, the authors propose the subassociations shafretosum platyphyllae and acrosynanthetosum trachyphylli; both form a compact subgroup separated from the type association. It is evident that the subassociation acrosynanthetosum trachyphylli represents an ecotone contact with Acrosynantho trachyphylli-Pinetum cubensis, an association described in the ophiolitic complex in western Cuba and with high rainfall, for which, in addition to the type subassociation, its authors describe the subassociations ossaeetosum shaferi and psychotrietosum grandis. Both subassociations form a subgroup separated from the typus of the association (see table on the comparative analysis of typus); the subassociation ossaeetosum shaferi is characterised by the endemisms Gesneria wrightii Urb., Ilex hypaneura Loes. and Ossaea shaferi Britton & P.Wils. (syn.= Miconia jashaferi Majure & Judd.) However, the subassociation psychotrietosum grandis presents the following species as differentials of the association of native species with a broad distribution: Palicourea dominguensis, Pimenta odilens, Psychotria grandis, Purdiaeae parvifolia and Vanilla bicolor. This subassociation is really a catenal contact with the broadleaved forests and should therefore have been treated as a variant. In the case of Protio fraganti-Pinetum cubensis described for the extreme northwest of the municipality of Baracoa, this is a pine forest whose authors claim is located at low altitudes in islands of ultramafic substrates, contacting at higher altitudes with the tropical and subtropical moist forest. This is therefore an edaphoxeric and thermotropical pine forest located on sites with steep slopes. The general cluster shows that the association (type relevé 111PP), corresponding to relevé 4 Table 11 Reyes & Acosta [27], forms a subgroup with the subassociation myricetosum, whereas the subassociation notodonetosum roigii constitutes an independent subgroup. However, Notodon roigii has been used exclusively as a differential species; this is a native plant with a broad distribution. The subassociation myricetosum presents the following endemisms as differential species for the type of the association: Calycogonium cristalensis Urb., Chiococca cubensis Urb., Purdiaeae eknami Vict. and P. stenopetala Griseb. Finally, as in previous cases the relevés for the association Phyllantho mirifico-Pinetum cubensis represent a homogeneous group in the general cluster, separating into subgroups the relevés corresponding to the association from those of the subassociation pitcairnetosum cubensis; this separation can be observed in the comparative analysis of the typus for the syntaxa.

Therefore, to avoid confusion we propose a change of status for the following subassociations: we propose a change from the subassociation to variant rank for subass. ilicetosum repandae Reyes & Acosta 2012: syn. var. with Ilex repanda; subass. schmidottietosum shaferi Reyes & Acosta 2012: syn. var. with Schmidottia shaferi; subass. acrosynanthetosum...
trachyphylli Reyes & Acosta 2012: syn. var. with Acrosyanthus trachyphyllus; subass. psychotrietosum grandis Reyes & Acosta 2012: var. with Psychotria grandis; subass. notodonetosum roigii Reyes & Acosta 2012: syn. var. with Notodon roigii (article 27 [36]).

5. Conclusions
All the Caribbean pine forests are included in 4 orders and 12 alliances, with a total of 34 plant associations. The high diversity of syntaxa is due to the special characteristics of the territory, as these are islands with a high rate of endemisms and numerous different substrates. Siliceous, basic, and neutral substrates, and ophite, andesite and serpentine rocks are very frequent, leading to a wide range of different soil types. All this is favoured by the special orography of the islands, as there are steep slopes with gradients between 30 and 60°. The analysis of the studies by several authors and by ourselves reveals a high number of syntaxa with the rank of association and subassociation, and ecological and geographic variants. In this work we update several syntaxa based on the nomenclature of the ICPN [36] in order to avoid possible nomenclatural conflicts, and we include all the associations described until now. Finally, we propose the following syntaxonomic checklist for all the Caribbean pine forests.

Syntaxonomic Checklist

**BYRSONIMO CRASSIFOLIAE-PINETEA CARIBAEAE** Samek & Borhidi in Borhidi 1996

*Pinetalia tropicalis-caribaeae* Samek & Borhidi in Borhidi 1996

Acoelorrapho-Pinion tropicalis Samek in Borhidi 1996

*Paepalantho seslerioidis-Pinetum tropicalis* Sameck 1969

*Roigello-Pinetum tropicalis* (Samek 1969) Borhidi 1996

*Blechno serrulati-Acoelorraphion wrightii* Hadac & Hadacová 1971

*Byrsonimo pinetorum-Pinetum tropicalis-caribaeae* Borhidi & Capote 1991

Neomazaeo-Pinion caribaeae Borhidi 1991

*Neomazaeo-Pinetum caribaeae* (Samek 1973) Borhidi 1991

*Guettardo valenzuelanae-Pinetum caribaeae* Borhidi 1996

*Agaro cajalbanensi-Pinetum caribaeae* Sameck 1973 corr. Borhidi 1991

*Ilici tuerckheimi-Pinion occidentalis* Cano, Veloz & Cano-Ortiz 2011

*Dendropemon phycnophylli-Pinetum occidentalis* Cano, Veloz & Cano-Ortiz 2011

*Cocottroino scopari-Pinetum occidentalis* Cano, Veloz & Cano-Ortiz 2011

*Pinetalia occidentalis-maestrensis* Borhidi 1991

*Pinion maestrensis* Borhidi 1996

*Clethro cubensis-Pinetum maestrensis* Borhidi 1991

*Pachyantho poirettii-Pinion caribaeae* Borhidi & Capote in Borhidi 1991

*Querco-Pinetum caribaeae* Borhidi & Capote in Borhidi 1991

**CASEARIO CRASSINERVIS-PINETEA CUBENSIS** Borhidi & Muñiz in Borhidi 1996

*Pinetalia cubensis* Borhidi & Muñiz in Borhidi 1996

*Andropogono reinoldii-Pinion cubensis* Borhidi 1996

*Shafero-Pinetum cubensis* Borhidi & Muñiz 1996

*Rhynchosporo cernuae-Pinetum cubensis* Borhidi 1996

*Guettardo ferrugineae-Pinion cubensis* Borhidi 1996

*Caseario crassinervis-Pinenion cubensis* Reyes in Reyes & Acosta 2012
Anthaenantio-Pinetum cubensis (Samek 1973) Reyes & Acosta 2012
iaquinietosum oxiphyllae Reyes & Acosta 2012 ex Cano et al. hoc loco
euphorbietsosum Reyes & Acosta 2012
Eugenio-Pinetum cubensis Del Risco, Samek & Reyes 1996
Anemio coriaceae-Pinetum cubensis (Samek 1973) Borhidi 1991
Garcinio-Pinenion cubensis Reyes in Reyes & Acosta 2012
Arthrostylidio-Pinetum cubensis Reyes in Reyes & Acosta 2012
annonetosum sclerophyllae Reyes & Acosta 2012
xylosnetosum buxifolii Reyes & Acosta 2012
Phyllantho mirifico-Pinetum cubensis Reyes & Acosta 2012
Scenery-Pinetum cubensis Del Risco, Samek & Reyes 1996
Euphorbio helenae-Pinetum cubensis Borhidi 1996
Agavo shaferi-Pinetum cubensis Borhidi 1996
Vernonio-Pinenion cubensis Samek, Del Risco & Reyes 1996
Dracaeno cubensis-Pinenion cubensis (Borhidi 1991) Reyes in Reyes & Acosta 2012
Dracaeno-Pinetum cubensis Borhidi 1991
Bactri cubensis-Pinion cubensis Reyes in Reyes & Acosta 2012
Panico-Pinenion cubensis Reyes in Reyes & Acosta 2012
Panico-Pinetum cubensis (Samek 1973) Reyes stat. nov. Reyes & Acosta 2012
lyonetosum affinis Reyes & Acosta 2012
Coccocypselo herbacei-Pinetum cubensis Reyes & Acosta 2012
var. with Ilex repanda
var. with Schmidtottia shaferi
Schmidtottio shaferi-Pinetum cubensis Reyes & Acosta 2012
shaferetosum platphyllae Reyes & Acosta 2012
var. with Acrosynanthus trachyphyllus
Acrosynanha trachyphylli-Pinetum cubensis Reyes & Acosta 2012
ossaetosum shaferi Reyes & Acosta 3012
var. with Psychotria grandis
Protio fraganti-Pinetum cubensis Reyes & Acosta 2012
myricetosum Reyes & Acosta 2012
var. with Notodon roigii
Clidemio rubrinervis-Pinetum cubensis Del Risco, Samek & Reyes 1996
Gundlachio-Pinetum cubensis Samek, Del Risco & Reyes 1996
Illici-Pinetum cubensis Reyes, Samek & Del Risco 1996
Agavo albescentis-Pinion cubensis Reyes in Reyes & Acosta 2012
Alvaradoo-Pinetum cubensis Samek, del Risco & Reyes 1996
Cyrillo nipensis-Pinenion cubensis Borhidi & Muñiz in Borhidi 1996 (Syn.: Cyrillo nipensis-Pinenion cubensis Reyes in Reyes & Acosta 2012, art. 2b ICPN)
Cyrillo nipensis-Pinetum cubensis Borhidi & Muñiz 1991
PHYLLANTHIDAE

PHYLLANTHUS HEDERAIFOLIUS Borhidi & Muñiz in Borhidi 1996

Ariadna shaferi-Phyllanthetalia myrtilloiis Borhidi & Muñiz in Borhidi 1996

Rondeletio christii-Pinion occidentalis Cano, Cano-Ortiz, Del Río, Veloz & Esteban 2014

Leptogono Buchii-Pinetum occidentalis Cano, Veloz & Cano Ortiz 2011

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Appendix A: supplementary material

Table A1  | Synthetic analysis of the syntaxa studied.
Table A2  | Comparative analysis of the typus of the syntaxa studied.

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Table A1. Synthetic analysis of the syntaxa studied.

| Taxon                                      | Status | DP | CP | LP | CLP | PAP | BYP | QUP | ACP | EHP | ASP | DCP | PP | CSP | SP | AP | PFP | ANP | ARP | PHP |
|--------------------------------------------|--------|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|-----|-----|-----|-----|
| *Pinus cubensis*                           | E      |    |    |    |     |     |     |     |     |     |     |     |    |    |    |    |     |     |     |     |
| *Pteridium caudatum*                       | N      |    |    |    |     |     |     |     |     |     |     |     |    |    |    |    |     |     |     |     |
| *Odontosoria aculeata*                     | N      |    |    |    |     |     |     |     |     |     |     |     |    |    |    |    |     |     |     |     |
| *Clusia rosea*                             | N      |    |    |    |     |     |     |     |     |     |     |     |    |    |    |    |     |     |     |     |
| *Ilex macfadyenii*                         | N      |    |    |    |     |     |     |     |     |     |     |     |    |    |    |    |     |     |     |     |
| *Miconia dodecandra*                       | N      |    |    |    |     |     |     |     |     |     |     |     |    |    |    |    |     |     |     |     |
| *Clusia tetrastigma*                       | E      |    |    |    |     |     |     |     |     |     |     |     |    |    |    |    |     |     |     |     |
| *Cyrilla nipensis*                         | N      |    |    |    |     |     |     |     |     |     |     |     |    |    |    |    |     |     |     |     |
| *Dicranopteris flexuosa*                   | N      |    |    |    |     |     |     |     |     |     |     |     |    |    |    |    |     |     |     |     |
| *Coccocyclus herbaceum*                    | N      |    |    |    |     |     |     |     |     |     |     |     |    |    |    |    |     |     |     |     |
| *Aristida refracta*                        | N      |    |    |    |     |     |     |     |     |     |     |     |    |    |    |    |     |     |     |     |
| *Andropogon gracilis*                      | N      |    |    |    |     |     |     |     |     |     |     |     |    |    |    |    |     |     |     |     |
| *Coccorinax orientalis*                    | E      |    |    |    |     |     |     |     |     |     |     |     |    |    |    |    |     |     |     |     |
| *Ichnanthus mayarensis*                    | E      |    |    |    |     |     |     |     |     |     |     |     |    |    |    |    |     |     |     |     |
| *Rhynchospora tenuis*                      | N      |    |    |    |     |     |     |     |     |     |     |     |    |    |    |    |     |     |     |     |
| *Myrica cerifera*                          | N      |    |    |    |     |     |     |     |     |     |     |     |    |    |    |    |     |     |     |     |
| *Panicum aciculare*                        | N      |    |    |    |     |     |     |     |     |     |     |     |    |    |    |    |     |     |     |     |

E: Endemic; N: Native.
| Species                          | N | I | II | III | IV | V | VI | VII |
|---------------------------------|---|---|----|-----|----|---|----|-----|
| Andropogon virginicus           |   |   |    |     |    |   |    |     |
| Psychotria revoluta             |   |   |    |     |    |   |    |     |
| Tillandsia fasciculata          |   |   |    |     |    |   |    |     |
| Ossaea pauciflora               |   |   |    |     |    |   |    |     |
| Panicum xalapense               |   |   |    |     |    |   |    |     |
| Baccharis scoparioides          |   |   |    |     |    |   |    |     |
| Andropogon bicornis             |   |   |    |     |    |   |    |     |
| Bactris cubensis                |   |   |    |     |    |   |    |     |
| Bletia purpurea                 |   |   |    |     |    |   |    |     |
| Eugenia pinetorum               |   |   |    |     |    |   |    |     |
| Vernonia urbaniana              |   |   |    |     |    |   |    |     |
| Casearia crassinervis           |   |   |    |     |    |   |    |     |
| Clerodendrum nipense            |   |   |    |     |    |   |    |     |
| Vaccinium cubense               |   |   |    |     |    |   |    |     |
| Bisgoeppertia scandens          |   |   |    |     |    |   |    |     |
| Angadenia cubensis              |   |   |    |     |    |   |    |     |
| Andropogon reinoldii            |   |   |    |     |    |   |    |     |
| Stigmaphyllum sagræanum         |   |   |    |     |    |   |    |     |
| Exsporrhia helenae              |   |   |    |     |    |   |    |     |
| Baccharis shaferi               |   |   |    |     |    |   |    |     |
| Ariadne shaferi                 |   |   |    |     |    |   |    |     |
| Guettarda ferruginea            |   |   |    |     |    |   |    |     |
| Guettarda monocarpa             |   |   |    |     |    |   |    |     |
| Chaplalia pumila                |   |   |    |     |    |   |    |     |
| Scaevola wrightii               |   |   |    |     |    |   |    |     |
| Senecio plumbeus                |   |   |    |     |    |   |    |     |
| Koanophyllum polystictum        |   |   |    |     |    |   |    |     |
| Species                                    | N | . | . | . | . | . | . | . | . | I | . | I | III | . | V | IV | V | IV |
|--------------------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|-----|---|---|---|---|---|
| *Vernonia pineticola*                      |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |
| *Vernonia hieracioides*                    |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |
| *Suberanthus stellatus.*                   |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |
| *Plum Neobracea valenzuelana*              |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |
| *Miconia baracoensis*                      |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |
| *Metopium venosa*                          |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |
| *Machaerina cubensis*                      |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |
| *Linodendron aronifolium*                  |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |
| *Jacaranda arborea*                        |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |
| *Lindendron aronioides*                    |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |
| *Machaerina cubensis*                      |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |
| *Metopium venosa*                          |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |
| *Miconia baracoensis*                      |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |
| *Neobracea valenzuelana*                   |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |
| *Plumeria elioides*                        |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |
| *Suberanthus stellatus.*                   |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |
| *Vernonia hieracioides*                    |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |
| *Vernonia pineticola*                      |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |

*Note:* The table above lists the species mentioned in the text, their scientific names, and a series of numbers that likely represent data or observations related to each species. The exact significance of these numbers is not specified in the provided text.
| Species                                      | N | IV | V | VI | VII | VIII | IX |
|----------------------------------------------|---|----|---|----|-----|------|----|
| *Catopsis* sp.                              | N | .  | . | .  | .   | .    | .  |
| *Coccoloba shaferi*                         | E | .  | . | .  | .   | .    | .  |
| *Vanilla planiflora*                        | N | .  | . | .  | .   | .    | .  |
| *Chamaecrista linearis*                     | E | .  | . | .  | .   | .    | .  |
| *Scleria havaensis*                         | E | .  | . | .  | .   | .    | .  |
| *Smilax havaensis*                          | N | .  | V | V  | .   | .    | .  |
| *Scleria lithosperma*                       | N | .  | V | V  | .   | .    | .  |
| *Dodonaea viscosa*                          | N | .  | IV | V  | .   | .    | .  |
| *Lasiacis divaricata*                       | N | .  | III| II  | .   | .    | .  |
| *Byrsoma crassifolia*                       | N | .  | IV | IV | 2   | V    | .  |
| *Tillandsia balbisiana*                     | N | .  | III| II  | .   | .    | .  |
| *Chrysolepis oliviforme var. oliviforme*    | N | .  | V | V  | .   | .    | .  |
| *Centrolea virginiana*                      | N | .  | V | .  | III | +    | .  |
| *Cassia filiformis*                         | N | .  | I  | I II| +   | .    | .  |
| *Scleria secans*                            | N | .  | I  | I  | .   | .    | .  |
| *Miconia laevigata*                        | N | .  | I  | I  | .   | .    | .  |
| *Passiflora suberosa*                       | N | .  | IV | .  | .   | .    | .  |
| *Swietenia mahagoni*                        | N | .  | IV | I  | .   | .    | .  |
| *Ternstroemia peduncularis*                 | N | .  | III| I   | .   | .    | .  |
| *Sideroxylon cubense*                       | N | .  | III| I   | .   | .    | .  |
| *Hypericum hypericoides*                    | N | .  | I  | .   | .   | .    | .  |
| *Angiadenia berteroi*                       | N | .  | III| .   | .   | .    | .  |
| *Myrica picardae*                           | N | IV | III| .   | .   | .    | .  |
| *Myrsine coriacea*                          | N | IV | I  | .   | .   | IV   | V  |
| *Brasenia chococtasia*                      | N | I  | V  | .   | .   | .    | .  |
| *Pinus occidentalis*                        | E | V  | V  | .   | .   | .    | .  |
| *Pteridium aquilinum*                       | N | IV | V  | .   | .   | .    | .  |
| Species                        | Atten. | Level | Hardiness |
|-------------------------------|--------|-------|-----------|
| Ilex tuerckheimii             | E      | IV    | I         |
| Dendropomum pycnocephalum     | E      | IV    | I         |
| Garrya fadgensii              | N      | V     |           |
| Baccharis myrsinites          | N      | V     |           |
| Lobelia rotundifolia         | N      | IV    |           |
| Laphosoria quadripinnata      | N      | IV    |           |
| Lycopodium fauvettii          | N      | IV    |           |
| Dendropomum constantiae       | E      | IV    |           |
| Tetrazygia urbaniana          | E      | IV    |           |
| Rubus eggersii                | E      | IV    |           |
| Dianthus domingensis          | E      | IV    |           |
| Weinmania pinnata L.          | N      | III   |           |
| Gaultheria domingensis        | E      | III   |           |
| Fuelsia pringsheimii          | E      | III   |           |
| Hypericum constanzae          | E      | III   |           |
| Miconia selleana              | N      | III   |           |
| Mykania barahonensis          | N      | III   |           |
| Lycopodium cernuum            | N      | I     |           |
| Lycopodium clavatum           | N      | I     |           |
| Lyonia heptamera              | E      | I     |           |
| Lyonia urbaniana              | E      | I     |           |
| Alsophila minor               | N      | I     |           |
| Pilea microphylla             | N      | I     |           |
| Blechnum fragile              | N      | I     |           |
| Blechnum occidentale          | N      | I     |           |
| Miconia krugii                | N      | I     |           |
| Microgramma piloselloides     | N      | I     |           |
| Species                              | E | I |
|--------------------------------------|---|---|
| Paepalanthus repens                  |   |   |
| Pelea ternifolia                     |   |   |
| Polypodium angustifolium             |   |   |
| Styxoe ochraceus                     |   |   |
| Eupatorium illitum                   |   |   |
| Cheilanthes nivea                    |   |   |
| Isachne rigidifolia                  |   |   |
| Ilex fuertesiana                     |   |   |
| Verbascum thapsus                    |   |   |
| Haematocylon campechanum L.          | V |   |
| Chiococca alba                       | V |   |
| Exostema spinosum                    | IV|   |
| Erythroxylum rufum                   | III| III|
| Eugenia odorata                      | III| III|
| Chrysobalanus icaco                  | III| III|
| Echites umbellata                    | III| III|
| Guettarda pungens                    | III| III|
| Leptogonium buchii                   | III| III|
| Jacaranda ekmanii                    | III| III|
| Meschites repens                     | III| III|
| Coccoloba buchii                     | V | V |
| Coccoloba fuertesii                  | IV| IV |
| Comocladia cuneata                   | III| III|
| Comocladia pinnatifolia              | I | III|
| Cordia lima                          | V | V |
| Ouratea ilicifolia                   | IV| IV |
| Oceoclades maculata                  | I | I |
| Scientific Name                  | Assigned Area 1 | Assigned Area 2 | Assigned Area 3 | Assigned Area 4 | Assigned Area 5 | Assigned Area 6 | Assigned Area 7 | Assigned Area 8 | Assigned Area 9 | Assigned Area 10 | Assigned Area 11 | Assigned Area 12 | Assigned Area 13 | Assigned Area 14 | Assigned Area 15 | Assigned Area 16 | Assigned Area 17 |
|---------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Ocotea coriacea                 | N               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               |
| Croton linearis                 | N               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               |
| Passiflora bilobata             | N               | IV              | IV              | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               |
| Passiflora murucuja             | N               | V               | V               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               |
| Psychotria dolichocalyx         | E               | V               | V               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               |
| Poitea pascifolia               | N               | IV              | IV              | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               |
| Rajania quinquefolia            | N               | IV              | IV              | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               |
| Randia aculeata                 | N               | V               | IV              | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               |
| Rondeletia christii             | E               | IV              | IV              | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               |
| Securidaca virgata              | N               | IV              | IV              | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               |
| Simarouba berteroana            | E               | III             | III             | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               |
| Stigmaphyllum emarginatum       | N               | V               | V               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               |
| Tabebuia berteri                | E               | IV              | IV              | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               |
| Turneria ulmifolia              | N               | III             | III             | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               |
| Tillandsia recurvata            | N               | III             | III             | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               |
| Sabal domingensis               | E               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               |
| Rynchosia reticulata            | N               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               |
| Samyda dodocandra               | N               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               |
| Bursiera simaruba               | N               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               |
| Calophyllum calaba              | N               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               |
| Diosia eckmani                 | E               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               |
| Chamaesyce berteroana           | N               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               |
| Eugenia domingensis             | N               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               |
| Eugenia maleolens               | N               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               |
| Polygala penae                 | N               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               |
| Pictetia spinifolia            | N               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               |
| Pimenta ozua                    | E               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               | I               |
| Species                          | Letter | I  | II | III |
|---------------------------------|--------|----|----|-----|
| Lantana camara                  | N      | I  | I  |     |
| Lonchocarpus neurophyllus       | E      | I  | I  |     |
| Maytenus domingensis            | E      | I  | I  |     |
| Serjania polyphylla             | N      | I  | I  |     |
| Coreopsis buchii                | N      | I  | I  |     |
| Artemisia                       | N      |     |    |     |
| Chamaesyce adenoptera           | N      | I  | I  |     |
| Gnaphalium eggersii             | N      | I  | I  |     |
| Garrya fadyenii                 | N      | I  | I  |     |
| Tetramicra ekmanii              | N      | I  | I  |     |
| Dillenia americana              | N      | I  | I  |     |
| Eupatorium gabbi                | E      |     |    |     |
| Eupatorium sinuatum var. viscigerum | E  |     |    |     |
| Chamaecrista glandulosa var. picardiae | E  |     |    |     |
| Lyonia truncatula var. truncatula | E  |     |    |     |
| Dillenia americana              | N      | I  | I  |     |
| Eupatorium gabbi                | E      | I  | I  |     |
| Eupatorium sinuatum var. viscigerum | E  | I  | I  |     |
| Lyonia truncatula var. truncatula | E  | I  | I  |     |
| Chamaesyce adenoptera subsp. adenoptera | N  | I  | I  |     |
| Agave intermixta                | E      | I  | I  |     |
| Artemisia peruviana             | N      | I  | I  |     |
| Coreopsis buchii                | E      | I  | I  |     |
| Lygodium venetum                | N      | I  | I  |     |
| Wedelia reticulata              | N      |     |    |     |
| Species                          | E  | N  |  |
|---------------------------------|----|----|---|
| Eupatorium illitum              | E  | N  |  |
| Galactia dicyophylla            | E  | N  |  |
| Galactia rudolphioides var. haitiensis | E  | N  |  |
| Coniza canadensis               | E  | N  |  |
| Cordia selleana                 | E  | N  |  |
| Meschites angustifolia           | E  | N  |  |
| Piptadenia peregrina            | E  | N  |  |
| Leptochloa monticola            | E  | N  |  |
| Artemisia domingensis           | E  | N  |  |
| Boonia frutescens               | E  | N  |  |
| Cestrum brefeldii               | E  | N  |  |
| Setaria glauca                  | E  | N  |  |
| Vernonia fruticosa              | E  | N  |  |
| Vernonia sprengeliana           | E  | N  |  |
| Chaptalia angustata             | E  | N  |  |
| Diodia rigida                   | E  | N  |  |
| Ipomoea viridiflora             | E  | N  |  |
| Forestiera selleana             | E  | N  |  |
| Pitcairnia domingensis          | E  | N  |  |
| Polygala crucianelloides        | E  | N  |  |
| Melochia tomentosa              | E  | N  |  |
| Anemia adiantifolia             | E  | N  |  |
| Citharexylum schulzii           | E  | N  |  |
| Cuscuta americana               | E  | N  |  |
| Ateleia gummiifera              | E  | N  |  |
| Passiflora anadenia             | E  | N  |  |
| Dillenia americana              | E  | N  |  |
| Species                          | Life Form | Life Form | Life Form | Life Form | Life Form | Life Form | Life Form | Life Form | Life Form | Life Form | Life Form |
|---------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| *Lygodium venetum*              | N         | IV        |           |           |           |           |           |           |           |           |           |
| *Sicietina mahagoni*            | N         | IV        |           |           |           |           |           |           |           |           |           |
| *Piptadenia peregrina*          | N         | III       |           |           |           |           |           |           |           |           |           |
| *Wedelia reticulata*            | N         | III       |           |           |           |           |           |           |           |           |           |
| *Cassytha filiformis*           | N         | I         |           |           |           |           |           |           |           |           |           |
| *Desmodium barbatum*            | N         | II        | IV        | I         |           |           |           |           |           |           |           |
| *Callicarpa ferruginea*          | N         | II        |           |           |           |           |           |           |           |           | I         |
| *Phaiai tunkervilliae*          | N         | II        |           | III       | IV        | I         |           |           |           |           | I         |
| *Panicum scoparium*              | N         | III       |           |           |           |           |           |           |           |           |           |
| *Ascyrum hypericoides*           | N         | II        |           |           |           |           |           |           |           |           |           |
| *Clidemia hirta*                | N         | II        |           |           |           |           |           |           |           |           |           |
| *Clidemia strigillosa*           | N         | II        |           |           |           |           |           |           |           |           |           |
| *Clusia minor*                  | N         | II        |           |           |           |           |           |           |           |           |           |
| *Panicum boliviense*             | N         | III       |           |           |           |           |           |           |           |           |           |
| *Clidemia umbellata*             | N         | V         |           |           |           |           |           |           |           |           | I         |
| *Trema cubensis*                 | E         | V         |           |           |           |           |           |           |           |           |           |
| *Lonia calycosa*                 | E         | V         |           |           |           |           |           |           |           |           |           |
| *Blechnum occidentale*           | N         | V         |           |           |           |           |           |           |           |           |           |
| *Hypericum hypericoides*         | N         | V         |           |           |           |           |           |           |           |           |           |
| *Mataqua domingensis*            | N         | IV        |           |           |           |           |           |           |           |           |           |
| *Ageratina paucibracteata*       | E         | IV        |           |           |           |           |           |           |           |           |           |
| *Clethra cubensis*               | E         | IV        |           |           |           |           |           |           |           |           |           |
| *Pyrogramsma sulphurea*          | N         | IV        |           |           |           |           |           |           |           |           |           |
| *Rubus turquinensis*             | E         | III       |           |           |           |           |           |           |           |           |           |
| *Sapium erythrospermum*          | N         | III       |           |           |           |           |           |           |           |           |           |
| *Sapium jamaicense*              | N         | III       |           |           |           |           |           |           |           |           |           |
| *Vaccinium leonis*               | E         | III       |           |           |           |           |           |           |           |           |           |
| Species                        | Zone | Coverage | Wetness | Ancestry | Size   | Activity | Growth | productivity | Light | Shade | Wind | Temperature | Soil | Distance | Neighbors |
|-------------------------------|------|----------|---------|----------|--------|----------|--------|--------------|-------|-------|------|-------------|------|----------|-----------|
| Dennstaedtia adiantoides      | N    | III      |         |          |        |          |        |              |       |       |      |             |      |          |           |
| Cyrilla racemisflora          | N    | III      |         |          |        |          |        |              |       |       |      |             |      |          |           |
| Lobelia assurgens             | N    | III      |         |          |        |          |        |              |       |       |      |             |      |          |           |
| Cyathrea aranosa              | N    | III      |         |          |        |          |        |              |       |       |      |             |      |          |           |
| Cyathrea arborea              | N    | III      |         |          |        |          |        |              |       |       |      |             |      |          |           |
| Cocculus pseudox lancelatum   | N    | II       |         |          |        |          |        |              |       |       |      |             |      |          |           |
| Critonia dalea                | N    | II       |         |          |        |          |        |              |       |       |      |             |      |          |           |
| Cyathrea armata               | N    | II       |         |          |        |          |        |              |       |       |      |             |      |          |           |
| Tabebia hypeoleuca            | E    | II       |         |          |        |          |        |              |       |       |      |             |      |          |           |
| Tibouchina longifolia         | N    | II       |         |          |        |          |        |              |       |       |      |             |      |          |           |
| Vernonia poduliceps           | N    | II       |         |          |        |          |        |              |       |       |      |             |      |          |           |
| Weinmannia pinata             | N    | II       |         |          |        |          |        |              |       |       |      |             |      |          |           |
| Wigandia reflexa              | N    | II       |         |          |        |          |        |              |       |       |      |             |      |          |           |
| Viburnum villosum             | N    | II       |         |          |        |          |        |              |       |       |      |             |      |          |           |
| Solonia reflexa               | E    | II       |         |          |        |          |        |              |       |       |      |             |      |          |           |
| Garrya fadynii                | N    | II       |         |          |        |          |        |              |       |       |      |             |      |          |           |
| Rondeletia calophylla         | E    | II       |         |          |        |          |        |              |       |       |      |             |      |          |           |
| Dalbergia cahensis            | N    | II       |         |          |        |          |        |              |       |       |      |             |      |          |           |
| Habenaria monorrhiza          | N    | II       |         |          |        |          |        |              |       |       |      |             |      |          |           |
| Laphosoria quadriflora       | N    | II       |         |          |        |          |        |              |       |       |      |             |      |          |           |
| Lycopodium dichotomum         | N    | II       |         |          |        |          |        |              |       |       |      |             |      |          |           |
| Lyonia maestrensis            | E    | II       |         |          |        |          |        |              |       |       |      |             |      |          |           |
| Miconia acureae               | E    | II       |         |          |        |          |        |              |       |       |      |             |      |          |           |
| Miconia alternifolia          | E    | II       |         |          |        |          |        |              |       |       |      |             |      |          |           |
| Miconia punctata              | N    | II       |         |          |        |          |        |              |       |       |      |             |      |          |           |
| Purdua maestrensis            | E    | II       |         |          |        |          |        |              |       |       |      |             |      |          |           |
| Myrica cacuminis              | E    | II       |         |          |        |          |        |              |       |       |      |             |      |          |           |
| Specie                                      | Code | Subsp. | Code | Code |
|--------------------------------------------|------|--------|------|------|
| Nephrolepis biserrata                       | N    |        | II   |      |
| Odontosoria uncinella                       | N    |        | II   |      |
| Ossaea maricata                             | E    |        | I    |      |
| Palicourea alpina                           | N    |        | I    |      |
| Myrica punctata                             | N    |        | I    |      |
| Myrcia splendens                            | N    |        | I    |      |
| Rondeletia naguensis                        | E    |        | I    |      |
| Eugenia rigida                              | N    |        | I    |      |
| Gesneria viridiflora                        | E    |        | I    |      |
| Graffenrieda refescens                      | E    |        | I    |      |
| Helmosum grisebachii                        | N    |        | I    |      |
| Sauvagesia brownei                          | N    |        | +    |      |
| Buchnera elongata                           | N    |        | +    |      |
| Tetrandra eulakiae                          | E    |        | +    |      |
| Trachypogon filiformis                      | N    |        | 1    | IV   |
| Acerolrhapia wrightii                        | N    |        | +    | IV   |
| Eugenia punicifolia                         | N    |        | +    |      |
| Tabebuia lepidophylla                       | E    |        | 1    | V    |
| Pinus tropicalis                            | E    |        | 2    | V    |
| Roigella corrifolia                         | E    |        | 1    | IV   |
| Coccothrinax miraguama subsp. arenicola     | E    |        | 1    | IV   |
| Croton cerinns                              | E    |        | 1    | V    |
| Croton crispedotrichus                      | E    |        | +    | V    |
| Calyptranthes pinetorum                     | E    |        | +    | II   |
| Phyllanthus juncens                         | E    |        | +    | II   |
| Chaetolepis cubensis                        | N    |        | 1    | II   |
| Evolulus grisebachii                        | N    |        | +    | I    |
| Species                          | A  | B  | C  | D  | E  | F  | G  | H  | I  | J  | K  | L  | M  | N  | O  | P  | Q  | R  | S  | T  | U  | V  |
|---------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Xiphidium xanthorrhizum         | E  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Xyris elliottii                 | N  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Hypericum styphelioides         | E  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Syngonanthus insularis          | E  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Scleria verticillata            | N  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Rhynchospora globosa            | E  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Lachnorrhiza piloselloides      | E  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Lyonia vaccinioides             | N  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Andropogon multinervosus        | N  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Byrsonima wrightiana            | E  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Miconia androsaemifolia         | N  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Phyllanthus heliotropus         | E  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Polygala uncinata               | E  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Sachisia polycephala            | N  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Tabernaemontana amblyocarpa      | N  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Oxalis pinetorum                | N  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Leptocoryphium lanatum          | N  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Andropogon nashianus            | N  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Panicum fusiforme               | N  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Sida linifolia                  | N  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Malpighia hirsuta               | N  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Sebastiania corniculata         | N  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Waltheria americana             | N  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Pachypanthus poireti            | N  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Pinus caribaea                  | E  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Tetrazygia bicolor              | N  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Miconia ibaguensis              | N  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Species                        | Column 1 | Column 2 | Column 3 | Column 4 | Column 5 | Column 6 | Column 7 | Column 8 | Column 9 | Column 10 |
|-------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|
| Richarida muricata            | N        | E        | IV       | IV       | IV       | IV       | IV       | IV       | IV       | IV        |
| Heptanthus sp                  | N        | E        | IV       | IV       | IV       | IV       | IV       | IV       | IV       | IV        |
| Hypsicapse pedalis             | E        | E        | IV       | IV       | IV       | IV       | IV       | IV       | IV       | IV        |
| Aristida neglecta             | N        | E        | IV       | IV       | IV       | IV       | IV       | IV       | IV       | IV        |
| Byrsonima pinetorum           | N        | E        | IV       | IV       | IV       | IV       | IV       | IV       | IV       | IV        |
| Mesostemum filiforme          | N        | E        | IV       | IV       | IV       | IV       | IV       | IV       | IV       | IV        |
| Melochia savannorum           | E        | E        | IV       | IV       | IV       | IV       | IV       | IV       | IV       | IV        |
| Meschites roseus              | E        | E        | IV       | IV       | IV       | IV       | IV       | IV       | IV       | IV        |
| Aristida vilosa               | N        | E        | IV       | IV       | IV       | IV       | IV       | IV       | IV       | IV        |
| Borreria thyrocephala         | N        | E        | IV       | IV       | IV       | IV       | IV       | IV       | IV       | IV        |
| Burmannia capitata            | N        | E        | IV       | IV       | IV       | IV       | IV       | IV       | IV       | IV        |
| Byrsonima hystrix             | N        | E        | IV       | IV       | IV       | IV       | IV       | IV       | IV       | IV        |
| Diosia teres                  | N        | E        | IV       | IV       | IV       | IV       | IV       | IV       | IV       | IV        |
| Paspalum multicaule           | N        | E        | IV       | IV       | IV       | IV       | IV       | IV       | IV       | IV        |
| Rhynchospora cyperoides       | N        | E        | IV       | IV       | IV       | IV       | IV       | IV       | IV       | IV        |
| Cassia diphylla               | N        | E        | IV       | IV       | IV       | IV       | IV       | IV       | IV       | IV        |
| Cocothrinax wrightii          | E        | E        | IV       | IV       | IV       | IV       | IV       | IV       | IV       | IV        |
| Cassia pilosa                 | N        | E        | IV       | IV       | IV       | IV       | IV       | IV       | IV       | IV        |
| Cassia serpens                | N        | E        | IV       | IV       | IV       | IV       | IV       | IV       | IV       | IV        |
| Curatella americana           | N        | E        | IV       | IV       | IV       | IV       | IV       | IV       | IV       | IV        |
| Richardia scabra              | N        | E        | IV       | IV       | IV       | IV       | IV       | IV       | IV       | IV        |
| Rhynchospora seslerioides     | E        | E        | IV       | IV       | IV       | IV       | IV       | IV       | IV       | IV        |
| Lacnoorhiza piloselloides     | E        | E        | IV       | IV       | IV       | IV       | IV       | IV       | IV       | IV        |
| Andropogon virgatus           | N        | E        | IV       | IV       | IV       | IV       | IV       | IV       | IV       | IV        |
| Rhynchospora plumosa          | N        | E        | IV       | IV       | IV       | IV       | IV       | IV       | IV       | IV        |
| Eriosema crinitum             | N        | E        | IV       | IV       | IV       | IV       | IV       | IV       | IV       | IV        |
| Species                          | Code | Code | Code | Code | Code |
|----------------------------------|------|------|------|------|------|
| Cynanchum savannarum             | N    | .    | .    | .    | III  |
| Chamaesycera pinionana           | N    | .    | .    | .    | III  |
| Aster grisebachii                | E    | .    | .    | .    | II   |
| Arthropogon piptostachyus        | N    | .    | .    | .    | II   |
| Borreria strumphioides           | N    | .    | .    | .    | II   |
| Rhynchospora wrightiana          | N    | .    | .    | .    | II   |
| Decleria fruticosa               | N    | .    | .    | .    | II   |
| Galactia isopoda                 | N    | .    | .    | .    | II   |
| Saccagesia tenella               | N    | .    | .    | .    | II   |
| Eragrostis cubensis              | N    | .    | .    | .    | II   |
| Caphea micrantha                 | N    | .    | .    | .    | II   |
| Conostega xalapensis             | N    | .    | .    | .    | II   |
| Schultesia guianensis subsp. nana| N    | .    | .    | .    | II   |
| Sporobolus virginicus            | N    | .    | .    | .    | II   |
| Stenandrum ovatum                | E    | .    | .    | .    | II   |
| Piriqueta cistoides              | N    | .    | .    | .    | II   |
| Rhexia cubensis                  | N    | .    | .    | .    | II   |
| Polygala wrightii                | E    | .    | .    | .    | II   |
| Polygala squamifolia             | E    | .    | .    | .    | II   |
| Pisonia rotundata                | N    | .    | .    | .    | II   |
| Crithiovalaxus peliocarpus       | N    | .    | .    | .    | II   |
| Pachyanthus cubensis             | E    | .    | .    | .    | II   |
| Pachyanthus wrightii             | N    | .    | .    | .    | II   |
| Lyonia myrtilloides              | E    | .    | .    | .    | II   |
| Tetrazizia delicatula            | N    | .    | .    | .    | II   |
| Herpyza grandiflora              | E    | .    | .    | .    | II   |
| Angelonia pilosella              | N    | .    | .    | .    | II   |
| Species                        | Presence | Notes |
|-------------------------------|----------|-------|
| Aristida ternipes             | N        |       |
| Scoparia dulcis               | N        |       |
| Paeonia intermixta            | E        |       |
| Pinguicula filifolia          | E        |       |
| Copernicia curtissii          | E        |       |
| Mitracarpus glabrescentes     | N        |       |
| Cordia lineata                | N        |       |
| Bulbostylis setacea           | E        |       |
| Stigmaphyllon microphyllum    | E        |       |
| Convolvulus angustifolius      | N        |       |
| Lachnanthes tinctoria         | N        |       |
| Jatropha angustifolia          | E        |       |
| Aeschynomene tenuis           | E        |       |
| Eupatorium villosum           | N        |       |
| Xyris navicularis             | N        |       |
| Alchornea latifolia           | N        | +     |
| Quercus sagradaea             | E        | 3     |
| Wedelia rugosa                | E        | 1     |
| Xylopia aromatica             | N        | 2     |
| Urena lobata                  | N        | +     |
| Vernonia cubensis             | N        | +     |
| Vernonia sagradaea            | N        | +     |
| Scleria cubensis              | N        | 1     |
| Eugenia farameoides           | E        | +     |
| Desmodium canum               | N        | 1     |
| Didimopanax morotonomi        | N        | +     |
| Davilla rugosa                | N        | 1     |
| Plant Name                        | Code | 1  | 2  | 1 | 2 | 1 | 2 |
|----------------------------------|------|----|----|---|---|---|---|
| Dendropanax cuneifolius          | E    | .  | .  |  .| . | . | . |
| Guarea guidonia                  | N    | .  | .  |  .| . | . | . |
| Hibiscus costatus                | N    | .  | .  |  .| . | . | . |
| Jambosa vulgaris                 | N    | .  | .  |  .| . | . | . |
| Matayba oppositifolia           | N    | .  | .  | 1 | . | . | . |
| Alsophila magassuroides          | N    | .  | .  | 1 | . | . | . |
| Amaoua corymbosa                | N    | .  | .  | 1 | . | . | . |
| Barbiera pinnata                 | N    | .  | .  | 1 | . | . | . |
| Blechnum serrulatum              | N    | .  | .  | 2 | . | . | . |
| Calophyllum pinetorum            | E    | .  | .  | 2 | . | . | . |
| Miconia prasina                  | N    | .  | .  | 2 | . | . | . |
| Mikania ranunculifolia           | E    | .  | .  |  .| . | . | . |
| Ossaea parviflora                | N    | .  | .  | 1 | . | . | . |
| Panicum chrysopсидifolium       | N    | .  | .  |  .| . | . | . |
| Panicum ischaemum               | N    | .  | .  |  .| . | . | . |
| Phania matricarioides            | N    | .  | .  |  .| . | . | . |
| Renalmia sp.                     | N    | .  | .  |  .| . | . | . |
| Rhus copallina subsp. leucantha  | N    | .  | .  | 1 | . | . | . |
| Rhynchosia minimia               | N    | .  | .  |  .| . | . | . |
| Galactia rudolphiiodes           | N    | .  | .  |  .| . | . | . |
| Casearia sylvestris var. myricoides | E | .  | .  |  .| . | IV| 1 |
| Clidemia rubinervis              | N    | .  | .  |  .| . | . | . |
| Eupatorium polystictum           | N    | .  | .  | 1 | 1 | . | . |
| Smilax balvisiana                | N    | .  | .  |  .| . | 1 | . |
| Echites crassipes                | N    | .  | .  |  .| . | . | . |
| Eupatorium ayapanoides           | N    | .  | .  |  .| . | . | . |
| Catopsis berteroniana            | N    | .  | .  |  .| . | . | . |
| Species                          | N  | .  | .  | .  | +  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  |
|---------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Rajania howardii                |    |    |    |    | +  |    |    |    |    |    |    |    |    |    |    |    |
| Rhynchospora shaferi           |    |    |    |    | +  |    |    |    |    |    |    |    |    |    |    |    |
| Rondeletia alaternoides        |    |    |    |    | +  |    |    |    |    |    |    |    |    |    |    |    |
| Imperata contracta             |    |    |    |    | +  |    |    |    |    |    |    |    |    |    |    |    |
| Stigmaphyllum lineare          |    |    |    |    | +  |    |    |    |    |    |    |    |    |    |    |    |
| Ipomoea ophitica               |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Maclura nipensis               |    |    |    |    | +  |    |    |    |    |    |    |    |    |    |    |    |
| Marsdenia linearis             |    |    |    |    | +  |    |    |    |    |    |    |    |    |    |    |    |
| Aristida eggersii              |    |    |    |    | +  |    |    |    |    |    |    |    |    |    |    |    |
| Coelanthia attenuata           |    |    |    |    | +  |    |    |    |    |    |    |    |    |    |    |    |
| Eupatorium lantanifolium       |    |    |    |    | +  |    |    |    |    |    |    |    |    |    |    |    |
| Phyllanthus myrtilloides subsp. shaferi | E   |    |    |    | +  |    |    |    |    |    |    |    |    |    |    |    |
| Rondeletia myrtacea            |    |    |    |    | +  |    |    |    |    |    |    |    |    |    |    |    |
| Lyonia nipensis                |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Rhynchospora cernua            |    |    |    |    | 1  |    |    |    |    |    |    |    |    |    |    |    |
| Polygala saginoides            |    |    |    |    | +  |    |    |    |    |    |    |    |    |    |    |    |
| Rhynchosia nipensis            |    |    |    |    | +  |    |    |    |    |    |    |    |    |    |    |    |
| Turnera diffusa                |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Spathelia pinetorum            |    |    |    |    | 1  |    |    |    |    |    |    |    |    |    |    |    |
| Rajania nipensis               |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Rhynchospora dixdon            |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Arthrostylium capillifolium    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Xylosma buxifolium             |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Callicarpa cuneifolia          |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Setaria tenax                  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Vernonia nipensis              |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Epidendrum coeleatum           |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Species                          | N | E | A | P | T | V | I | II | III | IV | V |
|---------------------------------|---|---|---|---|---|---|---|----|-----|----|---|
| Epidendrum howardii             |   |   |   |   |   |   |   |    |     |    |   |
| Eugenia subspinulosa           |   |   |   |   |   |   |   |    |     |    |   |
| Anemia nipensis                |   |   |   |   |   |   |   |    |     |    |   |
| Clusia nipensis                |   |   |   |   |   |   |   |    |     |    |   |
| Playgyna triandra              |   |   |   |   |   |   |   |    |     |    |   |
| Psychotria graminifolia        |   |   |   |   |   |   |   |    |     |    |   |
| Purdiaea nipensis              |   |   |   |   |   |   |   |    |     |    |   |
| Psidium parvifolium            | E |   |   |   |   |   | 1 | I  |     |    | V |
| Myrtus ophiticola              | N |   |   |   |   |   | 1 | IV | II  |    |   |
| Callicarpa oblancoelata        | E |   |   |   |   |   | 1 |    |     |    |   |
| Aristolochia lindeniana        | E |   |   |   |   |   | 1 | III|     |    |   |
| Guatteria moralesi             | N |   |   |   |   |   | 1 |    |     |    |   |
| Callicarpa urrightii           | E |   |   |   |   |   | 1 |    |     |    |   |
| Rajania baracoensis            | N |   |   |   |   |   | 1 |    |     |    |   |
| Rhyynchospora lindeniana       | E |   |   |   |   |   | 1 |    |     |    |   |
| Eugenia cycloidea              | E |   |   |   |   |   | 1 |    |     |    |   |
| Guettarda crassipes            | E |   |   |   |   |   | 2 |    |     |    |   |
| Chaptalia shaferi              | E |   |   |   |   |   | 1 |    |     |    |   |
| Heptanthus shaferi             | E |   |   |   |   |   | 1 |    |     |    |   |
| Jacquinia roigii               | E |   |   |   |   |   | 1 |    |     |    |   |
| Panicum breve                  | N |   |   |   |   |   | 1 |    |     |    |   |
| Casearia bissei                | E |   |   |   |   |   | 1 |    |     |    |   |
| Casearia ophiticola            | E |   |   |   |   |   | 1 |    |     |    |   |
| Angadenia moaensis             | N |   |   |   |   |   | 1 |    |     |    |   |
| Cassia lineata                 | N |   |   |   |   |   | 1 |    |     |    |   |
| Cordia duartei                 | E |   |   |   |   |   | 1 |    |     |    |   |
| Mouriri emarginata             | E |   |   |   |   |   | 1 |    |     |    |   |
| Species                        | Score | Notes |
|-------------------------------|-------|-------|
| Philanthus pachystylus        | E     |       |
| Platygyna obovata             | E     | +     |
| Rheedia polyneura             | N     |       |
| Cynanchum brachystephanum     | E     | IV    |
| Anthaenanthis lanata          | N     | I     |
| Evolvulus sericeus            | N     | I     |
| Spermacoce spinosa            | N     | III   |
| Imperata brasiliensis         | N     | IV    |
| Waltheria indica              | N     | V     |
| Galactia savannarum           | E     | III   |
| Andropogon hirtiflorus        | N     | II    |
| Adiantum cristatum            | N     | I     |
| Cecropia peltata              | N     | I     |
| Chaptalia dentata             | N     | IV    |
| Phylanthus procerus           | E     | IV    |
| Paspalum notatum              | N     | IV    |
| Lyonia affinis                | E     | III   |
| Andropogon glomeratus         | E     | III   |
| Panicum policaulon            | N     | III   |
| Panicum wilmingtonense        | N     | III   |
| Setaria geniculata            | N     | III   |
| Rheynchopora pruinosa         | E     | II    |
| Vernonia angustissima         | N     | II    |
| Hyptis minutifolia            | E     | II    |
| Paspalum laxum                | N     | I     |
| Passiflora foetida            | N     | I     |
| Polygala paniculata           | N     | I     |
| Species                        | C  | D  | E  | F  | G  | H  | I  |
|-------------------------------|----|----|----|----|----|----|----|
| Rhynchelytrum repens         | N  | N  | E  | E  |   |    |    |
| Spermacoce laevis            | N  | N  | E  | E  |   |    |    |
| Hypericum nitidum            | N  | N  | E  | E  |   |    |    |
| Desmodium incanum            | N  | N  | E  | E  |   |    |    |
| Lantana montevidensis        | N  | N  | E  | E  |   |    |    |
| Angadenia lindeniana         | E  | N  | N  | N  |   |    |    |
| Panicum pilosum              | N  | N  | E  | E  |   |    |    |
| Malpighia martiana           | E  | N  | N  | N  |   |    |    |
| Gundlachia apiculata         | E  | N  | N  | N  |   |    |    |
| Eupatorium sp.               | N  | N  | E  | E  |   |    |    |
| Guapira rufescens            | E  | N  | N  | N  |   |    |    |
| Chaetocarpus acutifolius      | E  | N  | N  | N  |   |    |    |
| Calophyllum utile            | E  | N  | N  | N  |   |    |    |
| Pera bumelifolia             | N  | N  | E  | E  |   |    |    |
| Pera bumelifolia             | N  | N  | E  | E  |   |    |    |
| Tabebia dubia                | E  | N  | N  | N  |   |    |    |
| Sloanea caratellifolia       | E  | N  | N  | N  |   |    |    |
| Smilax lanceolata            | N  | N  | E  | E  |   |    |    |
| Platygyna leonis             | E  | N  | N  | N  |   |    |    |
| Chiococca cubensis           | E  | N  | N  | N  |   |    |    |
| Ilex repanda                 | N  | N  | E  | E  |   |    |    |
| Erythroxylum rotundifolium   | N  | N  | E  | E  |   |    |    |
| Acrosynanthus trachyphyllus  | N  | N  | E  | E  |   |    |    |
| Arthrostylidium fimbriatum   | E  | N  | N  | N  |   |    |    |
| Chionanthus domingensis      | N  | N  | E  | E  |   |    |    |
| Guzmania monostachya         | N  | N  | E  | E  |   |    |    |
| Hieronyma nipensis           | E  | N  | N  | N  |   |    |    |

C: Collected; D: Destructive; E: Estimated; F: Field; G: Greenhouse; H: Herbarium; I: Inventory.
| Species                        | E | N | I | II | III | IV |
|-------------------------------|---|---|---|---|-----|----|
| *Alvaradoa arborescens*       |   |   |   |   | I   | III|
| *Byrsonima biflora*           |   |   |   |   | I   | IV |
| *Clusia tetrastigma*          |   |   |   |   | I   | IV |
| *Scheffera morotononi*        |   |   |   |   | II  | I  |
| *Rajania ovata*               |   |   |   |   | IV  | II |
| *Salacia nipensis*            |   |   |   |   | II  | I  |
| *Exostema purpureum*          |   |   |   |   | II  | I  |
| *Gesneria noritundii*         |   |   |   |   | III | I  |
| *Terminalia sp.*              |   |   |   |   | I   | I  |
| *Clidemia capituliflora*      |   |   |   |   | IV  |   |
| *Koanophyllum ayapanoides*    |   |   |   |   | II  |   |
| *Lygodium volubile*           |   |   |   |   | II  |   |
| *Calytronoma plumeriana*      |   |   |   |   | II  |   |
| *Pentalinom luteum*           |   |   |   |   | II  |   |
| *Casearia sylvestris var. sylvestris* |   |   |   |   | II  |   |
| *Panicum glutinosum*          |   |   |   |   | II  |   |
| *Rhytidophyllum villosulum*   |   |   |   |   | II  |   |
| *Rynchospora scabrata*        |   |   |   |   | I   |   |
| *Lyonia sp.*                  |   |   |   |   | I   |   |
| *Erithalis fruticosa*         |   |   |   |   | I   |   |
| *Guapira obtusata*            |   |   |   |   | I   |   |
| *Hyperbaena sp.*              |   |   |   |   | I   |   |
| *Adiantum pyramidal*          |   |   |   |   | I   |   |
| *Alectoria sp.*               |   |   |   |   | I   |   |
| *Beilschmiedia pendula*       |   |   |   |   | I   |   |
| *Bonnetia cubensis*           |   |   |   |   | I   |   |
| *Buchenavia capitata*         |   |   |   |   | I   |   |
| Species                        | A | B | C | D | E | F | G | H | I |
|-------------------------------|---|---|---|---|---|---|---|---|---|
| Campyloneurum phyllitidis     | N | . | . | . | . | . | . | . | I |
| Cinnamomum elongatum          | N | . | . | . | . | . | . | . | I |
| Cojoba arborescens            | N | . | . | . | . | . | . | . | I |
| Colubrina nipensis            | N | . | . | . | . | . | . | . | I |
| Passiflora penduliflora       | N | . | . | . | . | . | . | . | I |
| Passiflora sexflora           | N | . | . | . | . | . | . | . | I |
| Oplismenus sp.                | N | . | . | . | . | . | . | . | I |
| Polypodium aureum             | N | . | . | . | . | . | . | . | I |
| Psychotria sp.                | N | . | . | . | . | . | . | . | IV |
| Shafera platyphylla           | E | . | . | . | . | . | . | . | II |
| Phyllanthus myrtilloides      | E | . | . | . | . | . | . | . | IV |
| Lyonia glandulosa var. toensis| E | . | . | . | . | . | . | . | II |
| Guandlachia apiculata         | N | . | . | . | . | . | . | . | IV |
| Loranthaceae                  | N | . | . | . | . | . | . | . | IV |
| Lycopodiella cernua           | N | . | . | . | . | . | . | . | II |
| Eugenia asperifolia           | E | . | . | . | . | . | . | . | I |
| Gerasantus ellipticus         | E | . | . | . | . | . | . | . | I |
| Epidendrum sp.                | N | . | . | . | . | . | . | . | I |
| Laplacea moaensis             | N | . | . | . | . | . | . | . | I |
| Cojoba arborea                | E | . | . | . | . | . | . | . | I |
| Tillandsia valenzuelana       | N | . | . | . | . | . | . | . | I |
| Spathelia splendidens         | E | . | . | . | . | . | . | . | IV |
| Erythroxylum longipes         | E | . | . | . | . | . | . | . | III |
| Senecio polycephalus          | N | . | . | . | . | . | . | . | I |
| Grisebachianthus laiantifolius| E | . | . | . | . | . | . | . | IV |

Notes:
- A: Altitudinal
- B: Botanical
- C: Comic
- D: Diametric
- E: Elevation
- F: Flattening
- G: Geographical
- H: Height
- I: Illation
| Plant Name                        | A | B | C | D | E | F | G |
|----------------------------------|---|---|---|---|---|---|---|
| Protium fragans                  |   |   |   |   |   | II | V |
| Symphysia alainii                |   |   |   |   |   | I  | II|
| Rhynchospora sp.                 |   |   |   |   |   | III|   |
| Sinarouba laevis                 |   |   |   |   |   | III|   |
| Sticherus remotus                |   |   |   |   |   | III|   |
| Rajania sp.                      |   |   |   |   |   | III|   |
| Clycopeonimum grisebachii        |   |   |   |   |   | III|   |
| Guzmania lingulata               |   |   |   |   |   | II |   |
| Vanilla bicolor                  |   |   |   |   |   | II |   |
| Ossaea shaferi                   |   |   |   |   |   | II |   |
| Pimenta odorifera                |   |   |   |   |   | II |   |
| Psychotria grandi                |   |   |   |   |   |   | I |
| Gesneria wrightii                |   |   |   |   |   | I  |   |
| Sideroxylon jubilla              |   |   |   |   |   | I  |   |
| Callicarpa resinosa              |   |   |   |   |   | I  |   |
| Ilex hypaneura                   |   |   |   |   |   | I  |   |
| Maregravia evenia                |   |   |   |   |   | I  |   |
| Palicourea domingensis           |   |   |   |   |   | I  |   |
| Psilotum nudum                   |   |   |   |   |   | I  |   |
| Purdsea parvifolia               |   |   |   |   |   | I  |   |
| Tabebuia sp.                     |   |   |   |   |   | II | IV|
| Dendrophthora tetrastachya       |   |   |   |   | I  | II|
| Purdsea ekmanii                  |   |   |   |   | I  | I  |
| Notodon roigii                   |   |   |   |   | I  | I  |
| Cyathea nipensis                 |   |   |   |   | II |   |
| Rajania angustifolia             |   |   |   |   | IV |   |
| Pera ekmanii                     |   |   |   |   | III|   |
| Species                          | Abundance | Notes |
|---------------------------------|-----------|-------|
| Erythroxyllum coriaceum          | E         |       |
| Pachyanthus reticulatus          | E         | II    |
| Vernonia gnaphallifolia          | N         | II    |
| Plinia baracoensis               | E         | II    |
| Purdhea stenopetala              | E         | I     |
| Rhynchospora nipensis            | N         | I     |
| Guatteria blainii                | N         | I     |
| Machaerina filifolia             | E         |       |
| Caesalpinia nipensis             | E         | I     |
| Calycogonium cristalensis        | E         | I     |
| Grisebachianthus nipensis        | E         | II    |
| Agave shaferi                    | E         | I     |
| Coccloba reflexa Lindau          | E         | I     |
| Prostheca cochleata              | N         | I     |
| Gochnatia shaferi                | E         | I     |
| Arumna sclerophylla              | N         | I     |
| Tillandsia flexuosa              | N         |       |
| Filibrystis bufonia              | N         | I     |
| Heliotropium humifusum           | N         | I     |
| Jacquinia robusta                | E         | I     |
| Lobelia oxypylia                 | E         | I     |
| Acrosyanthus parvifolius         | E         | I     |
| Antirhea abbreviata              | N         | I     |
| Artistida curtifolia             | E         | I     |
| Bumelia cubensis                 | N         |        |
| Catopsis floribunda              | N         | I     |
| Myrtus acuinae                   | N         | I     |
| Species                        | Code | Code | Code | Code | Code | Code | Code | Code | Code | Code | Code |
|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|
| Myrtus sp.                    | N    | N    | N    | N    | N    | N    | N    | N    | N    | N    | I    |
| Scleria sp.                   | N    | N    | N    | N    | N    | N    | N    | N    | N    | N    | I    |
| Vanilla dilloniana            | N    | N    | N    | N    | N    | N    | N    | N    | N    | N    | V    |
| *Euphorbia podocarpifolia*    | E    | E    | E    | E    | E    | E    | E    | E    | E    | E    | V    |
| *Bourreria pauciflora*        | N    | N    | N    | N    | N    | N    | N    | N    | N    | N    | III  |
| *Zanthoxylum dumosum*         | N    | N    | N    | N    | N    | N    | N    | N    | N    | N    | II   |
| *Rondeletia plicatula*        | E    | E    | E    | E    | E    | E    | E    | E    | E    | E    | II   |
| *Bumelia conferta*            | N    | N    | N    | N    | N    | N    | N    | N    | N    | N    | II   |
| *Salvia cubensis*             | E    | E    | E    | E    | E    | E    | E    | E    | E    | E    | I    |
| *Senna benitoensis*           | E    | E    | E    | E    | E    | E    | E    | E    | E    | E    | I    |
| *Spathelia cubensis*          | E    | E    | E    | E    | E    | E    | E    | E    | E    | E    | I    |
| *Tabebuia pulvebrulenta*      | E    | E    | E    | E    | E    | E    | E    | E    | E    | E    | I    |
| *Encyclia phoenicia*          | E    | E    | E    | E    | E    | E    | E    | E    | E    | E    | I    |
| *Harnackia bisecta*           | E    | E    | E    | E    | E    | E    | E    | E    | E    | E    | I    |
| *Rhyynchospora cernua*        | E    | E    | E    | E    | E    | E    | E    | E    | E    | E    | I    |
| Ipomoea sp.                   | N    | N    | N    | N    | N    | N    | N    | N    | N    | N    | I    |
| *Garcinia revoluta*           | E    | E    | E    | E    | E    | E    | E    | E    | E    | E    | IV   |
| *Mosiera aphitica*            | E    | E    | E    | E    | E    | E    | E    | E    | E    | E    | IV   |
| *Oplonia spinosa*             | N    | N    | N    | N    | N    | N    | N    | N    | N    | N    | IV   |
| *Phyllanthus mirificus*       | E    | E    | E    | E    | E    | E    | E    | E    | E    | E    | IV   |
| *Tabebuia brooksiana*         | E    | E    | E    | E    | E    | E    | E    | E    | E    | E    | IV   |
| *Zanthoxylum cubense*         | N    | N    | N    | N    | N    | N    | N    | N    | N    | N    | II   |
| *Cyrilla nitidissima*         | N    | N    | N    | N    | N    | N    | N    | N    | N    | N    | II   |
| *Harpalyce cubensis*          | E    | E    | E    | E    | E    | E    | E    | E    | E    | E    | II   |
| *Lyonia longipes*             | E    | E    | E    | E    | E    | E    | E    | E    | E    | E    | II   |
| *Amyris sp.*                  | N    | N    | N    | N    | N    | N    | N    | N    | N    | N    | II   |
| *Arthrostylidium sp.*         | N    | N    | N    | N    | N    | N    | N    | N    | N    | N    | II   |
| Species               | E  | E  | E  | E  | E  | E  | E  | E  | E  | E  | E  | E  | E  | E  | E  | I1 |
|----------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| *Croton viminalis*    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | I1 |
| *Paspalum rupestre*   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | I1 |
| *Pitcairnia cubensis* |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | I1 |
Table A2. Comparative analysis of the typus of the syntaxa studied. 1DP: Dendropemon phycnophylli-Pinetum occidentalis. 6CP: Cocotrino scoparii-Pinetum occidentalis. 12LP: Leptotogon buchi-Pinetum occidentalis. 16CLP: Clethro-Pinetum maestrensis. 21BYP: Byrsomima pinetorum-Pinetum tropicalis-caribaeae. 32PP: Panico-Pinetum cubensis. 53PP: Panico-Pinetum cubensis subass. lyonetosum affinis. 75CP: Cocotrino herbacei-Pinetum cubensis. 80CP: Cocotrino herbacei-Pinetum cubensis subass. ilicetosum repandae. 82: Cocotrino herbacei-Pinetum cubensis subass. Schmidtiotettosum shaferi. 88SP: Schmidtiotettosum shaferi-Pinetum cubensis. 96SP: Schmidtiotettosum shaferi-Pinetum cubensis subass. shaferetosum platyphythii. 99SP: Schmidtiotettosum shaferi-Pinetum cubensis subass. acrosynanthetosum trachyphylli. 101AP: Acrosynantho trachyphylli-Pinetum cubensis subass. Schmidtiotettosum shaferi. 107AP: Acrosynantho trachyphylli-Pinetum cubensis subass. psychotrietosum grandis. 111PPF: Protoi fraganti-Pinetum cubensis. 113PPF: Protoi fraganti-Pinetum cubensis subass. lyonetosum affinis. 121ANP: Anthaenanti-Pinetum cubensis. 141ANP: Anthaenanti-Pinetum cubensis subass. grisebachiaedetosum. 163ARP: Arthrostylidio-Pinetum cubensis. 166ARP: Arthrostylidio-Pinetum cubensis subass. annonetosum sclerophyllae. 171ARP: Arthrostylidio-Pinetum cubensis subass. xylometosum buxifolii. 173PHP: Phyllantho mirtifico-Pinetum cubensis. 180PHP: Phyllantho mirtifico-Pinetum cubensis subass. ptilcaruietosum cubensis. The abundance values of the species correspond to the phytosociological values transformed to Van der Maarel. + = 2; 1 = 3; 2 = 4; 3 = 5; 4 = 6; 5 = 7.

| Inventories number typus | 1 | 6 | 12 | 16 | 21 | 32 | 53 | 75 | 80 | 82 | 96 | 99 | 101 | 104 | 107 | 111 | 113 | 116 | 121 | 141 | 163 | 166 | 171 | 173 | 180 |
|--------------------------|---|---|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| **Taxon**                |   |   |    |    |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| **Pinus cubensis**       | E | . | . | . | . | . | . | 4  | 4  | 6  | 6  | 5  | 5  | 5  | 5  | 5  | 6  | 5  | 6  | 5  | 5  | 6  | 4  | 4  | 4  | 4  | 4  | 4  |
| **Ichtevurus maurensis**  | E | . | . | . | 3 | . | . | 5  | 5  | 5  | 5  | 5  | 4  | 3  | 3  | .  | 5  | 5  | 4  | 2  | 2  | 3  | 2  | 2  | 4  |
| **Koanophyon polystictum** | E | . | . | . | 3 | 3 | 4 | .  | 3  | 3 | 3  | 3  | 2  | .  | .  | .  | 2  | 2  | 4  | 2  | 2  | 2  | 3  | 3  | 3  |
| **Psychotria revoluta**   | N | . | . | . | . | . | . | 2  | 2  | 2  | 2  | 2  | 3  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 3  | 3  | 3  |
| **Smilax havanensis**     | N | . | 3 | 3 | . | . | . | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 3  | 3  | 3  |
| **Neobractea calenzuecola** | E | . | . | . | . | 2  | 2  | 3  | 2  | 2  | 3  | 2  | 3  | 2  | 4  | 3  | 2  | 2  | .  | .  | .  | 2  | 3  | 4  |
| **Baccharis scoparoides**  | E | . | . | . | . | 4  | 5  | 5  | 3  | .  | 4  | 3  | 4  | 2  | 2  | .  | .  | 3  | 2  | 2  | 3  | 2  | 2  | 2  |
| **Galactia revoluta**     | E | . | . | . | . | . | . | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 3  | 3  | 3  | 2  |
| **jacaaranda arborea**    | E | . | . | . | . | . | . | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 5  | 4  | 3  | 3  | 3  | .  | 2  | 2  | 2  | 2  |
| **Pteridium caudatum**    | N | . | . | . | 3 | 3 | 3 | 3 | 2  | 3  | 3 | 2  | 3  | 2  | 2  | 3  | 2  | 3 | 3 | 3 | .  | 3  | 2  | 2  | 2  |
| **Ouratea striata**       | N | . | . | . | 2  | 2  | 2  | 3  | 2  | 2  | 2  | .  | 2  | 5  | 3  | 2  | 2  | .  | 2  | .  | 2  | 2  | 2  | 2  |
| **Lyonia macrophylla**    | E | . | . | . | 2  | 3 | 5 | 3 | 2  | 3  | 2  | 4  | .  | .  | .  | 3  | 2  | 3  | 2  | 2  | .  | .  | .  | .  |
| **Anemia coriacea**       | N | . | . | . | . | . | . | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  |
| **Clerodendrum nipeuse**  | E | . | . | . | . | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | .  | 2  | .  | 2  | 2  | 2  | 2  |
| **Cocotrinox orientalis** | E | . | . | . | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 4  | 4  | 3  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  |
| Species                      | N | 2 | 3 | 4 | 4 | 2 | 3 | 2 | 3 | 5 | 5 | 6 | N | 2 | 3 | 2 | 3 | 5 | 5 | 6 |
|-----------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Cytisus parvula*           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| *Eugenia pinetorum*         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| *Guettarda monocarpa*       | E |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| *Ilex macfadynii*           | N |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| *Ossaea pauciflora*         | E |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| *Schizachyrium gracile*     | N |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| *Stigmaphyllum sagrananum*  | N |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| *Bactris cubensis*          | N |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| *Bletia purpurea*           | N |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| *Cyrilla nipensis*          | N | 6 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| *Guettarda ferruginea*      | E | 2 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| *Ipomea carolina*           | N |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| *Miconia baracoensis*       | E | 2 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| *Myrsine coriacea*          | N | 4 | 2 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| *Tillandsia fasciculata*    | N |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| *Vernonia pinetica*         | N | 2 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| *Clusia rosea*              | N |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| *Catopsis sp.*              | N |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| *Chaetocarpus oblongatus*   | N |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| *Odontosoria acaleata*      | N | 2 | 2 | 2 | 4 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| *Andropogon virginicus*     | N | 3 | 2 | 3 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| *Caseria aquifolia*         | E | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| *Rhynchospora tenuis*       | N | 2 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| *Scleria latanensis*        | E | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| *Suberanthus stellatus*     | E | 4 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| *Dodonae viscosa*           | N | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| *Epidendrum nocturnum*      | N |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

This table likely represents data on plant species, possibly related to their abundance or presence in a specific area, as indicated by the numerical entries.
| Species                          | Frequency | Total | E | N | Total |
|---------------------------------|-----------|-------|---|---|-------|
| *Schmidtottia shaferi*          | E         | 2     | 5 | 2 | 7     |
| *Spiroteca apiculata*           | N         | 2     | 4 | 3 | 9     |
| *Metopium venosa*               | E         | 2     | 5 | 3 | 8     |
| *Plumeria clusiaoides*          | N         | 2     | 3 | 2 | 7     |
| *Rhynchospora purpusilla*       |           | 2     | 2 | 2 | 6     |
| *Guapira rafescens*             | E         | 3     | 2 | 2 | 7     |
| *Scaevola wrightii*              | N         | 3     | 2 | 2 | 7     |
| *Scleria secans*                | N         | 2     | 2 | 2 | 6     |
| *Linodendron aronifolium*       | E         | 2     | 3 | 2 | 7     |
| *Smilax lanceolata*             | N         | 2     | 2 | 2 | 6     |
| *Vanilla palmarum*              | N         | 2     | 2 | 2 | 6     |
| *Tillandsia bulbosa*            | N         | 2     | 2 | 2 | 6     |
| *Vernonia urbaniana*            | N         | 2     | 2 | 2 | 6     |
| *Calopogon utile*               | E         | 1     | 2 | 2 | 4     |
| *Callicarpa olbalcanolata*      | E         | 2     | 2 | 2 | 6     |
| *Clidemia capitataflora*        | E         | 3     | 2 | 2 | 7     |
| *Coccoloba shaferi*             | E         | 2     | 2 | 2 | 6     |
| *Chamaecrista lineata*          | E         | 2     | 2 | 2 | 6     |
| *Dracaena cubensis*             | E         | 2     | 2 | 2 | 6     |
| *Guettarda valenzuelana*        | N         | 4     | 2 | 2 | 8     |
| *Hypericum hypericoides*        | N         | 3     | 2 | 2 | 7     |
| *Malpighia martiana*            | E         | 3     | 3 | 2 | 8     |
| *Myrica cerifera*               | N         | 2     | 2 | 2 | 6     |
| *Rajania ovata*                 | N         | 2     | 2 | 2 | 6     |
| *Sloanea curatellosa*            | E         | 3     | 2 | 2 | 7     |
| *Vanilla dilomiana*             | N         | 2     | 2 | 2 | 6     |
| *Machaerina cubensis*           | E         | 2     | 2 | 2 | 6     |
| Species                        | Code | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |
|-------------------------------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Scleria lithosperma           | N    | 2   | 4   | .   | .   | .   | .   | .   | .   | .   | .   |
| Acroscyrtanthus trachyphyllyus | N    | .   | .   | .   | 2   | 5   | 4   | .   | .   | .   | .   |
| Ayaqua shafferi               | E    | .   | .   | .   | .   | .   | .   | .   | 2   | 5   | 3   |
| Andropogon bicornis           | N    | .   | .   | .   | 2   | 3   | .   | .   | 2   | .   | .   |
| Anthaenanita lanata           | N    | .   | .   | .   | 2   | .   | .   | .   | .   | 5   | 4   |
| Adriana shafferi              | N    | .   | .   | .   | .   | .   | .   | .   | .   | 3   | 2   |
| Arthrostylidium fimbriatum    | E    | .   | .   | .   | 3   | 4   | 2   | 4   | .   | .   | .   |
| Bisgoeppertia scandens        | N    | .   | .   | .   | 2   | .   | .   | .   | 2   | 3   | .   |
| Clusia tetrastigma            | E    | .   | 2   | .   | .   | .   | .   | 2   | 3   | 2   | .   |
| Cococypselum herbaceum        | N    | .   | .   | .   | 2   | 4   | 3   | .   | .   | 2   | .   |
| Chaetocarpus acutifolius      | E    | .   | .   | .   | 2   | 2   | 2   | .   | .   | .   | 2   |
| Chionanthus domingensis       | N    | .   | .   | .   | 2   | 2   | .   | .   | 2   | 2   | .   |
| Dicranopteris flexuosa        | N    | .   | .   | 2   | .   | .   | 5   | .   | .   | 2   | 3   |
| Euphorbia heleneae            | E    | .   | .   | .   | .   | 2   | .   | .   | 6   | .   | .   |
| Exostema purpureum            | E    | .   | .   | .   | .   | .   | .   | .   | 2   | 2   | 2   |
| Grisebachianthus nipensis      | E    | .   | .   | .   | .   | .   | .   | .   | 2   | 2   | 2   |
| Guatteria blainii             | N    | .   | .   | .   | 2   | 2   | .   | .   | .   | 2   | 2   |
| Gundlachia apiculata          | E    | .   | .   | .   | .   | 2   | 3   | .   | .   | .   | .   |
| Miconia dodecandra            | N    | .   | 2   | 2   | 2   | .   | .   | .   | 2   | .   | .   |
| Paspalum breve                | N    | .   | .   | 2   | 2   | .   | .   | .   | 2   | 2   | 3   |
| Pera bumbleifolia             | N    | .   | .   | .   | 2   | 2   | .   | 2   | 2   | .   | .   |
| Plectrachis spinifolia         | N    | .   | 3   | .   | .   | .   | .   | .   | .   | .   | 2   |
| Protium frugans               | E    | .   | .   | .   | .   | .   | .   | 2   | 2   | 3   | 2   |
| Platygyna leonis              | E    | .   | .   | .   | 2   | 2   | .   | .   | 2   | 2   | .   |
| Spathelia pinetorum           | E    | .   | .   | .   | .   | 2   | 2   | .   | 2   | 2   | .   |
| Tabebuia dubia                | E    | .   | .   | .   | .   | 2   | .   | .   | 3   | 2   | .   |
| Vaccinium cubense             | E    | .   | .   | .   | 3   | .   | 2   | 3   | 2   | .   | .   |
| Species                        | Value |
|-------------------------------|-------|
| Myrtus ophiticola             | N     |
| Alvaradoa arborescens         | E     |
| Angadenia berteroi            | N     |
| Antirhea shaferi              | N     |
| Aristida refracta             | N     |
| Arthrostylidium capillifolium | N     |
| Baccharis shaferi             | E     |
| Byrsonima biglora             | E     |
| Byrsonima crassifolia         | N     |
| Callicarpa ferruginea         | N     |
| Cacalia crassineris           | E     |
| Cacalia sylvestris var. myricoides | E     |
| Coccoloba reflexa             | E     |
| Cynanchum brachystephanum     | E     |
| Cynanchum sp.                 | N     |
| Erythroxylum rotundifolium    | N     |
| Grisebachianthus lantaniolius | E     |
| Guandlachia apiculata         | N     |
| Gesneria nolindii             | E     |
| Euphorbia podocarpifolia      | E     |
| Imperata brasiliensis         | N     |
| Panicum fusiforme             | N     |
| Phlauek tankervillae          | N     |
| Psidium parvifolium           | E     |
| Psychotria sp.                | N     |
| Schiffera moronononi          | N     |
| Schiffera platyphylla         |       |
| Species                        | Code | Abundance 1 | Abundance 2 | Abundance 3 | Abundance 4 | Abundance 5 | Abundance 6 | Abundance 7 |
|-------------------------------|------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| *Sida linifolia*              | N    | 2           | 2           | 2           |             |             |             |             |
| *Passiflora saseraosa*        | N    | 2           | 2           | 2           |             |             |             |             |
| *Spermacoce spinosa*          | N    | 3           | 2           |             |             |             |             |             |
| *Tillandsia balbisiana*       | N    | 2           |             |             |             |             |             |             |
| *Tabebia sp.*                 | N    |             |             |             | 2           | 2           | 2           |             |
| *Vernonia hieracioides*       | N    |             |             |             |             |             |             |             |
| *Lyonia glandulosa var. toensis* | E  |             |             |             | 2           | 3           | 2           |             |
| *Brunellia conocondifolia*    | N    | 2           |             |             |             |             |             |             |
| *Lophosoria quadripinnata*    | N    | 4           | 2           |             |             |             |             |             |
| *Pinus occidentalis*          | E    | 7           | 6           | 6           |             |             |             |             |
| *Garrya fadyenii*             | N    | 4           | 2           |             |             |             |             |             |
| *Myrica picardeae*            | N    | 4           | 3           |             |             |             |             |             |
| *Alsophila minor*             | N    | 2           |             |             |             |             |             |             |
| *Baccharis myrsinioides*      | N    | 4           |             |             |             |             |             |             |
| *Dendropenom constantiae*     | E    | 2           |             |             |             |             |             |             |
| *Dendropenom pycnoptilus*     | E    | 3           |             |             |             |             |             |             |
| *Fuchsia pringsheimii*        | E    | 3           |             |             |             |             |             |             |
| *Gautheria domingensis*       | E    | 4           |             |             |             |             |             |             |
| *Ilex tuickheimii*            | E    | 4           |             |             |             |             |             |             |
| *Lobelia rotundifolia*        | N    | 4           |             |             |             |             |             |             |
| *Lycopodium cernuum*          | N    | 2           |             |             |             |             |             |             |
| *Miconia krugii*              | N    | 3           |             |             |             |             |             |             |
| *Miconia sellowana*           | N    | 4           |             |             |             |             |             |             |
| *Microgramma piloselloides*   | N    | 2           |             |             |             |             |             |             |
| *Mykania barahonensis*        | N    | 2           |             |             |             |             |             |             |
| *Polypodium angustifolium*    | N    | 2           |             |             |             |             |             |             |
| *Tetrazygia urbaniana*        | E    | 2           |             |             |             |             |             |             |
| Species                                    | Country | No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|-------------------------------------------|---------|-----|---|---|---|---|---|---|---|---|---|----|
| Weinmannia pinnata                        | N       | 2   | . | . | . | . | . | . | . | . | . | .  |
| Styrax ochraceus                          | E       | 2   | . | . | . | . | . | . | . | . | . | .  |
| Ternstroemia peduncularis                 | N       | 3   | . | . | . | . | . | . | . | . | . | 2  |
| Centrosema virginianaum                   | N       | 4   | . | . | 2 | . | . | . | . | . | . | .  |
| Maytenus domingensis                      | E       | 2   | . | 2 | . | . | . | . | . | . | . | .  |
| Coccoloba buchii                          | N       | 2   | 2 | . | . | . | . | . | . | . | . | .  |
| Coccoloba fuertesii                       | N       | 2   | 2 | . | . | . | . | . | . | . | . | .  |
| Dillenia americana                        | N       | 5   | 5 | . | . | . | . | . | . | . | . | .  |
| Haematoxylon campechianum                 | N       | 4   | 4 | . | . | . | . | . | . | . | . | .  |
| Psychotria dolichocalyx                    | E       | 5   | 5 | . | . | . | . | . | . | . | . | .  |
| Rajania quinquefolia                      | N       | 3   | 4 | . | . | . | . | . | . | . | . | .  |
| Chiococca alba                            | N       | 3   | 2 | . | . | . | . | . | . | . | . | .  |
| Chrysophyllum oliviforme var. oliviforme  | N       | 3   | 5 | . | . | . | . | . | . | . | . | .  |
| Cordia lima                               | N       | 3   | 3 | . | . | . | . | . | . | . | . | .  |
| Passiflora bilobata                        | N       | 2   | 2 | . | . | . | . | . | . | . | . | .  |
| Passiflora muruceja                       | N       | 3   | 4 | . | . | . | . | . | . | . | . | .  |
| Exostema spinosum                         | N       | 2   | 2 | . | . | . | . | . | . | . | . | .  |
| Leptogonium buchii                        | E       | 2   | 2 | . | . | . | . | . | . | . | . | .  |
| Poitaea paucifolia                        | N       | 2   | 3 | . | . | . | . | . | . | . | . | .  |
| Randia aculeata                           | N       | 3   | 3 | . | . | . | . | . | . | . | . | .  |
| Securidaca virgata                        | N       | 2   | 2 | . | . | . | . | . | . | . | . | .  |
| Stigmaphyllon emarginatum                 | N       | 2   | 3 | . | . | . | . | . | . | . | . | .  |
| Swietenia mahagoni                        | N       | 2   | 2 | . | . | . | . | . | . | . | . | .  |
| Tillandsia recurvata                      | N       | 2   | 2 | . | . | . | . | . | . | . | . | .  |
| Agave intermixta                          | E       | 4   | . | . | . | . | . | . | . | . | . | .  |
| Anemia adiantifolia                       | N       | 2   | . | . | . | . | . | . | . | . | . | .  |
| Species                                | Status | Density |
|----------------------------------------|--------|---------|
| Artemisia domingensis                  | E      | 2       |
| Artemisia peruviana                    | N      | 3       |
| Boonia frutescens                      | N      | 3       |
| Brugia buxifolia                       | N      | 4       |
| Bumelia repens                         | E      | 4       |
| Coccotrinae scoparia                   | E      | 4       |
| Coniza canadensis                      | N      | 2       |
| Cordia selloana                        | E      | 2       |
| Coreopsis buchii                       | E      | 4       |
| Chamaecrista glandulosa var. picardae  | E      | 4       |
| Chamaesyce adenoptera subsp. adenoptera| N      | 2       |
| Chrysobalanus icaco                    | N      | 2       |
| Diodia rigida                          | N      | 2       |
| Erythroxyllum rufum                    | N      | 2       |
| Eugenia odorata                        | E      | 2       |
| Eupatorium gabbii                      | E      | 3       |
| Eupatorium sinuatum var. viscigerum    | E      | 4       |
| Galactia dictyophylla                  | E      | 2       |
| Galactia rudolfioides var. haitiensis  | E      | 4       |
| Guaphaliun eggersii                    | E      | 3       |
| Lyonia truncatula var. truncatula      | E      | 4       |
| Lantana camara                         | N      | 2       |
| Leptochloa monticola                   | N      | 4       |
| Narovalina domingensis                 | E      | 4       |
| Oeoelades maculata                     | N      | 2       |
| Species                        | Altitude | Density |
|-------------------------------|----------|---------|
| Ouratea ilicifolia            | 3        | E       |
| Pilea spathulifolia           | 4        | E       |
| Pitcairnia domingensis        | 2        | E       |
| Pteridium aquilinum           | 4        | N       |
| Rondeletia christii          | 3        | E       |
| Rynchosia reticulata          | 3        | N       |
| Sabal domingensis             | 2        | E       |
| Senecio barahonensis          | 4        | E       |
| Sideroxylon cubense           | 2        | N       |
| Tetramicra ekmanii            | 2        | E       |
| Tripsacum floridanum          | 3        | N       |
| Turnera ulmifolia             | 2        | N       |
| Calophyllum calaba            | 2        | N       |
| Chamaesyce berteroana         | 2        | N       |
| Guettarda purgens             | 3        | N       |
| Jacaranda ekmarni            | 3        | E       |
| Lygodium venetum              | 3        | N       |
| Mecchites repens              | 2        | N       |
| Ocotea coriacea              | 2        | N       |
| Piptadenia peregrina          | 2        | N       |
| Rynchosia reticulata          | 3        | N       |
| Tabebuia berterii             | 3        | E       |
| Wedelia reticulata            | 3        | N       |
| Clidemia umbellata            | 2        | N       |
| Clidemia strigillosa          | 2        | N       |
| Clusia minor                  | 2        | N       |
| Clethra cubensis              | 2        | E       |
| Species                        | Code | Note |
|-------------------------------|------|------|
| Clidemia hirta                | N    | 2    |
| Critonia data                 | N    | 2    |
| Demissa adiantoides           | N    | 7    |
| Eugenia uniflora              | N    | 2    |
| Graffenrieda refescens        | E    | 2    |
| Lobelia assurgentina          | N    | 3    |
| Lyonia calyosca               | E    | 3    |
| Miconia acuacae               | E    | 2    |
| Miconia alternifolia          | E    | 2    |
| Myrica cactensis              | E    | 2    |
| Myrica punctata               | N    | 2    |
| Purdicae maestrensis          | E    | 2    |
| Pythrogramma sulphurea        | N    | 2    |
| Rondeletia naguensis          | E    | 2    |
| Rubus turquinensis            | E    | 2    |
| Sapium erythrospermum         | N    | 2    |
| Trema cubensis                | E    | 2    |
| Vernonnia parvuliceps         | N    | 2    |
| Wigandia reflexa              | N    | 2    |
| Blechnum occidentale          | N    | 2    |
| Ageratina paucibracteata      | E    | 2    |
| Sachsia polycephala           | N    | 2    |
| Acorus rhapale virgatum       | N    | 4    |
| Andropogon nasianus           | N    | 3    |
| Andropogon virgatus           | N    | 4    |
| Aristida neglecta             | N    | 3    |
| Aristida ternipes             | N    | 4    |
| Species                      | Growth Form | Width | Height | Density | Shade | Soil | Water | pH | Fire Resistant | Pest Resistance | Pest Management | Notes                |
|-----------------------------|-------------|-------|--------|---------|-------|------|-------|----|----------------|------------------|-----------------|---------------------|
| Aristida vilisfolia         | N           |       |        |         |       |      |       |    |                |                  |                 |                     |
| Borreria strumphioides      | N           |       |        |         |       |      |       |    |                |                  |                 |                     |
| Borreria thymocephala       | N           |       |        |         |       |      |       |    |                |                  |                 |                     |
| Brya depressa               | N           |       |        |         |       |      |       |    |                |                  |                 |                     |
| Buchnera elongata           | N           |       |        |         |       |      |       |    |                |                  |                 |                     |
| Burmannia capitata          | N           |       |        |         |       |      |       |    |                |                  |                 |                     |
| Byrsonima hybrid             | N           |       |        |         |       |      |       |    |                |                  |                 |                     |
| Byrsonima pisotanum         | E           |       |        |         |       |      |       |    |                |                  |                 |                     |
| Calyptranthes sinopterus    | E           |       |        |         |       |      |       |    |                |                  |                 |                     |
| Cassia diphylla             | N           |       |        |         |       |      |       |    |                |                  |                 |                     |
| Cassia serpenes             | N           |       |        |         |       |      |       |    |                |                  |                 |                     |
| Cassytha filiformis         | N           |       |        |         |       |      |       |    |                |                  |                 |                     |
| Chrysobalanus pellucarbus   | N           |       |        |         |       |      |       |    |                |                  |                 |                     |
| Croton cerius               | E           |       |        |         |       |      |       |    |                |                  |                 |                     |
| Croton crasspedotrichus      | E           |       |        |         |       |      |       |    |                |                  |                 |                     |
| Cuphea micrantha            | N           |       |        |         |       |      |       |    |                |                  |                 |                     |
| Cynanchum savannarum        | N           |       |        |         |       |      |       |    |                |                  |                 |                     |
| Chamaesyce pinaria          | N           |       |        |         |       |      |       |    |                |                  |                 |                     |
| Eugenia punicifolia         | N           |       |        |         |       |      |       |    |                |                  |                 |                     |
| Heptanthus cocleareifolius  | -           |       |        |         |       |      |       |    |                |                  |                 |                     |
| Herpyza grandiflora         | E           |       |        |         |       |      |       |    |                |                  |                 |                     |
| Hyptis pedalipes            | E           |       |        |         |       |      |       |    |                |                  |                 |                     |
| Jatropha anastatifolia      | E           |       |        |         |       |      |       |    |                |                  |                 |                     |
| Lachnorhiza piloseloides    | E           |       |        |         |       |      |       |    |                |                  |                 |                     |
| Lachnanthes tinctoria       | N           |       |        |         |       |      |       |    |                |                  |                 |                     |
| Pachyanthus cubensis        | E           |       |        |         |       |      |       |    |                |                  |                 |                     |
| Pachyanthus poirei          | N           |       |        |         |       |      |       |    |                |                  |                 |                     |
| Species                          | Distribution | Rating |
|---------------------------------|--------------|--------|
| Pachyanthus wrightii             | N            | 2      |
| Leptocoryphium tanatum           | N            | 5      |
| Lyonia myrtilloides             | E            | 3      |
| Mesechites rosea                 | N            | 2      |
| Mesosetum filiforme              | N            | 5      |
| Paspalum multicaule              | N            | 2      |
| Phlyanthus juneus                | E            | 2      |
| Pinguiula filifolia              | E            | 2      |
| Pinus caribaea                   | E            | 2      |
| Pinus tropicalis                 | E            | 4      |
| Polygala squamifolia             | E            | 3      |
| Polygala wrightii                | E            | 2      |
| Rheia cubensis                   | N            | 2      |
| Rhynchospora seslerioides        | E            | 4      |
| Rhynchospora wrightiana          | N            | 2      |
| Richarda muricata                | N            | 2      |
| Rhynchospora cyperoides          | N            | 3      |
| Saucoesia tenella                | N            | 2      |
| Stenandrium ovatum               | E            | 3      |
| Stigmaphilylom microphyllum      | E            | 2      |
| Tabeuia lepidophylla             | E            | 4      |
| Tetrazygia bicolor               | N            | 2      |
| Tetrazygia delicata              | N            | 2      |
| Trachypogon filifolius           | N            | 3      |
| Xiphidium xanthorrhizion          | E            | 2      |
| Xyris eliotii                    | N            | 2      |
| Xyris navicularis                | N            | 2      |
| Species                          | Column 1 | Column 2 | Column 3 | Column 4 | Column 5 | Column 6 | Column 7 | Column 8 |
|---------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Chaptalia dentata               | N        | .        | .        | .        | .        | .        | .        | .        |
| Galactia savanarum              | E        | .        | .        | .        | .        | .        | .        | .        |
| Hyptis minutifolia              | E        | .        | .        | .        | .        | .        | .        | .        |
| Panicum aciculare               | N        | .        | .        | .        | .        | .        | .        | .        |
| Panicum wilmingtonense          | N        | .        | .        | .        | .        | .        | .        | .        |
| Phyllanthus procerus            | E        | .        | .        | .        | .        | .        | .        | .        |
| Sauvagesia brownei              | N        | .        | .        | .        | .        | .        | .        | .        |
| Sebastiania corniculata         | N        | .        | .        | .        | .        | .        | .        | .        |
| Waltheria indica                | N        | .        | .        | .        | .        | .        | .        | .        |
| Paspalum notatum                | N        | .        | .        | .        | .        | .        | .        | .        |
| Andropogon hirtiflorus          | N        | .        | .        | .        | .        | .        | .        | .        |
| Hypericum nitidum               | N        | .        | .        | .        | .        | .        | .        | .        |
| Passiflora foetida              | N        | .        | .        | .        | .        | .        | .        | .        |
| Rhynchelytrum repens            | N        | .        | .        | .        | .        | .        | .        | .        |
| Senecio plumbeus                | N        | .        | .        | .        | .        | .        | .        | .        |
| Vernonia angustissima           | N        | .        | .        | .        | .        | .        | .        | .        |
| Andropogon glomeratus           | E        | .        | .        | .        | .        | .        | .        | .        |
| Panicum xalapense               | N        | .        | .        | .        | .        | .        | .        | .        |
| Desmodium incanum               | N        | .        | .        | .        | .        | .        | .        | .        |
| Lasiaciavarietica               | N        | .        | .        | .        | .        | .        | .        | .        |
| Lyonia affinis                  | E        | .        | .        | .        | .        | .        | .        | .        |
| Miconia lacvigata               | N        | .        | .        | .        | .        | .        | .        | .        |
| Panicum policaulon              | N        | .        | .        | .        | .        | .        | .        | .        |
| Rhynchospora pruinosa           | E        | .        | .        | .        | .        | .        | .        | .        |
| Setaria geniculata              | N        | .        | .        | .        | .        | .        | .        | .        |
| Spermacoce laevis               | N        | .        | .        | .        | .        | .        | .        | .        |
| Lygodium volubile               | N        | .        | .        | .        | .        | .        | .        | .        |
| Species                          | Status | Number |
|---------------------------------|--------|--------|
| Buchenavia capitata              | N      | 2      |
| Campyloceuthum phyllitidis       | N      | 2      |
| Caseria sylvestris var. sylvestris | E    | 2      |
| Koanophyllum angapoides          | N      | 2      |
| Pentalinom luteum                | N      | 2      |
| Salacia nipensis                 | E      | 2      |
| Ilex rehana                     | N      | 2      |
| Erithalis fruticosa              | N      | 2      |
| Colubrina nipensis               | N      | 2      |
| Alectoria sp.                    | N      | 2      |
| Guapira obtusata                 | N      | 2      |
| Guanania monostachya             | N      | 2      |
| Hieronyma nipensis               | E      | 2      |
| Adiantum cristatum               | N      | 2      |
| Alchornea latifolia              | N      | 2      |
| Beilschmieda pendula             | N      | 2      |
| Lyonia sp.                       | N      | 2      |
| Terminila sp.                    | N      | 2      |
| Loranthaceae                     | N      | 2      |
| Machaerina filifolia             | E      | 4      |
| Gersecanthus ellipticus          | N      | 2      |
| Acrosynanthus revolutus          | E      | 2      |
| Clidemia rubrinervis             | N      | 3      |
| Coccoloba nipensis               | E      | 2      |
| Laplaca moenensis                | N      | 2      |
| Lycopodiella cernua              | N      | 2      |
| Lyonia glandulososa              | E      | 2      |
| Species                               | Habitat | Latitude | Longitude | Elevation | Dominance |
|---------------------------------------|---------|----------|-----------|-----------|-----------|
| Rhynchospora dioxidon                 | N       |          |           |           | 3         |
| Tillandsia valenzuelana               | N       |          |           |           | 2         |
| Calycogonium grisebachii              | E       | 2        | 2         |           |           |
| Rhynchospora sp.                      | N       |          |           |           | 3         |
| Rajania sp.                           | N       |          |           |           | 2         |
| Senecio polyplebias                   | N       |          |           |           | 2         |
| Erythroxylum longipes                 | E       | 2        | 2         |           |           |
| Symphisia alainii                     | E       | 2        | 2         |           |           |
| Simarouba laevis                      | E       | 2        | 2         |           |           |
| Tabernaemontana amblyocarpa           | N       |          |           |           | 2         |
| Callicarpa resinosa                   | E       | 2        | 2         |           |           |
| Gesneria wrightii                     | E       | 2        |           |           |           |
| Ilex hypanuera                        | E       | 2        |           |           |           |
| Ossaea shaferi                        | E       | 2        |           |           |           |
| Palicourea domingensis                | N       |          |           | 4         |           |
| Pimenta odiolens                      | N       |          |           | 2         |           |
| Psychotria grandis                    | N       |          |           | 2         |           |
| Pardiea parvifolia                    | N       |          |           | 6         |           |
| Stichurus remotus                     | N       |          |           | 2         |           |
| Vanilla bicolor                       | N       |          |           | 2         |           |
| Rajania angustifolia                  | N       |          |           | 2         |
| Erythroxylum coriceum                 | E       | 2        | 2         |           |           |
| Pera ekmanii                          | E       | 2        | 3         |           |           |
| Plinia baracoensis                    | E       | 2        | 3         |           |           |
| Pachyrhizus reticulatus               | E       | 2        | 3         |           |           |
| Vernonia gnaphallifolia               | N       |          |           | 4         |
| Calycogonium cristalensis             | E       | 2        |           |           |           |
| Species                     | E  | N  | 2  | 2  |
|----------------------------|----|----|----|----|
| Chiococca cubensis         |    |    |    |    |
| Dendrophylla tetrastachya  |    |    |    |    |
| Purdiera ekmanii           |    |    |    |    |
| Purdiera stenopetala       |    |    |    |    |
| Notodon roigii             |    |    |    |    |
| Aristolochia lindeniana    |    |    |    |    |
| Rhynchosia nipensis        |    |    |    |    |
| Rhynchospora nipensis      |    |    |    |    |
| Tetrandra eulophiae        |    |    |    |    |
| Rajania nipensis           |    |    |    |    |
| Annona sclerophylla        |    |    |    |    |
| Rhynchospora cernea        |    |    |    |    |
| Lobelia oxyphylla          |    |    |    |    |
| Jacquinia robusta          |    |    |    |    |
| Bumelia conferta           |    |    |    |    |
| Prosthechea cochleata      |    |    |    |    |
| Bourreria pauciflora       |    |    |    |    |
| Chaptalia pumila           |    |    |    |    |
| Ipomoea sp.                |    |    |    |    |
| Malpighia hordida          |    |    |    |    |
| Rondeletia plicatula       |    |    |    |    |
| Gochnatia shaferi          |    |    |    |    |
| Encyclia phoenicia         |    |    |    |    |
| Phyllanthus myrtilloides   |    |    |    |    |
| Rondeletia myrtacea        |    |    |    |    |
| Senna benitoensis          |    |    |    |    |
| Xylosma buxifolium         |    |    |    |    |
| Species                        | N1 | N2 | N3 | N4 | E1 | E2 | E3 | E4 | 2  | 2  | 4  | 2  | 2  | 3  | 2  |
|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Arthrostylidium sp.           | N  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | 2  |
| Calycogonium moanum           | E  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | 2  |
| Callicarpa wrightii            | E  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | 4  |
| Oplonia spinosa               | N  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | 2  |
| Mosiera ophiticola            | E  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | 3  |
| Phylanthus mirificus          | E  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | 2  |
| Cyrilla nitidissima           | N  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | 2  |
| Zanthoxylum cubense           | N  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | 2  |
| Amyris sp.                    | N  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | 2  |
| Paspalum rupestre             | N  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | 4  |
| Eupatorium sp.                | N  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | 2  |
| Harpalyce cubensis            | E  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | 2  |
| Lyonia longipes               | E  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | 2  |
| Pitcairnia cubensis           | E  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | 2  |
| Spathelia splendens           | E  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | 2  |
| Tabebuia brooksiiana          | E  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | .  | 3  |
