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The cloud forest in the Dominican Republic: diversity and conservation status

Ana Cano Ortiz[1¶], Carmelo M. Musarella[1,2&*], Ricardo Quinto Canas[3&], José C. Piñar Fuentes[1&], Carlos J. Pinto Gomes[3&], Eusebio Cano[1¶]

[1]Department of Animal and Plant Biology and Ecology, Section of Botany, University of Jaén, Jaén, Spain

[2]Department of AGRARIA, "Mediterranea" University of Reggio Calabria, Reggio Calabria, Italy

[3]Department of Landscape, Environment and Planning, Institute for Mediterranean Agrarian and Environmental Sciences (ICAAM), School of Science and Technology, University of Évora, Évora, Portugal

*Corresponding author

E-mail: carmelo.musarella@unirc.it (CMM)

¶These authors contributed equally to this work.

&These authors also contributed equally to this work.

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Abstract

The study of the forest in rainy environments of the Dominican Republic reveals the presence of four types of vegetation formations, clearly differentiated from each other in terms of their floristic and biogeographical composition, and also significantly different from the rainforests of Cuba. This leads us to propose two new alliances and four plant associations located in northern mountain areas exposed to moisture-laden winds from the Atlantic: All. *Rondeletio ochraceae-Clusion roseae* (Ass. *Cyatheo furfuracei-Prestoetum motanae*; Ass. *Ormosio krugii-Prestoetum montanae*); and All. *Rondeletio ochraceae-Didymopanion tremuli* (Ass. *Hyeronimo montanae-Magnolietum pallescentis*; *Hyeronimo dominguensis-Magnolietum hamorii*). Due to human activity, some areas are very poorly conserved, as evidenced by the diversity index and the presence of endemic tree and plant elements. The worst conserved in terms of the relationship between characteristic plants vegetation (cloud forest) in areas with high rainfall in the Dominican Republic, along with its floristic diversity and state of conservation. Thanks to this study it has been possible to significantly increase the botanical knowledge of this important habitat.

Introduction

The territory of the Dominican Republic (DR), with an extension of 48,198 km^2 including the small adjacent islands, accounts for over two thirds of the territory of Hispaniola, an island located between parallels 17-19ºN in the group of the Greater Antilles. Most previous botanical studies have concentrated predominantly on the flora –for example the work of [1] in the Sierra de Bahoruco– and highlight the abundant rainfall of up to 4,000 mm and the very high rate of endemic species. There are also other studies by several authors on the cloud forest in the Cordillera Central, Septentrional and Oriental ranges [2-17]. All these works, together with previous studies carried out by ourselves [18-29] have enabled us to undertake the present work. All the aforementioned studies focus attention on the knowledge of the flora, with only passing references to the vegetation. The main aim of this work is to determine the forest vegetation (cloud forest) in areas with high rainfall in the Dominican Republic, along with its floristic diversity and conservation status.

Material and methods

The island of Hispaniola, with an area of 76,484 km^2, and Cuba, Jamaica and Puerto Rico are the largest islands in the Caribbean region. The geological origin of the mountains on the island dates from the Cretaceous and Oligocene-Miocene era with the exception of the intramountain valleys formed during the Quaternary period due to the deposit of materials [30]. There is a predominance of calcareous materials with a karstic character, marbles, limestones and Quaternary deposit materials, and a large central nucleus of siliceous materials with serpentine outcrops [19-21]. The island has a mountainous relief with several mountain chains such as the Oriental, Central and Septentrional ranges, and sierras such as Bahoruco and Niebla. The northwest-southwest orientation of the mountains and the prevailing direction of the Atlantic winds explains the existence of a permanent sea of clouds, which gives rise to high rainfall on north-northeast-facing slopes.

This study is focused on the humid-hyper-humid forests in the Dominican Republic (DR) on the island of Hispaniola. Vegetation samples were taken in areas of high rainfall such as the Cordillera Central and Oriental ranges and the Sierra de Bahoruco, selecting sampling plots with an area of 500-2000 m^2. Due to the scarcity of vegetation studies, we analysed

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the works of [31-35] in territories of Cuba. For the dynamic-catenal landscape study we took into account the criteria of [36-37]. An Excel© table was created with 483 rows (species) x 12 columns (tables containing 67 relevés) (Table 1). A statistical treatment (clustering) was applied to separate the communities described for Cuba from those of Hispaniola. The statistical treatment was done by adapting the Van der Maarel conversion [38] and substituting the abundance-dominance indexes with synthetic indexes with the following equivalence: I = 3, II = 4, III = 5, IV = 6, V = 7. Once the indexes were converted, a cluster analysis was applied using the Jaccard distance marking the distance between the associations studied. After separating the forests in the Dominican Republic (DR) from those of Cuba based on the Jaccard distance, an Excel© table was created with the vegetation relevés from the DR, and a Euclidean distance cluster analysis and a DCA were applied to obtain the different types of forests present in the DR. A CCA was done to determine the influence of environmental factors (temperature and rainfall) on the distribution of these forests, followed by a study of the diversity and conservation status.

Table 1. Plant communities studied and number of relevés.

	Communities	Authors	No. of rel.
C1	*Clethro-Pinetum maestrensis* Borhidi 1991 (Cuba)	Borhidi (1991). Phytogeography and vegetation ecology of Cuba, Table 139, page 624	5
C2	*Hyeronimo-Sloanetum curatellifoliae* Borhidi 1991 (Cuba)	Borhidi (1991). Phytogeography and vegetation ecology of Cuba, Table 140, page 627	5
C3	*Alchorneo-Calophylletum rivularis* Reyes 2005 (Cuba)	Reyes (2005). Synecological study of submontane rainforests on metamorphic complex rocks, Table 1	6
C4	*Pruno-Guareetum guidoniae* Reyes & Acosta 2011 (Cuba)	Reyes & Acosta (2011). Phytocoenosis in evergreen forests in eastern Cuba III, Table 2	4
C5	*Ocoteo-Phoebietum elongatae* Reyes & Acosta 2010 (Cuba)	Reyes & Acosta (2010). Phytocoenosis in evergreen forests in eastern Cuba I, Table 1	7
C6	*Guareo guidoniae-Zantoxyletum martinicensis* Reyes & Acosta 2010 (Cuba)	Reyes & Acosta (2010). Phytocoenosis in evergreen forests in eastern Cuba II, Table 1	8
			Total 35 relevés
DR7	*Hyeronimo montanae-Magnolietum pallescentis nova* (DR)	Own relevés	5
DR8	*Cyatheo furfuracei-Prestoetum montanae nova* (DR)	Own relevés	5

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DR9	*Hyeronimo dominguensis-Magnolietum hamorii nova* (DR)	Own relevés	4
DR10	*Ormosio krugii-Prestoetum montanae nova* (DR)	Own relevés	3
DR11	Vegetation relevés (DR)	May & Peguero (2000). Vegetation and flora of the El Mogote ridge, Jarabacoa, Cordillera Central range, Dominican Republic; Table 1 page 23	3
DR12	Vegetation relevés (DR)	May (2007). Composition, structure and diversity in broadleaved cloud forests in the Ebano Verde scientific reserve (Cordillera Central range, Dominican Republic); Table 1 page 171	12
			Total 32 relevés

Results

The results of the analysis of Jaccard distances (Fig 1) applied to six plant communities in Cuba and six in the DR, show that the six communities described in Cuba by [31-35], C1-C6 (Table 1, 35 relevés), can be broken down into the community C1 and the group G_1 (C2,C3,C4,C5,C6). C1 is differentiated from the rest in terms of its floristic, structural and ecological composition, as this is a pinewood of *Pinus maestrensis* Bise growing in rainy environments but on highly oligotrophic soils, in common with the other communities in group G_1, which is floristically significantly different from group G_2. There are very significant floristic differences between Cuba and the DR (Tables 2 and 3), with 173 species present in the samplings in the DR but not in Cuba, whereas the samplings in Cuba reveal 139 plants that are absent from the DR. In group G_2, which contains 32 of our own relevés and those one of [9-10], (DR7, DR8, DR9, DR10, DR11, DR12), the communities DR7, DR11 and DR12 can be seen to form a group for the DR representing different types of forests; these formations are a series of plant communities in very rainy environments in the Dominican Republic (DR) located in the Sierra de Bahoruco and the Cordillera Central and Oriental ranges, with rainfall of over 2,000 mm. Group G_2 is broken down into two subgroups of plant communities –DR7-DR11-DR12 and DR8-DR9-DR10– which is plausible, as the first three correspond to areas with acid substrates and rainy environments in the Cordillera Central range, whereas the second subgroup contains communities growing on different kinds of substrates and in hyper-humid environments. We therefore focus on the analysis of 17 of our own samplings to which we apply a Euclidean distance cluster analysis and an ordination analysis, both of which perfectly separate the sampling groups.

Fig 1. Jaccard distance cluster. Cluster analysis for the associations of Cuba and the Dominican Republic.

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Table 2. Plants from Cuba not present in the relevés from the DR

Ageratina paucibracteata (Alain) King et Robins.	*Ocotea cuneata* (Griseb.) Urb.
Alsophila aquilina C. Chr.	*Oplismenus hirtellus* (L.) Beauv.
Allophyllus cristalensis Lippold	*Ossaea muricata* (Griseb.) Wr. ex Sam.
Ascyrum hypericoides L.	*Ouratea revoluta* (Wr ex Griseb.) Engl.
Bactris cubensis Burret	*Panicum boliviense* Hack.
Buchenavia capitata (Vahl.) Eichl.	*Panicum glutinosum* Sw.
Byrsonima biflora Griseb.	*Panicum scoparium* L.
Byrsonima coriacea R. Br.	*Pardiaea maestrensis* Borhidi and Catassus
Byrsonima orientensis Bisse	*Pera ekmanii* Urb.
Calophyllum utile Bisse	*Phaius tankervilliae* (Banks) Blume
Calycogonium grisebachii Triana	*Pharus latifolius* L.
Calycogonium lindenianum Naud.	*Philodendron lacerum* (Jacq.) Schott
Calyptrantes punctata Griseb.	*Phyllanthus pachystylus* Urb.
Callicarpa ferruginea Sw.	*Phyllanthus subcarnosus* Wr ex Muell. Arg.
Cestrum laurifolium L´Hérit	*Pilocarpus racemosus* Vahl.
Clethra cubensis A. Rich.	*Pinus maestrensis* Bisse
Clidemia strigillosa (Sw.) DC.	*Piper holguinianum* Trel.
Clusia minor L.	*Pithecellobium arboreum* (L.) Urb.
Clusia tetrastigma Vesque	*Platygine triandra* Borhidi
Coccocypselum x *lanceolatum* (Urb.) Borhidi	*Pleurothalis tribuloides* (Sw.) Lindl.
Coccoloba costata Wr. Inn Sauv.	*Pleurothalis velaticaulis* Rchb.
Coccoloba ekmanii O. C. Schmidt	*Podocarpus ekmanii* Urb.
Coccoloba retusa Griseb.	*Polygala oblongata* (Britt.) Blake
Coussarea urbaniana Standl.	*Polypodium phyllitidis* L.
Critonia dalea (L.) DC.	*Polystachya cubensis* Schltr.
Cyathea araneosa (Sw.) Domin	*Protium cubense* (Rose) Urb.
Cyrilla nipensis Urb.	*Psidium balium* Urb.
Chrysophyllum argenteum Jacq.	*Psychotria shaferi* Urb.
Dalbergaria cubensis (Urb.) Borhidi	*Pteridium caudatum* (L.) Max.
Dendropanax nervosus (Urb et Ekm.) A. C. Sm.	*Pteris rigida* Sw.
Dennstaedtia adiantoides (H. & B) Moore	*Pytirogramma sulphurea* (Sw.) Max.
Desmodium herbaceum (L.) Benth. & Oerst.	*Rajania nipensis* Howard
Dicranopteris flexuosa (Schrad.) Mett.	*Raudolfia salicifolia* Griseb.
Dichaea hystricina Rchb.	*Rhamnidium nipense* Urb.
Dilomilis oligophylla (Schltr.) Summerh.	*Rondeletia calophylla* Standl ex Britt.
Dinema cubincola (Borhidi) H. Dietr.	*Rondeletia naguensis* Britt and Wils
Dipholis cubensis (Griseb.) Pierre	*Rubus turquinensis* Rydb.
Ditta myricoides Griseb.	*Salacia nipensis* Britt.
Elaphoglossum firmum (Mett.) Urb.	*Sapium cubense* Britt ex Wils.
Eugenia rigida Berg.	*Sapium erythrospermum* (Griseb.) Muell. Arg.
Garrya fadyenii Hook.	*Sapium jamiaicense* Sw.
Gesneria pachyclada Urb.	*Savia cuneifolia* Urb.
Gesneria viridiflora (Dcne) Kuntze	*Scleria pilosissima* Britt.
Graffenrieda refescens Britt. & Wils.	*Schradera cubensis* Steyerm.
Guatteria moralesii Urb.	*Simaruba laevis* Griseb.
Guettarda lindeniana A. Rich.	*Sloanea curatellifolia* Griseb.
Habenaria monorrhiza (Sw.) Rchb.	*Solanum cristalense* Amsh.
Hedyosmum grissebachii Solms	*Solanum pachyneurum* O.E. Schulz
Heterotrichum umbellatum (Mill.) Urb.	*Solanum virgatum* Lam.

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Hyeronima nipensis Urb.	*Solonia reflexa* Urb.
Ichnanthus mayarensis (Wr.) Hitchc.	*Stelis ophioglossoides* (Jacq.) Sw.
Illicium cubense A.C.Sm.	*Tabebuia hypoleuca* Griseb.
Jacquiniella globosa (Jacq.) Schlechter	*Talauna minor* Urb. subsp *oblongifolia* (León) Borhidi
Lasiacis sloanei (L.) Hitchc.	*Terminalia nipensis* Alain
Leucocroton wrightii Griseb.	*Trema cubensis* Urb.
Litachne pauciflora (Swartz) P. Beauverd	*Trichomanes crispum* L.
Lobelia assurgens L.	*Vaccinium leonis* Acuña & Roig
Lophosoria quadripinnata (Gmel.) C. Chr.	*Vandenboschia scandens* (L.) Copel
Lycopodium dichotomum Jacq.	*Vanilla phaeantha* Rchb.
Lyonia calycosa (Samll) Urb.	*Vanilla wrightii* Rchb.
Lyonia maestrensis Acuña and Roig	*Vernonia parvuliceps* Ekm.
Magnolia cubensis Urb.	*Viburnum villosum* Sw.
Marcgravia evenia Kr et Urb.	*Wallenia laurifolia* (A. Rich.) Wr in Sauv subsp. *pinetorum* (Britt.) Borhidi
Mataiba domingensis (DC.) Radlk.	*Wigandia reflexa* Brand
Mecodium polyanthos (Sw.) Copel	*Zanthoxyllum cubense* P. Wils.
Meriania leucantha Sw. subsp. *nana* (Naud.) Borhidi	
Meringium fucoides (Sw.) Copel	
Miconia acunae Borhidi	
Miconia alternifolia Griseb.	
Miconia dodecandra (Desv.) Cogn.	
Micropholis polita (Griseb.) Pierre	
Mozartia gundlachii (Kr. & Urb.) Urb.	
Myrica cacuminis Britt and Wils.	
Myrica punctata Griseb.	

Table 3. Plants from the Dominican Republic (DR) not present in the relevés from Cuba.

Alsophila minor (D.C.Eaton) R.M.Tryon	*Magnolia hamorii* Howard
Anacheilium cochleatum (L.) Hoffm.	*Magnolia pallescens* Urb. & Ekm.
Antrophyum lanceolatum (L.) Kaulf.	*Malpighia macracantha* Ekm. & Nied.
Arthrostylidium multispicatum Pilger	*Marattia kaulfussii* J. Smith
Arthrostylidium sarmentosum Pilger	*Marcgravia rubra* A. Liogier
Asplenium radicans L.	*Maxillaria coccinea* (Jacq.) L.O. Wms.
Baccharis myrsinites (Lam.) Pers.	*Mecranium ovatum* Cog.
Bactris plumeriana Mart.	*Meriania involucrata* (Desv.) Naud.
Beilschmiedia pendula (Sw.) Hemsl.	*Miconia mirabilis* (Aubl.) L.O. Willians
Blechneum fragile (Liebm.) Morton & Lellinger	*Miconia prasina* (Sw.) DC.
Blechnum tuerckheimii A. Brause	*Miconia racemosa* (Aubl.) DC.
Bocconia frutescens L.	*Microgramma piloselloides* L.
Buchenavia tetraphylla (Aubl.) R. A. Howard	*Mikania cordifolia* (L.) Willd.
Byrsonima lucida (Mill.) L.c. rich.	*Mikania venosa* A. Liogier
Byrsonima spicata (Cav.) Kunth	*Mimosa pudica* L.
Calyptrantes selleanus Urb. & Ekm.	*Mucuna urens* (L.) Fawc. & Rendle
Camparettia falcata Poepp. & Endl.	*Myrcia deflexa* (Poir) DC.
Casearea arborea (L.C.Rich.) Urb.	*Myrsine nubicola* A. Liogier
Cecropia screberiana Miq.	*Nephrolepis multiflora* (Roxb.) Jarret
Cestrum coelophlebium O. E. Schulz	*Nepsera aquatica* (Aubl.) Naud.
Cestrum daphnoides Griseb.	*Neurolaena lobata* (L.) Cass.
Cestrum inclusum Urb.	*Niphidium crassifolium* (L.) Lell.
Cinnamomum alainii (C.K. Allen) A. Liogier	*Ocotea acarina* C. K. allen

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Cissampelos pareira L.	*Ocotea floribunda* (Sw.) Mez
Cissus verticillata (L.) Nicholson & Farris	*Ocotea foeniculacea* Mez
Clidemia umbellata (Miller) L.O. Wms.	*Ocotea globosa* (Aubl.) Schlecht. & Cham.
Clusia clusioides (Griseb.) D´arcy	*Ocotea nemodaphne* Mez
Cnemidaria horrida (L.) K. Presl	*Ocotea patens* (Sw.) Nees
Coccoloba wrightii Lindau	*Odontadenia polyneura* (Urb.) Wood.
Columnea domingensis (Urb.) Wiehler	*Olyra latifolia* L.
Columnea sanguinea Urb.	*Oncidium variegatum* (Sw.) Sw.
Commelina elegans Kunth	*Ophioglossum palmatum* L.
Cordia dependens Urb. & Ekm.	*Oreopanax capitatus* (Jacq.) Decne. & Planch.
Cupania americana L.	*Ormosia krugii* Urb.
Cyathea fulgens C. Chr.	*Palicourea crocea* (Sw.) Schultes
Cyathea furfuracea Baker	*Passiflora rubra* L.
Chaetocarpus domingensis Proctor	*Peperomia hernandifolia* (Vahl) A. Dietr.
Daphnosis crassifolia (Poir.) Meiss.	*Persea krugii* Mez
Dendropanax arboreus (L.) Dcne & Planch.	*Persea oblongifolia* Kopp.
Dichaea glauca (Sw.) Lindley	*Phlebodium aureum* (L.) J. Smith
Didymopanax tremulus Krug. & Urb.	*Pilea geminata* Urb.
Dilomilis montana (Sw.) Summerh.	*Pinguicula casabitoana* J. Jiménez
Diplazium hastile (Christ.) C. Chr.	*Piper adunculum* L.
Diplazium hians Kuntze	*Pleurothalis ruscifolia* (Jaq.) R. Br.
Ditta maestrensis Borhidi	*Pleurothallis domingensis* Cogn.
Elaphoglossum crinitum (L.) C. Chr.	*Polygala fuertesii* (Urb.) Blake
Elaphoglossum latifolium (Sw.) J. Sm.	*Polypodium angustifolium* Sw.
Elleanthus cephalotus Garay & Sweet	*Polypodium loriceum* L.
Entada gigas (L.) Fawc. & Rendle	*Pothomorphe peltata* (L.) Miquel
Epidendrum anceps Jacq.	*Pothuya nudicaulis* (L.) Regel
Epidendrum carpophorum Barb. Rodr.	*Prestoea montana*(Grah.) Nichol
Epidendrum jamaicense Lindl	*Psychotria domingensis* Jacq.
Epidendrum ramosum Jacq.	*Psychotria liogieri* Sateyerm
Eupatorium odoratum L.	*Psychotria uliginosa* Sw.
Exostema elliptica Griseb.	*Pytirogramma calomelanos* (L.) Link
Gleychenia bifida (Willd.) Spreng.	*Renealmia jamaicensis* (Gaertn.) Horan var. *puberula* (Gagn.) Maas
Gomedesia lindeniana Berg.	*Rondeletia ochracea* Urb.
Gonocalyx tetrapterus A. Liogier	*Sagraea fuertesii* (Cogn.in Urb.) Alain
Grammitis asplenifolia (L.) Proctor	*Schlegelia brachyantha* Griseb.
Guarea guidonea Sleumer	*Schradera subsessilis* Steyermark
Guatteria blainii (Griseb.) Urb.	*Senecio lucens* (Poir.) Urb.
Guzmania monostrachya (Sw.) Rusby	*Sloanea berteriana* Choisy
Gyrotaenia myriocarpa Griseb.	*Smilax havanensis* Jacq.
Hedychium coronarium Koen.	*Smilax populnea* Kunt var. *horrida* O.E. Schulz
Hedyosmum domingense Urb.	*Solanum crotonoides* Lam.
Hirtella triandra Sw.	*Solanum jamaicense* Mill.
Hyeronima domingensis Urb.	*Solanum torvum* Sw.
Hyeronima montana A. Liogier	*Solanum virgatum* Lam.
Hypolepis hispaniolica Mason	*Stigmaphyllon emarginatum* (L.) A. Juss.
Hyptis americana (Poir.) Briq.	*Styrax ochraceus* Urb.
Ichnanthus pallens (Sw.) Munro	*Syngonium podophyllum* Schott
Ilex tuerckheimii Loes.	*Tabebuia bullata* A. Gentry
Inga fagifolia (L.) Willd. ex Benth.	*Tabebuia vinosa* A. Gentry
Inga vera Willd.	*Torralbasia cuneifolia* (C. Wright) Krug. & Urb.

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Ipomoea furcyensis Urb.	*Triunfetta semitriloba* Jacq.
Ipomoea tiliacea (Willd.) Choisy	*Turpinia occidentalis* (Sw.) G. Don
Isachne rigidifolia (Poir.) Urb.	*Uncinia hamata* (L.) Urb.
Lasianthus bahorucanus Zanoni	*Urena lobata* L.
Leandra limoides (Urb.) W. Judd & Skean	*Urera baccifera* (L.) Gaud.
Lobelia robusta Graham	*Vaccinium racemosum* (Vahl) Wilbur & Luteyn
Lobelia rotundifolia Juss.	*Vernonia buxifolia* (Cass.) Less.
Lomariopsis sorbifolia (L.) Fée	*Vitis tiliifolia* H. & B. ex Willd.
Lycopodium cernuum L.	*Vittaria lineata* (L.) Smith
Lycopodium clavatum L.	*Vriesea sintenisii* (Baker) L.B. Smith & Pitt.
Lyonia alainii W. Judd.	*Vriesea tuercheimii* (Mez.) L.B. Smith
Macrocarpaea domingensis Urb.	*Zanthoxyllum martinicensis* (DC.) Lam.
Machaerina cubensis (Kük.) T. Koyama	

Phytosociological study

The statistical analysis of the samplings from the DR reveals the existence of four forest plant associations (Fig 2): As1) *Hyeronimo montanae-Magnolietum pallescentis nova hoc loco* (S1 Table rel. DR1, DR2, DR4, DR5, DR6; typus rel. DR4), growing at altitudes of between 1,300 and 1,500 metres on siliceous substrates in the Cordillera Central range (central biogeographical district), and in rainy environments with a humid ombrotype and a mesotropical thermotype [16,23,39,40]. These forests contact in hyper-humid areas with forests of *Prestoea montana* (Grah.) Nichol, and have a high floristic diversity with 21 trees, eight climbing species and five epiphytes, and a high rate of endemisms (14 species). As2) *Cyatheo furfuracei-Prestoetum montanae nova hoc loco* (S2 Table rel. DR3, DR7, DR8, DR9, DR10; typus rel. DR3), a plant community dominated by *Prestoea montana*, always found in hyper-humid environments, generally in very rainy and shady gorges, contacting with the previous association towards areas that are somewhat less rainy and more exposed to sun and wind. It also has a high diversity, with 40 tree and 25 epiphyte species. Due to the catenal contact between both associations, As1 and As2 present a series of common species; they are therefore statistically close (Figs 3 and 4). As3) *Hyeronimo dominguensis-Magnolietum hamorii nova hoc loco* (S3 Table rel. DR11, DR12, DR13, DR14; typus rel. DR11) represents forests of *Magnolia* in the Sierra de Bahoruco, which develop on calcareous substrates in humid environments at altitudes of around 1,200-1,300 metres in a humid ombrotype and a mesotropical thermotype, with a high number of tree (25) and epiphyte (14) species. As4) *Ormosio krugii-Prestoetum montanae nova hoc loco* (S4 Table rel. DR15, DR16, DR17; typus rel. DR16), an association characterised by a high diversity of trees (27 species), and a lower number of endemic species than the previous associations. The four associations present a clear floristic and biogeographical differentiation (Fig 5, Table 4) [41,42].

Fig 2. Cluster from the DR. Euclidean distance using Ward's method.

Fig 3. DCA ordination analysis. Management analysis for inventories of the Dominican Republic, separation between 4 associations.

Fig 4. DCA ordination analysis. DCA analysis confirming the separation of the 4 associations.

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Fig 5. Biogeographical distribution of the associations in the study. As1. *Hyeronimo montanae-Magnolietum pallescentis* (A16: central district). As2. *Cyatheo furfuracei-Prestoetum montanae* (A16: central district). As3. *Hyeronimo dominguensis-Magnolietum hamorii* (A12: Bahoruco district). As4. *Ormosio krugii-Prestoetum montanae* (A5: eastern district).

Table 4. Synthetic table of the associations in the study.

Synthetic table	As1	As2	As3	As4	P
Myrsine coriacea (Sw.) R. Br.	IV	III	V	III	4
Ocotea leucoxylon (Sw.) Mez	I	IV	III	III	4
Prestoea montana (Grah.) Nichol	I	V	V	V	4
Psychotria domingensis Jacq.	IV	IV	V	III	4
Gleychenia bifida (Willd.) Spreng.	II	I		I	3
Clidemia umbellata (Miller) L.O. Wms.	I	I	-	I	3
Renealmia jamaicensis (Gaertn.) Horan var. *puberula* (Gagn.) Maas	V	III	V	-	3
Arthrostylidium multispicatum Pilger	V	IV	III	-	3
Rondeletia ochracea Urb.	V	II	V	-	3
Didymopanax tremulus Krug. & Urb.	IV	I	V	-	3
Psychotria guadalupensis (DC.) Howard	III	III	V	-	3
Mikania venosa A. Liogier	II	IV	V	-	3
Odontosoria uncinella (Kunze) Fée	II	II	V	-	3
Brunellia comocladifolia H. & B.	II	III	III	-	3
Lobelia rotundifolia Juss.	III	I	I	-	3
Alchornea latifolia Sw.	-	III	I	V	3
Miconia mirabilis (Aubl.) L.O. Willians	-	II	I	V	3
Mucuna urens (L.) Fawc. & Rendle	-	II	I	V	3
Nephrolepis multiflora (Roxb.) Jarret	-	I	III	I	3
Ilex macfadyenii (Walp.) Rehder	V	-	I	-	2
Chionanthus domingensis Lam.	V	-	I	-	2
Macrocarpaea domingensis Urb.	IV	-	III	-	2
Polygala fuertesii (Urb.) Blake	IV	-	III	-	2
Marcgravia rubra A. Liogier	IV	-	I	-	2
Alsophila minor (D.C.Eaton) R.M.Tryon	V	III	-	-	2
Palicourea alpina (Sw.) DC.	V	II	-	-	2
Blechnum occidentale L.	III	III	-	-	2
Cyrilla racemiflora L.	IV	IV	-	-	2
Ocotea nemodaphne Mez	III	-	I	-	2
Schradera subsessilis Steyermark	II	-	I	-	2
Lycopodium clavatum L.	II	-	-	I	2
Odontadenia polyneura (urb.) Wood.	II	I	-	-	2
Byrsonima lucida (Mill.) DC.	I	II	-	-	2
Weinmannia pinnata L.	I	-	V	-	2

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Epidendrum carpophorum Barb. Rodr.	I	-	I	-	2
Epidendrum carpophorum Barb. Rodr.	I	-	I	-	2
Pleurothallis domingensis Cogn.	I	II	-	-	2
Cestrum coelophlebium O. E. Schulz	I	II	-	-	2
Olyra latifolia L.	I	I	-	-	2
Cecropia screberiana Miq.	-	III	-	V	2
Turpinia occidentalis (Sw.) G. Don	-	III	-	V	2
Mikania cordifolia (L.) Willd.	-	I	-	V	2
Pothomorphe peltata (L.) Miquel	-	I	-	III	2
Ichnanthus pallens (Sw.) Munro	-	III	-	I	2
Guzmania monostrachya (Sw.) Rusby	-	II	-	I	2
Dendropanax arboreus (L.) Dcne & Planch.	-	IV	I	-	2
Dichaea glauca (Sw.) Lindley	-	III	III	-	2
Epidendrum ramosum Jacq.	-	III	I	-	2
Gomedesia lindeniana Berg.	-	II	V	-	2
Myrcia deflexa (Poir) DC.	-	II	V	-	2
Peperomia hernandifolia (Vahl) A. Dietr.	-	II	V	-	2
Vriesea tuercheimii (Mez.) L.B. Smith	-	I	V	-	2
Cyathea fulgens C. Chr.	-	I	V	-	2
Magnolia hamorii Howard	-	I	V	-	2
Mecranium ovatum Cog.	-	I	V	-	2
Lasianthus bahorucanus Zanoni	-	I	V	-	2
Nephrolepis biserrata (Sw.) Schott	-	I	V	-	2
Columnea domingensis (Urb.) Wiehler	-	I	V	-	2
Hedyosmum domingense Urb.	-	I	III	-	2
Lomariposis sorbifolia (L.) Feé	-	I	III	-	2
Beilschmiedia pendula (Sw.) Hemsl.	-	I	III	-	2
Vaccinium racemosum (Vahl) Wilbur & Luteyn	IV	I	III	-	2
Ocotea acarina C.	-	I	I	-	2
Hypolepis hispaniolica Mason	-	I	I	-	2
Schlegelia brachyantha Griseb.	-	I	I	-	2
Sagraea fuertesii (Cogn.in Urb.) Alain	-	II	I	-	2
Niphidium crassifolium (L.) Lell.	-	I	I	-	2
Phlebodium aureum (L.) J. Smith	-	I	I	-	2
Polypodium loriceum L.	-	I	I	-	2
Epidendrum jamaicense Lindl	-	I	I	-	2
Microgramma piloselloides L.	-	I	-	I	2
Miconia prasina (Sw.) DC.	-	-	III	V	2
Guarea guidonea Sleumer	-	-	I	V	2
Tibouchina longifolia (Vahl) Baill.	-	-	I	III	2
Smilax domingensis Willd.	-	-	I	I	2
Magnolia pallescens Urb. & Ekm.	V	-	-	-	1
Styrax ochraceus Urb.	V	-	-	-	1
Hyeronima montana A. Liogier	V	-	-	-	1

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Cyathea furfuracea Baker	V	-	-	-	1
Clusia clusioides (Griseb.) D´arcy	V	-	-	-	1
Ditta maestrensis Borhidi	V	-	-	-	1
Persea oblongifolia Kopp.	V	-	-	-	1
Smilax populnea Kunt var. *horrida* O.E. Schulz	V	-	-	-	1
Tabebuia vinosa A. Gentry	V	-	-	-	1
Gonocalyx tetrapterus A. Liogier	V	-	-	-	1
Cinnamomum alainii (C.K. Allen) A. Liogier	IV	-	-	-	1
Vriesea sintenisii (Baker) L.B. Smith & Pitt.	III	-	-	-	1
Baccharis myrsinites (Lam.) Pers.	III	-	-	-	1
Pinguicula casabitoana J. Jiménez	III	-	-	-	1
Chaetocarpus domingensis Proctor	II	-	-	-	1
Odontosoria aculeata (L.) J. Sm.	I	-	-	-	1
Myrsine nubicola A. Liogier	I	-	-	-	1
Persea krugii Mez	I	-	-	-	1
Lycopodium cernuum L.	I	-	-	-	1
Isachne rigidifolia (Poir.) Urb.	I	-	-	-	1
Machaerina cubensis (Kük.) T. Koyama	I	-	-	-	1
Vernonia buxifolia (Cass.) Less.	I	-	-	-	1
Lyonia alainii W. Judd.	I	-	-	-	1
Clidemia hirta (L.) D. don	I	-	-	-	1
Bocconia frutescens L.	I	-	-	-	1
Dilomilis montana (Sw.) Summerh.	I	-	-	-	1
Myrcia splendens (Sw.) DC.	-	IV	-	-	1
Cissampelos pareira L.	-	III	-	-	1
Uncinia hamata (L.) Urb.	-	III	-	-	1
Tabebuia bullata A. Gentry	-	III	-	-	1
Blechnum tuerckheimii A. Brause	-	III	-	-	1
Senecio lucens (Poir) Urb.	-	III	-	-	1
Coccoloba wrightii Lindau	-	III	-	-	1
Guatteria blainii (Griseb.) Urb.	-	II	-	-	1
Solanum crotonoides Lam.	-	II	-	-	1
Vitis tiliifolia H. & B. ex Willd.	-	I	-	-	1
Anacheilium cochleatum (L.) Hoffm.	-	I	-	-	1
Antrophyum lanceolatum (L.) Kaulf.	-	I	-	-	1
Camparettia falcata Poepp. & Endl.	-	I	-	-	1
Passiflora rubra L.	-	I	-	-	1
Smilax havanensis Jacq.	-	I	-	-	1
Stigmaphyllon emarginatum (L.) A. Juss.	-	I	-	-	1
Commelina elegans Kunth	-	I	-	-	1
Diplazium hastile (Christ.) C. Chr.	-	I	-	-	1
Diplazium hians Kuntze	-	I	-	-	1
Epidendrum anceps Jacq.	-	I	-	-	1
Grammitis asplenifolia (L.) Proctor	-	I	-	-	1

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Jacquiniella globosa (Jacq.) Schlechter	-	I	-	-	1
Oncidium variegatum (Sw.) Sw.	-	I	-	-	1
Pothuya nudicaulis (L.) Regel	-	I	-	-	1
Vittaria lineata (L.) Smith	-	I	-	-	1
Cestrum inclusum Urb.	-	I	-	-	1
Cordia dependens Urb. & Ekm.	-	I	-	-	1
Daphnosis crassifolia (Poir.) Meiss.	-	I	-	-	1
Eupatorium odoratum L.	-	I	-	-	1
Gyrotaenia myriocarpa Griseb.	-	I	-	-	1
Hyptis americana (Poir.) Briq.	-	I	-	-	1
Lasianthus lanceolatus (Griseb.) Gómez Maza		I	-	-	1
Lobelia robusta Graham	-	I	-	-	1
Psychotria liogieri Sateyerm	-	I	-	-	1
Solanum virgatum Lam.	-	I	-	-	1
Pilea geminata Urb.	-	I	-	-	1
Exostema elliptica Griseb.	-	I	-	-	1
Malpighia macracantha Ekm. & Nied.	-	I	-	-	1
Ocotea floribunda (Sw.) Mez	-	I	-	-	1
Ocotea patens (Sw.) Nees	-	I	-	-	1
Ipomoea furcyensis Urb.	-	I	-	-	1
Columnea sanguinea Urb.	-	-	V	-	1
Elaphoglossum crinitum (L.) C. Chr.	-	-	V	-	1
Elaphoglossum latifolium (Sw.) J. Sm.	-	-	V	-	1
Elleanthus cephalotus Garay & Sweet	-	-	V	-	1
Pleurothalis ruscifolia (Jaq.) R. Br.	-	-	V	-	1
Hyeronima domingensis Urb.	-	-	V	-	1
Calyptrantes selleanus Urb. & Ekm.	-	-	V	-	1
Torralbasia cuneifolia (C. Wright) Krug. & Urb.	IV	-	III	-	1
Meriania involucrata (Desv.) Naud.	-	-	III	-	1
Miconia punctata (Desr.) D. Don	-	-	III	-	1
Ophioglossum palmatum L.	-	-	III	-	1
Blechneum fragile (Liebm.) Morton & Lellinger		-	III	-	1
Arthrostylidium sarmentosum Pilger	-	-	III	-	1
Ilex tuerckheimii Loes.	-	-	I	-	1
Leandra limoides (Urb.) W. Judd & Skean	-	-	I	-	1
Maxillaria coccinea (Jacq.) L.O. Wms.	-	-	I	-	1
Asplenium radicans L.	-	-	I	-	1
Cestrum daphnoides Griseb.	-	-	I	-	1
Polypodium angustifolium Sw.	-	-	I	-	1
Ocotea foeniculacea Mez	-	-	I	-	1
Hillia parasitica Jacq.	-	-	I	-	1
Marattia kaulfussii J. Smith	-	-	I	-	1
Buchenavia tetraphylla (Aubl.) R. A. Howard	-	-	-	V	1
Byrsonima spicata (Cav.) Kunth	-	-	-	V	1

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Casearea arborea (L.C.Rich.) Urb.	-	-	-	V	1
Clusia rosea Jacq.	-	-	-	V	1
Cyathea arborea (L.) J.E. Smith	-	-	-	V	1
Didymopanax morototoni (Aubl.) Decne. & Planch		-	-	V	1
Pytirogramma calomelanos (L.) Link	-	-	-	V	1
Miconia serrulata (DC.) Naud.	-	-	-	V	1
Ocotea globosa (Aubl.) Schlecht. & Cham.	-	-	-	V	1
Oreopanax capitatus (Jacq.) Decne. & Planch.		-	-	V	1
Ormosia krugii Urb.	-	-	-	V	1
Sloanea berteriana Choisy	-	-	-	V	1
Cnemidaria horrida (L.) K. Presl	-	-	-	V	1
Solanum torvum Sw.	-	-	-	V	1
Ipomoea tiliacea (Willd.) Choisy	-	-	-	V	1
Inga fagifolia (L.) Willd. ex Benth.	-	-	-	III	1
Inga vera Willd.	-	-	-	III	1
Bactris plumeriana Mart.	-	-	-	III	1
Nepsera aquatica (Aubl.) Naud.	-	-	-	III	1
Syngonium podophyllum Schott	-	-	-	III	1
Psychotria uliginosa Sw.	-	-	-	III	1
Urera baccifera (L.) Gaud.	-	-	-	III	1
Mimosa pudica L.	-	-	-	I	1
Neurolaena lobata (L.) Cass.	-	-	-	I	1
Triunfetta semitriloba Jacq.	-	-	-	I	1
Cupania americana L.	-	-	-	I	1
Hirtella triandra Sw.	-	-	-	I	1
Miconia racemosa (Aubl.) DC.	-	-	-	I	1
Zantoxylum martinicensis (Lam.) DC.	-	-	-	I	1
Cissus verticillata (L.) Nicholson & Farris	-	-	-	I	1
Entada gigas (L.) Fawc. & Rendle	-	-	-	I	1
Palicourea crocea (Sw.) Schultes	-	-	-	I	1
Piper adunculum L.	-	-	-	I	1
Coccocypselum herbaceum Aubl.	-	-	-	I	1
Hedychium coronarium Koen.	-	-	-	I	1
Solanum jamaicense Mill.	-	-	-	I	1
Urena lobata L.	-	-	-	I	1

As1. *Hyeronimo montanae-Magnolietum pallescenti*. As2. *Cyatheo furfuracei-Prestoetum montanae*. As3. *Hyeronimo dominguensis-Magnolietum hamorii*. As4. *Ormosio krugii-Prestoetum montanae*. P. Presences.

Conservation status of the associations

The analysis of the floristic diversity of the relevés shows a predominance of Shannon_T diversity (total diversity) over the diversity of non-endemic and endemic species, except in the samplings DR15, DR16 and DR17, where there is a coincidence between Shannon_T and Shannon_Ne due to the low rate of endemic species, with only two species: *Bactris*

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plumeriana and *Clidemia umbellata*. The diversity rate for characteristic species (Shannon_Ca) tends to be high compared to companion species (Shannon_Co), except in DR3 which has a value for Shannon_Co = 1.099 (Table 5).

Table 5. Shannon diversity by relevé.

	DR1	DR2	DR3	DR4	DR5	DR6	DR7	DR8	DR9	DR10	DR11	DR12	DR13	DR14	DR15	DR16	DR17
Shannon_T	3,612	3,443	2,451	3,566	3,464	3,557	3,557	3,458	3,424	3,389	3,786	3,972	3,781	3,702	3,917	3,496	3,499
Shannon_Ca	3,17	3,247	2,165	3,097	3,119	3,152	2,819	2,606	2,803	2,563	3,119	3,154	3,013	2,683	3,173	3,061	3,027
Shannon_Co	2,591	1,718	1,099	2,602	2,232	2,507	2,91	2,901	2,655	2,814	3,066	3,391	3,162	3,256	3,277	2,458	2,532
Shannon_Ne	3,178	2,947	2,16	3	2,997	3,119	3,347	3,244	3,104	2,998	3,561	3,601	3,388	3,458	3,897	3,435	3,438
Shannon_E	2,574	2,508	1,089	2,732	2,49	2,557	1,891	1,842	2,137	2,158	2,41	2,803	2,658	2,074	0	0	0

(Shannon_T= total diversity; Shannon_Ca= characteristic community species diversity; Shannon_Co= companion community species diversity; Shannon_Ne= non-endemic species diversity; Shannon_E= endemic species diversity).

In the comparative analysis of the diversity between the four associations using the average diversity values for each relevé, it can be seen that association As4 has a Shannon_E =0 due to an almost total lack of endemic species. This association also has low values for total diversity and non-endemic species, with 44.2% trees, 22.9% shrubs, 13.1% climbing plants and 16.3% herbs; whereas the other associations have a greater diversity. The Shannon_Ca value is higher than Shannon_Co in the four associations except for As3; however, the values are similar due to a tendency to ingression by companion species from neighbouring communities (Table 6, Fig 6).

Table 6. Diversity analysis of each of the four plant associations.

	As1	As2	As3	As4
Shannon_T	3,049	2,681	3,268	2,4
Shannon_Ca	2,743	2,533	3,105	2,921
Shannon_Co	2,33	2,475	3,218	2,755
Shannon_Ne	2,81	2,397	2,994	1,795
Shannon_E	2,572	1,823	2,486	0

Fig 6. Shannon diversity value (T, Ca, Co, Ne, E). As1. *Hyeronimo montanae-Magnolietum pallescentis*. As2. *Cyatheo furfuracei-Prestoetum motanae*. As3. *Hyeronimo dominguensis-Magnolietum hamorii.* As4. *Ormosio krugii-Prestoetum montanae*.

Discussion

In all cases there is a high diversity of trees, among which it is particularly worth noting the endemics *Magnolia pallescens* Urb. & Ekm., *Hyeronima montana* A. Liogier, *Magnolia hamorii* Howard, *Hyeronima domingensis* Urb., *Malpighia macracantha* Ekm. & Nied., and *Bactris plumeriana* Mart. These are therefore plant communities with an endemic character that require protection measures. Although all four associations are of great interest to conservation, the two best conserved associations have the highest rate of endemics, and are precisely the ones located in the Bahoruco-Hottense and central biogeographical sectors [18,20] which concurs with the floristic studies of [1,3,11,43].

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However, the areas exposed to greater environmental impact, as is the case of biogeographical sectors such as the Cordillera Oriental range which are subjected to significant human pressure, have less floristic diversity and a lower number of endemic species. No significant differences can be seen between the relevés in the Shannon diversity index, whose values range between DR3 with indexes of Sh = 2.451, and DR12 with higher values of Sh = 3.972 (Table 5); this does not imply that DR3 is poorly conserved [27], but simply that there is an almost complete predominance of the faithful species *Prestoea montana*, which has a high cover and very few companion species. However, relevé DR12 contains many individuals with low cover and a high rate of companion species. The low rate of endemisms in As4 represented by relevés DR15, DR16, DR17 in the Cordillera Oriental range is the result of significant anthropic action owing to population density.

The four associations described are included in the phytosociological classes *Weinmannio-Cyrilletea* Knapp 1964 and *Ocoteo-Magnolietea* Borhidi and Muñiz, in Borhidi et al. 1979. Due to the high floristic and biogeographical differentiation between Hispaniola and Cuba (Tables 2 and 3), these associations cannot be included in any of the alliances described for the island of Cuba. We therefore propose two new alliances: all. *Rondeletio ochraceae-Clusion roseae*, in which the alliance species are *Rondeletia ochracea, Turpinia occidentalis, Clusia rosea, Mikania cordifolia, Alchornea latifolia*, and *Cyatheo furfuracei-Prestoetum motanae* is the type association; and all. *Rondeletio ochraceae-Didymopanion tremuli*, with the species *Rondeletia ochracea, Didymopanax tremulus, Psychotria guadalupensis,* and *Hyeronimo montanae-Magnolietum pallescentis* as the type association. All these results are according to [44]

Conclusions

This study in the Dominican Republic reveals the existence of different types of rainforest that are clearly differentiated by their floristic, biogeographical and bioclimatic composition. This broadleaved forest or rainforest is frequent in the Sierra de Bahoruco and the Cordillera Central, Septentrional and Oriental ranges due to the increased rainfall in these areas caused by the impact of moisture-laden Atlantic winds. Differences in soil and biogeography have conditioned a rich and different flora. The Cordillera Central range –geologically the oldest, and with a siliceous character– is home to rainforests of *Magnolia pallescens* and forests of *Prestoea montana* (As1 and As2) in humid-hyper-humid areas; whereas the associations As3 in Bahoruco and As4 in the Cordillera Oriental range also develop in humid environments but on soil substrates. This leads us to propose four new syntaxa with the rank of association and two new alliances.

Syntaxonomical checklist for the cloud forest of Hispaniola

Weinmannio-Cyrilletea Knapp 1964
- *Weinmannio-Cyrilletalia* Knapp 1964
  - *Rondeletio ochraceae-Clusion roseae* Cano, Cano-Ortiz & Veloz all. nova hoc loco
    - *Cyatheo furfuracei-Prestoetum motanae* Cano, Cano-Ortiz & Veloz ass. nova hoc loco
    - *Ormosio krugii-Prestoetum montanae* Cano, Cano-Ortiz & Veloz ass. nova hoc loco

Ocoteo-Magnolietea Borhidi and Muñiz in Borhdi et al. 1979

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Ocoteo-Magnolietalia Muñiz in Borhdi et al. 1979

Rondeletio ochraceae-Didymopanion tremuli Cano, Cano-Ortiz & Veloz all. nova hoc loco

Hyeronimo montanae-Magnolietum pallescentis Cano, Cano-Ortiz & Veloz ass. nova hoc loco

Hyeronimo dominguensis-Magnolietum hamorii Cano, Cano-Ortiz & Veloz ass. nova hoc loco

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References

1. García R, Mejía M, Peguero B, Jiménez F. Flora endémica de la sierra de Bahoruco, República Dominicana. Moscosoa. 2001; 12: 9-44.
2. De Los Ángeles I, Clase T, Peguero B. Flora y vegetación del Parque Nacional El Choco, Sosúa, provincia Puerto Plata, República Dominicana. Moscosoa. 2005; 14: 10-55.
3. Guerrero A, Jiménez F, Höner D, Zanoni T. La flora y la vegetación de la loma Barbacoa, Cordillera Central, República Dominicana. Moscosoa. 1997; 9: 84-116.
4. Höner D, Jiménez F. Flora vascular y vegetación de la loma la Herradura (Cordillera Oriental), República Dominicana. Moscosoa. 1994; 8: 65-85.
5. May T. Regeneración de la Vegetación arbórea y arbustiva en un terreno de cultivos abandonado durante 12 años en la zona de bosques húmedos montanos (Reserva Científica Ébano Verde, Cordillera Central, República Dominicana). Moscosoa. 1994; 8: 131-149.
6. May T. Fases tempranas de la sucesión en un bosque nublado de *Magnolia pallescens* después de un incendio (Loma Casabito, Reserva Científica de Ebano Verde, Cordillera Central, República Dominicana). Moscosoa. 1997; 9: 117-144.
7. May T. Tres años de obervaciones fenológicas en el bosque nublado de Casabito (Reserva científica Ebano Verde, Cordillera Central, República Dominicana). Moscosoa. 1998; 10: 164-178.
8. May T. Composición, estructura y diversidad en los bosques nublados latifoliados de la Reserva Científica Ébano Verde. (Cordillera Central, República Dominicana). Moscosoa. 2000; 15: 156-176.
9. May T. Composición, estructura y diversidad en los bosques nublados latifoliados de la Reserva Científica Ebano Verde (Cordillera Central, República Dominicana). Moscosoa. 2007; 15: 156-176.
10. May T, Peguero B. Vegetación y flora de la loma el Mogote, Jarabacoa, Cordillera Central, República Dominicana. Moscosoa. 2000; 11: 11-37.
11. Mejía M, García R, Jiménez F. Sub-región fitogeográfica Barbacoa-Casabito: riqueza florística y su importancia en la conservación de la flora de la isla Española. Moscosoa. 2000. 11: 57-106.
12. Mejía M, Jiménez F. Flora y vegetación de la loma la Humeadora, Cordillera Central, República Dominicana. Moscosoa. 1998; 10: 10-46.
13. Mejía M, Pimentel J, García R. Árboles y Arbustos de la región Cársica de los Haitises, República Dominicana. Moscosoa. 2011; 17: 90-114.
14. Veloz A. Flora y vegetación del Monte Jota, Sierra de Bahoruco, Provincia Independencia, República Dominicana. Moscosoa. 2007; 15: 206-217.
15. Hager J, Zanoni T. La vegetación natural de la República Dominicana: Una nueva clasificación. Moscosoa. 1993; 7: 39-81.

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16. Rivas-Martínez S, Navarro G, Penas A, Costa M. Biogeographic Map. of Sourh America. A preliminary survey. International Journal of Geobotanic Reserarch. 1: 21-40.
17. Zanoni T. 1990. La flora y la vegetación de loma Diego de Ocampo, Cordillera Septentrional, República Dominicana. Moscosoa. 2011; 6: 19-45.
18. Cano E, Cano-Ortiz A. Establishment of biogeographic areas by distributing endemic flora and habitats (Dominican Republic, Haiti R.). In: Stevens L, editor. Global Advances in Biogeography. Rijeka: InTechOpen; 2012. pp. 99-118. https://doi.org/10.5772/31591.
19. Cano E, Veloz Ramirez A, Cano Ortiz A, Esteban Ruiz FJ. Distribution of Central American Melastomataceae: biogeographical análisis of the Caribbean islands. Acta Bot Gallica. 2009; 156(4): 527-557. https://doi.org/10.1080/12538078.2009.10516176
20. Cano E, Veloz Ramirez A, Cano Ortiz A. Contribution to the biogeography of the Hispaniola (Dominican Republic, Haiti). Acta Bot Gallica. 2010; 157(4): 581-598. https://doi.org/10.1080/12538078.2010.10516233
21. Cano E, Veloz Ramirez A, Cano Ortiz A. Phytosociological study of the *Pinus occidentalis* forests in the Dominican Republic. Plant Biosyst. 2011; 145(2): 286-297. https://doi.org/10.1080/11263504.2010.547685
22. Cano E, Cano Ortiz A, Veloz A. Contribution to the knowledge of the edaphoxerophilous communities of the Samana Peninsula (Dominican Republic). Plant Sociology. 2015; 52(1): 3-8. https://doi.org/10.7338/pls2015521/01
23. Cano E, Cano Ortiz A, Del Río González S, Alatorre Cobos J, Veloz A. Bioclimatic map of the Dominican Republic. Plant Sociology. 2012; 49(1): 81-90. https://doi.org/10.7338/pls2012491/04
24. Cano Ortiz A, Musarella CM, Piñar Fuentes JC, Spampinato G, Veloz A, Cano E. Vegetation of the dry bioclimatic areas in the Dominican Republic. Plant Biosyst. 2015; 149(3): 451-472. http://dx.doi.org/10.1080/11263504.2015.1040482
25. Cano Ortiz, A, Musarella CM, Piñar Fuentes JC, Pinto Gomes CJ, Cano E. Distribution patterns of endemic flora to define hotspots on Hispaniola. Syst Biodivers. 2016; 14(3): 261-275. https://doi.org/10.1080/14772000.2015.1135195
26. Cano Ortiz, A, Musarella CM, Cano E. Biogeographical Areas of Hispaniola (Dominican Republic, Republic of Haiti). In: Yousaf Z, editor. Plant Ecology - Traditional Approaches to Recent Trends. London: InthechOpen; 2017. pp. 165-189. http://dx.doi.org/10.5772/intechopen.69081
27. Cano Ortiz A, Musarella CM, Piñar Fuentes JC, Bartolomé Esteban C, Quinto-Canas R, Pinto Gomes CJ, Del Río González S, Cano E. Advances in the Knowledge of the Vegetation of Hispaniola (Caribbean Central America). In: Sebata A, editor. Vegetation. London: InthechOpen; 2018. pp. 83-99. http://dx.doi.org/10.5772/intechopen.72090
28. Cano Ortiz, A, Musarella CM, Piñar Fuentes JC, Pinto Gomes CJ, Del Río González S, Cano E. Diversity and conservation status of mangrove communities in two areas of Mesocaribea biogeographic region. Curr Sci India. 2018; 115(3): 534-540. https://doi.org/10.18520/cs/v115/i3/534-540
29. Cano E, Veloz A. Contribution to the knowledge of the plant communities of the Caribbean-Cibensean sector in the Dominican Republic. Acta Bot Gallica. 2012; 159(2): 201-210. https://doi.org/10.1080/12538078.2012.696933
30. Mollat H, Wagner BM, Cepek P, Weiss W. Mapa geológico de la República Dominicana 1:250,000. Hannover: Geolog. Jahrb; 2004.
31. Borhidi A. Phytogeography and vegetation ecology of Cuba. Budapest: Ed. Academiai Kiado; 1991.
32. Reyes OJ. Estudio sinecológico de las pluvisilvas submontanas sobre rocas del complejo metamórfico. Foresta Veracruzana. 2005; 7(2): 15-22.
33. Reyes OJ, Acosta Cantillo F. Fitocenosis en los bosques siempre verdes de Cuba Oriental. I. *Ocoteo-Phoebietum elongatae* en los mogotes de la grán meseta de Guantánamo. Foresta Veracruzana. 2010; 12(1): 9-16.

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34. Reyes OJ, Acosta Cantillo F. Fitocenosis en los bosques siempre verdes de Cuba Oriental. II. *Guareo guidoniae-Zanthoxyletum martinicensis* en Sagua Baracoa. Foresta Veracruzana. 2010; 12(2): 1-6.
35. Reyes OJ, Acosta Cantillo F. Fitocenosis en los bosques siempre verdes de Cuba Oriental. III. *Pruno-Guareetum guidoniae* en la sierra Maestra. Foresta Veracruzana. 2011; 13(1): 1-6.
36. Rivas-Martínez S. Notions on dynamic-catenal phytosocilogy as a basis of landscape science. Plant Biosyst. 2005; 139(2): 135-144. https://doi.org/10.1080/11263500500193790
37. Rivas-Martínez S, Sánchez Mata D, Costa M. 1999. North American boreal and western temperate forest vegetation. Syntaxonomical synopsis ot the potential natural plant communities of North America , II. Itinera Geobotanica 12:5-326.
38. Van der Maarel E. Transformation of cover-abundance values in phytosociology and its effects on community similarity. Vegetatio. 1979; 39(2): 97-114. https://doi.org/10.1007/BF00052021
39. Rivas-Martínez S. Sinopsis biogeográfica, bioclimática y vegetacional de América del Norte. Fitosociología. 2004; 41: 19-52.
40. Rivas-Martínez S, Loidi J. Bioclimatology of the Iberian Peninsula. Itinera Geobot. 1999; 13: 41-47.
41. Lugo AE, Francis J K, Frangi JL. *Prestoea montana* (R. Graham) Nichols. Sierra palm. SO-ITF-SM-82. New Orleands, LA: US. Department o Agriculter, Forest Service, Southern Forest Experimental Station, New Orleans, U.S. 1998. pp. 420-450.
42. Zanoni T, Mejía MM, Pimentel JD, García RG. La flora y vegetación de los Haitises, República Dominicana. Moscosoa. 1990; 6: 46-97.
43. García R, Mejía M, Zanoni T. Composición florística y principales asociaciones vegetales en la Reserva Científica de Evano Verde, Cordillera Central, República Dominicana. Moscosoa. 1994; 8: 86-130.
44. Cano Ortiz A, Musarella CM, Quinto Canas R, Piñar Fuentes JC, Pinto Gomes CJ, Cano E. The cloud forest in the Dominican Republic: diversity and conservation status. Biorxiv 543892; doi: https://doi.org/10.1101/543892 2019.

S1 Table 1. *Ass. Hyeronimo montanae-Magnolietum pallescentis.*

	Family	Biotype	Status						
Altitude					1481	1474	1473	1441	1465
Area in m² x 10					200	100	200	50	200
Cover ratio In %					100	90	100	100	100
Xn in m.					15	15	10	4	20
Nº rel.					4	5	10	11	12
Nº order					DR1	DR2	DR4	DR5	DR6
Characteristics of the association and higher units									
Magnolia pallescens Urb. & Ekm.	*Magnoliaceae*	A	E		3	3	5	1	4
Cyathea furfuracea Baker	*Cyatheaceae*	A	N		2	3	2	4	2
Chionanthus domingensis Lam.	*Oleaceae*	A	N		2	3	3	1	2
Gonocalyx tetrapterus A. Liogier	*Ericaceae*	Tr	E		1	2	3	1	2
Hyeronima montana A. Liogier	*Euphorbiaceae*	A	E		+	3	2	4	4
Didymopanax tremulus Krug. & Urb.	*Araliaceae*	A	E		5	2	3		5
Persea oblongifolia Kopp.	*Lauraceae*	A	E		2	2	3	1	3
Arthrostylidium multispicatum Pilger	*Poaceae*	Tr	E		2	3	2	1	2
Rondeletia ochracea Urb.	*Rubiaceae*	A	E		1	1	2	3	3
Alsophila minor (D.C.Eaton) R.M.Tryon	*Cyatheaceae*	A	N		2	2	2	2	2
Tabebuia vinosa A. Gentry	*Bignoniaceae*	A	E		1	+	1	1	+
Ditta maestrensis Borhidi	*Euphorbiaceae*	A	N		1	2	3	2	2
Smilax populnea Kunt var. *horrida* O.E. Schulz	*Smilacaceae*	Tr	N		1	3	1	1	+
Ilex macfadyenii (Walp.) Rehder	*Aquifoliaceae*	A	N		1	3	+	+	+
Clusia clusioides (Griseb.) D´arcy	*Clusiaceae*	A	N		+	1	1	1	2
Cyrilla racemiflora L.	*Cyrillaceae*	A	N		2	2	3		2
Vaccinium racemosum (Vahl) Wilbur & Luteyn	*Ericaceae*	Tr	N		2	3		1	1
Cinnamomum alainii (C.K. Allen) A. Liogier	*Lauraceae*	A	E			+	2	1	2
Marcgravia rubra A. Liogier	*Marcgraviaceae*	Tr	E		1	1	2		2
Myrsine coriacea (Sw.) R. Br.	*Myrsinaceae*	A	N		1	2	+	+	
Pinguicula casabitoana J. Jiménez	*Lentibulariaceae*	Ep	E		+	+	1		
Vriesea sintenisii (Baker) L.B. Smith & Pitt.	*Bromeliaceae*	Ep	N				2	1	2
Ocotea nemodaphne Mez	*Lauraceae*	A	N		+	1			2

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Brunellia comocladifolia H. & B.	*Brunelliaceae*	A	N		1	+			
Ocotea leucoxylon (Sw.) Mez	*Lauraceae*	A	N		1				+
Schradera subsessilis Steyermark	*Rubiaceae*	Tr	N		1		2		
Mikania venosa A. Liogier	*Asteraceae*	Tr	E			2			+
Chaetocarpus domingensis Proctor	*Euphorbiaceae*	A	E				1		+
Odontadenia polyneura (urb.) Wood.	*Apocynaceae*	Tr	E					+	+
Myrsine nubicola A. Liogier	*Myrsinaceae*	A	E		+				
Prestoea montana(Grah.) Nichol	*Arecaceae*	A	N			2			
Weinmannia pinnata L.	*Cunoniaceae*	A	N			+			
Odontosoria uncinella (Kunze) Fée	*Polypodiaceae*	Tr	N			+			
Persea krugii Mez	*Lauraceae*	A	N					1	
Epidendrum carpophorum Barb. Rodr.	*Orchidaceae*	Ep.	N					+	
Pleurothallis domingensis Cogn.	*Orchidaceae*	Ep	E					+	
Byrsonima lucida (Mill.) L.c. rich.	*Malpighiaceae*	A	N					+	
Dilomilis montana (Sw.) Summerh.	*Orchidaceae*	Ep	N					+	
Companions species									
Styrax ochraceus Urb.	*Styracaceae*	Ar	E		1	1	1	1	1
Palicourea alpina (Sw.) DC.	*Rubiaceae*	Ar	N		1	3	1	1	+
Torralbasia cuneifolia (C. Wright) Krug. & Urb.	*Celastraceae*	Ar	N			+	4	2	3
Macrocarpaea domingensis Urb.	*Gentianaceae*	Ar	E		1		+	1	2
Psychotria domingensis Jacq.	*Rubiaceae*	Ar	N		3		1	1	+
Polygala fuertesii (Urb.) Blake	*Polygalaceae*	Ar	E		1		2	5	
Psychotria guadalupensis (DC.) Howard	*Rubiaceae*	Ar	N		+	3			+
Baccharis myrsinites (Lam.) Pers.	*Asteraceae*	Ar	N				1	1	+
Bocconia frutescens L.	*Papaveraceae*	Ar	N		+				
Clidemia umbellata (Miller) L.O. Wms.	*Melastomataceae*	Ar	N		+				
Vernonia buxifolia (Cass.) Less.	*Asteraceae*	Ar	N		+				
Cestrum coelophlebium O. E. Schulz	*Solanaceae*	Ar	E			+			
Lyonia alainii W. Judd.	*Ericaceae*	Ar	E				1		
Clidemia hirta (L.) D. don	*Melastomataceae*	Ar	N				+		
Renealmia jamaicensis (Gaertn.) Horan var. *puberula* (Gagn.) Maas	*Zingiberaceae*	H	N		+	3	1	1	+
Lobelia rotundifolia Juss.	*Campanulaceae*	H	E		1		1		+

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Gleychenia bifida (Willd.) Spreng.	*Gleycheniaceae*	H	N		2		1		
Blechnum occidentale L.	*Blechnaceae*	H	N		+		1		+
Lycopodium clavatum L.	*Lycopodiaceae*	H	N				1		+
Peperomia hernandifolia (Vahl) A. Dietr.	*Piperaceae*	H	N					+	
Lycopodium cernuum L.	*Lycopodiaceae*	H	N		2				
Odontosoria aculeata (L.) J. Sm.	*Polypodiaceae*	H	N					+	
Isachne rigidifolia (Poir.) Urb.	*Poaceae*	H	N						1
Machaerina cubensis (Kük.) T. Koyama	*Cyperaceae*	H	N						+

Sites sampled. DR1.- Casabito. Ébano Verde (19340280E/2105321N). DR2.- Casabito (19340299E/2105967N). DR4.- Casabito. Ébano Verde (19340283N/2106095N). DR5.- Casabito. Ébano Verde (19340288E/2106283N). DR6.- Palmerito. Ébano Verde (19340165E/2106429N).

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393 **S2 Table 2.-** ***Ass. Cyatheo furfuracei-Prestoetum motanae***

	Family	Biotype	Status					
Altitude				1097	1373	1377	1251	1200
Area in m² x 10				200	50	100	100	50
Cover ratio In %				100	100	100	100	100
Xn in m.				20	9	9	15	7
Nº rel.				6	13	14	15	17
Nº order				DR3	DR7	DR8	DR9	DR10
Characteristics of the association and higher units								
Prestoea montana (Grah.) Nichol	*Arecaceae*	A	N	5	4	5	5	4
Arthrostylidium multispicatum Pilger	*Poaceae*	Tr	E	2	3	2	1	2
Cyathea furfuracea Baker	*Cyatheaceae*	A	N	2	1	2	2	+
Dendropanax arboreus (L.) Dcne & Planch.	*Araliaceae*	A	N	2		+	+	+
3Alsophila minor (D.C.Eaton) R.M.Tryon	*Cyatheaceae*	A	N	1	1	2	1	
Ocotea leucoxylon (Sw.) Mez	*Lauraceae*	A	N		+	+	+	+
Coccoloba wrightii Lindau	*Polygnonaceae*	A	N		1	+	2	+
Alchornea latifolia Sw.	*Euphorbiaceae*	A	N	2	+		1	
Turpinia occidentalis (Sw.) G. Don	*Staphyleaceae*	A	N			+	2	1
Brunellia comocladifolia H. & B.	*Brunelliaceae*	A	N	2				+
Byrsonima lucida (Mill.) L.c. Rich.	*Malpighiaceae*	A	N		1			+
Calyptrantes selleanus Urb. & Ekm.	*Myrtaceae*	A	E					+
Cecropia screberiana Miq.	*Moraceae*	A	N	2		2		
Dichaea glauca (Sw.) Lindley	*Orchidaceae*	Ep	N		+		+	1
Epidendrum anceps Jacq.	*Orchidaceae*	Ep	N		1			
Epidendrum jamaicense Lindl	*Orchidaceae*	Ep	N				+	
Epidendrum ramosum Jacq.	*Orchidaceae*	Ep	N			+	+	
Epidendrum ramosum Jacq.	*Orchidaceae*	Ep	N					
Grammitis asplenifolia (L.) Proctor	*Grammitidaceae*	Ep	N		+			

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Guatteria blainii (Griseb.) Urb.	*Annonaceae*	A	N		+			+
Guzmania monostrachya (Sw.) Rusby	*Bromeliaceae*	Ep	N		+	+		
Malpighia macracantha Ekm. & Nied.	*Malpighiaceae*	A	E				2	
Jacquiniella globosa (Jacq.) Schlechter	*Orchidaceae*	Ep	N		+			
Didymopanax tremulus Krug. & Urb.	*Araliaceae*	A	E	1				
Miconia mirabilis (Aubl.) L.O. Willians	*Melastomataceae*	A	N		+			
Exostema elliptica Griseb.	*Rubiaceae*	A	N			+		
Microgramma piloselloides L.	*Polypodiaceae*	Ep	N			+		
Camparettia falcata Poepp. & Endl.	*Orchidaceae*	Ep	N				+	
Antrophyum lanceolatum (L.) Kaulf.	*Adiantaceae*	Ep	N			+		
Myrsine coriacea (Sw.) R. Br.	*Myrsinaceae*	A	N		+			+
Niphidium crassifolium (L.) Lell.	*Polypodiaceae*	Ep	N			+		
Oncidium variegatum (Sw.) Sw.	*Orchidaceae*	Ep	N				+	
Ophioglossum palmatum L.	*Ophioglossaceae*	Ep	N					
Phlebodium aureum (L.) J. Smith	*Polypodiaceae*	Ep	N				+	
Pleurothallis domingensis Cogn.	*Orchidaceae*	Ep	E		+			+
Pothuya nudicaulis (L.) Regel	*Bromeliaceae*	Ep	N				+	
Rondeletia ochracea Urb.	*Rubiaceae*	A	E		+		3	
Companions species								
Myrcia splendens (Sw.) DC.	*Myrtaceae*	Ar	N		5	2	2	5
Psychotria domingensis Jacq.	*Rubiaceae*	Ar	N		3	3	1	1
Tabebuia bullata A. Gentry	*Bignoniaceae*	Ar	E	1		+	+	+
Blechnum tuerckheimii A. Brause	*Blechnaceae*	H	E		1	2	3	
Psychotria guadalupensis (DC.) Howard	*Rubiaceae*	Ar	N		3		1	1
Renealmia jamaicensis (Gaertn.) Horan var. *puberula* (Gagn.) Maas	*Zingiberaceae*	H	N		2	2		+
Mikania venosa A. Liogier	*Asteraceae*	Tr	E			+	+	2
Sagraea fuertesii (Cogn.in Urb.) Alain	*Melastomataceae*	Ar	E		1			1

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Senecio lucens (Poir) Urb.	*Asteraceae*	Tr	E			+	2	1
Smilax havanensis Jacq.	*Smilacaceae*	Tr	N		+			
Solanum crotonoides Lam.	*Solanaceae*	Ar	N		1			+
Solanum virgatum Lam.	*Solanaceae*	Ar	N			+		
Stigmaphyllon emarginatum (L.) A. Juss.	*Malpighiaceae*	Tr	N					+
Uncinia hamata (L.) Urb.	*Cyperaceae*	H	N		+	+	+	
Vaccinium racemosum (Vahl) Wilbur & Luteyn	*Ericaceae*	Tr	N		+			
Vitis tiliifolia H. & B. ex Willd.	*Vitaceae*	Tr	N					+
Vittaria lineata (L.) Smith	*Pteridaceae*	Ep	N			+		
Blechnum occidentale L.	*Blechnaceae*	H	N		1	2		+
Cestrum coelophlebium O. E. Schulz	*Solanaceae*	Ar	E				1	+
Cestrum inclusum Urb.	*Solanaceae*	Ar	E			5		
Cissampelos pareira L.	*Menispermiaceae*	Tr	N	1		+		
Commelina elegans Kunth	*Commelinaceae*	H	N			+		
Daphnosis crassifolia (Poir.) Meiss.	*Thymelaeaceae*	Ar	N		+			
Diplazium hastile (Christ.) C. Chr.	*Athyriaceae*	H	N			2		
Diplazium hians Kuntze	*Athyriaceae*	H	N				2	
Gleychenia bifida (Willd.) Spreng.	*Gleycheniaceae*	H	N	1				+
Gomedesia lindeniana Berg.	*Myrtaceae*	Ar	N					1
Gyrotaenia myriocarpa Griseb.	*Urticaceae*	Ar	N			+		
Hyptis americana (Poir.) Briq.	*Lamiaceae*	Ar	N		+			
Ichnanthus pallens (Sw.) Munro	*Poaceae*	H	N		1	+	+	
Ipomoea furcyensis Urb.	*Convolvulaceae*	Tr	E				+	
Lasianthus lanceolatus (Griseb.) Gómez Maza	*Rubiaceae*	Ar	N		1			
Lobelia robusta Graham	*Campanulaceae*	Ar	E			+		
Lobelia rotundifolia Juss.	*Campanulaceae*	H	E		+			
Odontadenia polyneura (urb.) Wood.	*Apocynaceae*	Tr	E					1
Odontosoria uncinella (Kunze) Fée	*Polypodiaceae*	Tr	N		+			

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Olyra latifolia L.	*Poaceae*	H	N				+	
Palicourea alpina (Sw.) DC.	*Rubiaceae*	Ar	N		+			+
Peperomia hernandifolia (Vahl) A. Dietr.	*Piperaceae*	H	N		+			
Pilea geminata Urb.	*Urticaceae*	H	E			2		
Polypodium loriceum L.	*Polypodiaceae*	Ep	N				+	
Pothomorphe peltata (L.) Miquel	*Piperaceae*	Ar	N			+		
Mucuna urens (L.) Fawc. & Rendle	*Fabaceae*	Tr	N		+			
Myrcia deflexa (Poir) DC.	*Myrtaceae*	Ar	N				1	+

Sites sampled. DR3.- Río Jatubei (19341984E/2105891N). DR7.- Camino Casabito al Arroyazo (10339971E/2105962N). DR8.- Bajada Casabito al Centro Fernándo Dominguez (19339590E/2105699N). DR9.- Casabito-Arroyazo (Ébano Verde) (19339203E/2105784N). DR10.- Near Arroyazo (19339203E/2105785N).

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397 **S3 Table 3.** ***Ass. Hyeronimo dominguensis-Magnolietum hamorii.***

	Family	Biotype	Status				
Altitude				1207	1239	1233	1140
Area in m^2 x 10				200	200	200	200
Cover ratio In %				100	100	100	100
Xn in m.				25	15	20	15
Nº rel.				23	24	25	26
Nº order				DR11	DR12	DR13	DR14
Characteristics of the association and higher units							
Magnolia hamorii Howard	*Magnoliaceae*	A	E	5	2	2	5
Hyeronima domingensis Urb.	*Euphorbiaceae*	A	E	5	2	5	+
Cyathea fulgens C. Chr.	*Cyatheaceae*	A	N	2	2	2	1
Myrsine coriacea (Sw.) R. Br.	*Myrsinaceae*	A	N	1	1	1	2
Didymopanax tremulus Krug. & Urb.	*Araliaceae*	A	E	+	5	2	3
Brunellia comocladifolia H. & B.	*Brunelliaceae*	A	N	2	1		
Prestoea montana(Grah.) Nichol	*Arecaceae*	A	N	+	2	2	3
Beilschmiedia pendula (Sw.) Hemsl.	*Lauraceae*	A	N	2		1	
Ocotea leucoxylon (Sw.) Mez	*Lauraceae*	A	N		1	1	+
Calyptrantes selleanus Urb. & Ekm.	*Myrtaceae*	A	E	+	1	1	
Weinmannia pinnata L.	*Cunoniaceae*	A	N	2	2	2	
Pleurothalis ruscifolia (Jaq.) R. Br.	*Orchidaceae*	Ep	N	1	2	2	
Elleanthus cephalotus Garay & Sweet	*Orchidaceae*	Ep	N	2	2	1	
Elaphoglossum crinitum (L.) C. Chr.	*Lomariopsidaceae*	Ep	N	1	1	+	
Columnea sanguinea Urb.	*Gesneriaceae*	ArEp	N	1	2	1	
Elaphoglossum latifolium (Sw.) J. Sm.	*Lomariopsidaceae*	Ep	N	2	2	2	
Miconia prasina (Sw.) DC.	*Melastomataceae*	A	N	1		1	
Rondeletia ochracea Urb.	*Rubiaceae*	A	E	1	1	1	
Alchornea latifolia Sw.	*Euphorbiaceae*	A	N	1			+
Dendropanax arboreus (L.) Dcne & Planch.	*Araliaceae*	A	N	1			
Miconia mirabilis (Aubl.) L.O. Willians	*Melastomataceae*	A	N		1		+
Epidendrum ramosum Jacq.	*Orchidaceae*	Ep	N			2	+
Ophioglossum palmatum L.	*Ophioglossaceae*	Ep	N	+	1		

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Ocotea acarina C.K. Allen	*Lauraceae*	A	E			2	1
Chionanthus domingensis Lam.	*Oleaceae*	A	N			2	
Ocotea nemodaphne Mez	*Lauraceae*	A	N		1		
Ilex macfadyenii (Walp.) Rehder	*Aquifoliaceae*	A	N		1		
Niphidium crassifolium (L.) Lell.	*Polypodiaceae*	Ep	N	2			
Polypodium loriceum L.	*Polypodiaceae*	Ep	N	1			
Epidendrum jamaicense Lindl	*Orchidaceae*	Ep	N		2		
Phlebodium aureum (L.) J. Smith	*Polypodiaceae*	Ep	N	1			
Dichaea glauca (Sw.) Lindley	*Orchidaceae*	Ep	N		2		
Epidendrum carpophorum Barb. Rodr.	*Orchidaceae*	Ep.	N			1	
Ocotea floribunda (Sw.) Mez	*Lauraceae*	A	N				1
Anacheilium cochleatum (L.) Hoffm.	*Orchidaceae*	Ep	N				+
Ocotea patens (Sw.) Nees	*Lauraceae*	A	N				+
Guarea guidonea Sleumer	*Meliaceae*	A	N	1			
Maxillaria coccinea (Jacq.) L.O. Wms.	*Orchidaceae*	Ep	N		2		
Ocotea foeniculacea Mez	*Lauraceae*	A	N		1		
Cecropia screberiana Miq.	*Moraceae*	A	N				1
Beilschmiedia pendula (Sw.) Hemsl.	*Lauraceae*	A	N				1
Companions species							
Psychotria domingensis Jacq.	*Rubiaceae*	Ar	N	2	2	2	1
Mikania venosa A. Liogier	*Asteraceae*	Tr	E	1	2	1	2
Gomedesia lindeniana Berg.	*Myrtaceae*	Ar	N	1	1	1	2
Lasianthus bahorucanus Zanoni	*Rubiaceae*	H	E	2	2	1	1
Columnea domingensis (Urb.) Wiehler	*Gesneriaceae*	Ar	E	2	1	+	1
Odontosoria uncinella (Kunze) Fée	*Polypodiaceae*	Tr	N	3	2	2	2
Mecranium ovatum Cog.	*Melastomataceae*	Ar	E	2	1	1	1
Vriesea tuercheimii (Mez.) L.B. Smith	*Bromeliaceae*	H	E	2	2	2	1
Nephrolepis biserrata (Sw.) Schott	*Lomariopsidaceae*	H	N	2	2	2	2
Peperomia hernandifolia (Vahl) A. Dietr.	*Piperaceae*	H	N	+	1	1	1
Psychotria guadalupensis (DC.) Howard	*Rubiaceae*	Ar	N	2	2	1	
Myrcia deflexa (Poir) DC.	*Myrtaceae*	Ar	N	2	1	1	2
Lomariposis sorbifolia (L.) Feé	*Lomariopsidaceae*	H	N	1		1	1
Hedyosmum domingense Urb.	*Chloranthaceae*	Ar	E		1	1	+

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Lomariposis sorbifolia (L.) Feé	*Lomariopsidaceae*	H	N	2	2		1
Renealmia jamaicensis (Gaertn.) Horan var. *puberula* (Gagn.) Maas	*Zingiberaceae*	H	N	2	1	2	
Vaccinium racemosum (Vahl) Wilbur & Luteyn	*Ericaceae*	Tr	N		1	1	
Macrocarpaea domingensis Urb.	*Gentianaceae*	Ar	E		2	1	
Polygala fuertesii (Urb.) Blake	*Polygalaceae*	Ar	E		1	1	
Arthrostylidium multispicatum Pilger	*Poaceae*	Tr	E	3	2		
Torralbasia cuneifolia (C. Wright) Krug. & Urb.	*Celastraceae*	Ar	N		1	1	
Mucuna urens (L.) Fawc. & Rendle	*Fabaceae*	Tr	N	1			2
Schlegelia brachyantha Griseb.	*Schlegeliaceae*	Tr	N	1			+
Meriania involucrata (Desv.) Naud.	*Melastomataceae*	Ar	E		1	1	
Hypolepis hispaniolica Mason	*Polypodiaceae*	Tr	E		2		1
Arthrostylidium sarmentosum Pilger	*Poaceae*	Tr	N		2	2	
Blechneum fragile (Liebm.) Morton & Lellinger	*Blechnaceae*	H	N		2	2	
Ilex tuerckheimii Loes.	*Aquifoliaceae*	Ar	E			+	
Cordia dependens Urb. & Ekm.	*Boraginaceae*	Ar	E				+
Passiflora rubra L.	*Passifloraceae*	Tr	N				+
Eupatorium odoratum L.	*Asteraceae*	Ar	N				+
Mikania cordifolia (L.) Willd.	*Asteraceae*	Tr	N				1
*Psychotria liogieri S*ateyerm	*Rubiaceae*	Ar	N				+
Marattia kaulfussii J. Smith	*Marattiaceae*	H	N	1			
Asplenium radicans L.	*Aspleniaceae*	H	N	1			
Smilax domingensis Willd.	*Smilacaceae*	Tr	N	+			
Leandra limoides (Urb.) W. Judd & Skean	*Melastomataceae*	Ar	E		1		
Hillia parasitica Jacq.	*Rubiaceae*	Tr	N		2		
Cestrum daphnoides Griseb.	*Solanaceae*	Ar	E		1		
Tibouchina longifolia (Vahl) Baill.	*Melastomataceae*	Ar	N		1		
Clidemia umbellata (Miller) L.O. Wms.	*Melastomataceae*	Ar	N				+
Schradera subsessilis Steyermark	*Rubiaceae*	Tr	E	1			
Marcgravia rubra A. Liogier	*Marcgraviaceae*	Tr	E			1	
Lobelia rotundifolia Juss.	*Campanulaceae*	H	E		1		
Blechnum occidentale L.	*Blechnaceae*	H	N				+
Cissampelos pareira L.	*Menispermiaceae*	Tr	N				+

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Myrcia splendens (Sw.) DC.	*Myrtaceae*	Ar	N				3
Ichnanthus pallens (Sw.) Munro	*Poaceae*	H	N				1
Sagraea fuertesii (Cogn.in Urb.) Alain	*Melastomataceae*	Ar	E		1		

Sites sampled. DR11.- Sierra Bahoruco. El Cachote (19267592E/2002124N). DR12.- Sierra Bahoruco. El Cachote (19268161E/2002764N). DR13.- Sierra Bahoruco. Prox. el Cachote (19268152E/2002964N). DR14.- Km. 3 del poblado Cachote (19268736E/2000217N).

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400 **S4 Table 4.- *Ass. Ormosio krugii-Prestoetum montanae*.**

	Family	Biotype	Status				
Altitude				519	541	530	
Area in m^2 x 10				200	200	200	
Cover ratio In %				75	100	100	
Xn in m.				15	12	15	
Nº rel.				13	15	15b	
Nº order				DR15	DR16	DR17	
Characteristics of the association and higher units							
Prestoea montana (Grah.) Nichol	*Arecaceae*	A	N	3	4	4	
Cecropia screberiana Miq.	*Moraceae*	A	N	3	2	3	
Alchornea latifolia Sw.	*Euphorbiaceae*	A	N	2	5	4	
Miconia mirabilis (Aubl.) L.O. Willians	*Melastomataceae*	A	N	3	2	2	
Miconia prasina (Sw.) DC.	*Melastomataceae*	A	N	1	1	1	
Guarea guidonea Sleumer	*Meliaceae*	A	N	+	4	4	
Cyathea arborea (L.) J.E. Smith	*Cyatheaceae*	A	N	3	4	4	
Turpinia occidentalis (Sw.) G. Don	*Staphyleaceae*	A	N	1	+	1	
Clusia rosea Jacq.	*Clusiaceae*	A	N	1	+	+	
Ocotea globosa (Aubl.) Schlecht. & Cham.	*Lauraceae*	A	N	2	1	1	
Casearea arborea (L.C.Rich.) Urb.	*Flacourtiaceae*	A	N	1	1	+	
Oreopanax capitatus (Jacq.) Decne. & Planch.	*Araliaceae*	A	N	2	3	3	
Didymopanax morototoni (Aubl.) Decne. & Planch	*Araliaceae*	A	N	2	3	3	
Byrsonima spicata (Cav.) Kunth	*Malpighiaceae*	A	N	+	1	1	
Buchenavia tetraphylla (Aubl.) R. A. Howard	*Combretaceae*	A	N	1	1	1	
Sloanea berteriana Choisy	*Elaeocarpaceae*	A	N	1	1	2	
Ormosia krugii Urb.	*Fabaceae*	A	N	2	2	2	
Miconia serrulata (DC.) Naud.	*Melastomataceae*	A	N	+	+	1	
Bactris plumeriana Mart.	*Arecaceae*	A	E		1	1	
Myrsine coriacea (Sw.) R. Br.	*Myrsinaceae*	A	N	1	1		
Ocotea leucoxylon (Sw.) Mez	*Lauraceae*	A	N		2	2	
Inga fagifolia (L.) Willd. ex Benth.	*Mimosaceae*	A	N		+	+	
Inga vera Willd.	*Mimosaceae*	A	N		+	+	

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Cupania americana L.	*Sapindaceae*	A	N	2			
Hirtella triandra Sw.	*Chrysobalanaceae*	A	N	+			
Miconia racemosa (Aubl.) DC.	*Melastomataceae*	A	N	1			
Zantoxylum martinicensis (Lam.) DC.	*Rutaceae*	A	N	1			
Guzmania monostrachya (Sw.) Rusby	*Bromeliaceae*	Ep	N	+			
Microgramma piloselloides L.	*Polypodiaceae*	Ep	N	+			
Companions species							
Cnemidaria horrida (L.) K. Presl	*Cyatheaceae*	Ar	N	2	2	2	
Cnemidaria horrida (L.) K. Presl	*Cyatheaceae*	Ar	N	2	2	2	
Pytirogramma calomelanos (L.) Link	*Polypodiaceae*	H	N	1	+	+	
Ipomoea tiliacea (Willd.) Choisy	*Convolvulaceae*	Tr	N	+	2	2	
Mucuna urens (L.) Fawc. & Rendle	*Fabaceae*	Tr	N	1	2	2	
Solanum torvum Sw.	*Solanaceae*	Ar	N	1	1	1	
Mikania cordifolia (L.) Willd.	*Asteraceae*	Tr	N	2	1	1	
Psychotria domingensis Jacq.	*Rubiaceae*	Ar	N		2	1	
Pothomorphe peltata (L.) Miquel	*Piperaceae*	Ar	N		2	2	
Tibouchina longifolia (Vahl) Baill.	*Melastomataceae*	Ar	N	1		+	
Nepsera aquatica (Aubl.) Naud.	*Melastomataceae*	Ar	N	1		+	
Syngonium podophyllum Schott	*Araceae*	Tr	N	2	+		
Urera baccifera (L.) Gaud.	*Urticaceae*	Ar	N		2	2	
Psychotria uliginosa Sw.	*Rubiaceae*	Ar	N		2	2	
Coccocypselum herbaceum Aubl.	*Rubiaceae*	H	N	+			
Piper adunculum L.	*Piperaceae*	Ar	N	1			
Cissus verticillata (L.) Nicholson & Farris	*Vitaceae*	Tr	N	1			
Neurolaena lobata (L.) Cass.	*Asteraceae*	H	N	+			
Triunfetta semitriloba Jacq.	*Tiliaceae*	H	N	1			
Clidemia umbellata (Miller) L.O. Wms.	*Melastomataceae*	Ar	E	1			
Gleychenia bifida (Willd.) Spreng.	*Gleycheniaceae*	H	N	1			
Lycopodium clavatum L.	*Lycopodiaceae*	H	N	1			
Ichnanthus pallens (Sw.) Munro	*Poaceae*	H	N	1			
Nephrolepis multiflora (Roxb.) Jarret	*Lomariopsidaceae*	H	N	1			
Smilax domingensis Willd.	*Smilacaceae*	Tr	N	+			
Mimosa pudica L.	*Mimosaceae*	H	N	1			

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Palicourea crocea (Sw.) Schultes	*Rubiaceae*	Ar	N	1			
Urena lobata L.	*Malvaceae*	Ar	N	1			
Hedychium coronarium Koen.	*Zingiberaceae*	H	I	1			
Solanum jamaicense Mill.	*Solanaceae*	Ar	N	1			
Entada gigas (L.) Fawc. & Rendle	*Fabaceae*	Tr	N	+			

Sites sampled: DR15.- El Trece (eastern range) (19Q0489524/2092418). DR16.- Dieciseis de Mitche (19Q0486735/2092513). DR17.- Near Dieciseis de Mitche (19Q0486736/2092514).

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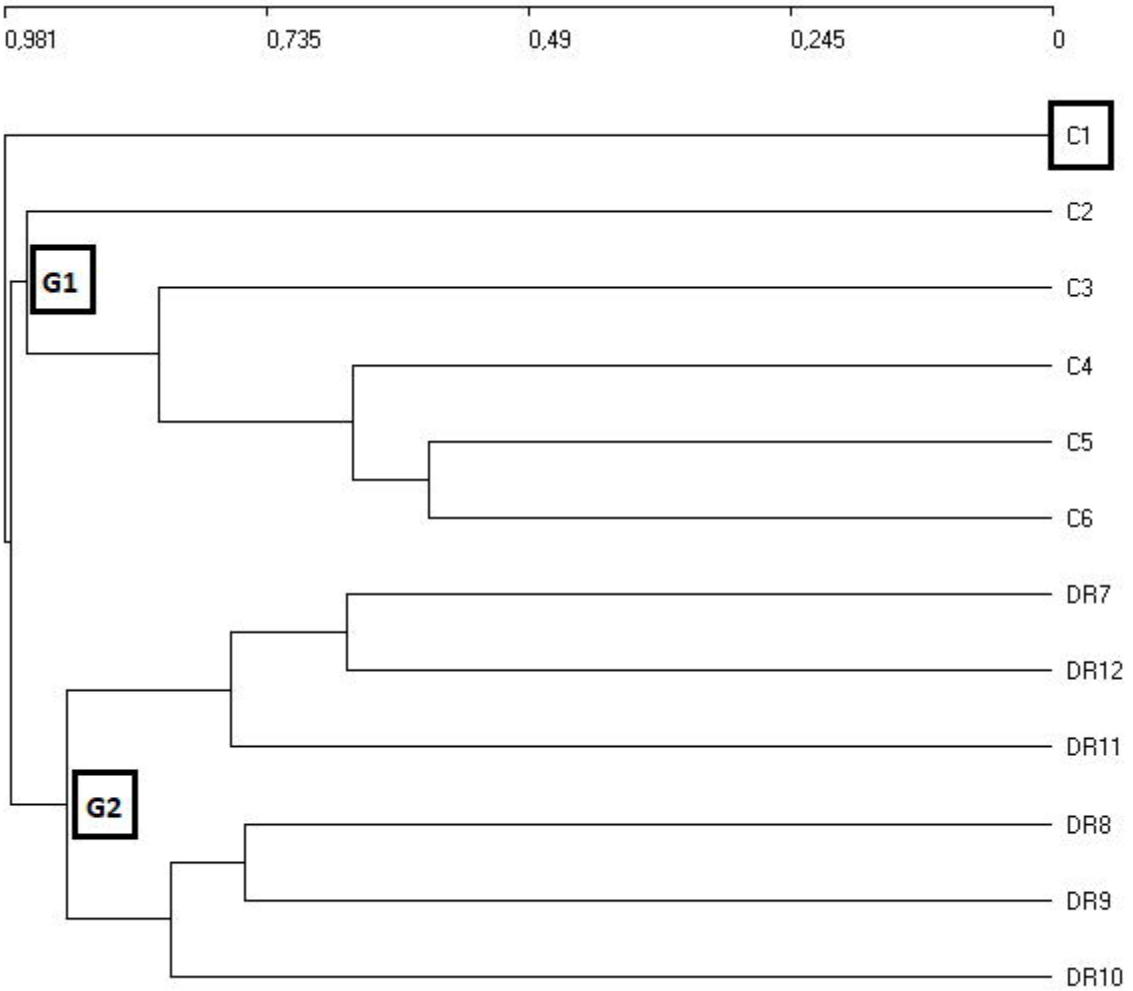
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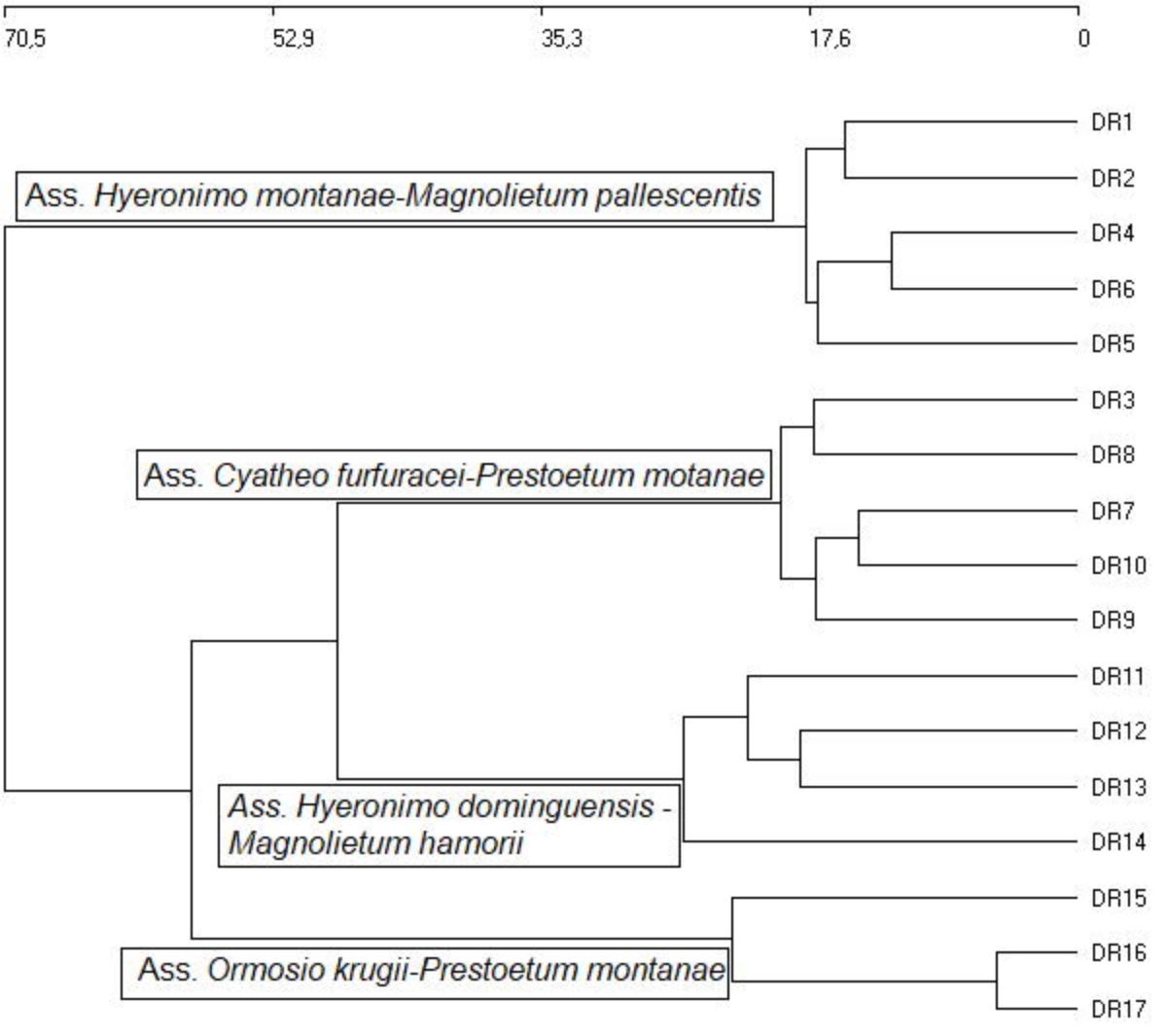
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Ass. Hyeronimo dominguensis - Magnolietum hamorii
Ass. Ormosio krugii-Prestoetum montanae
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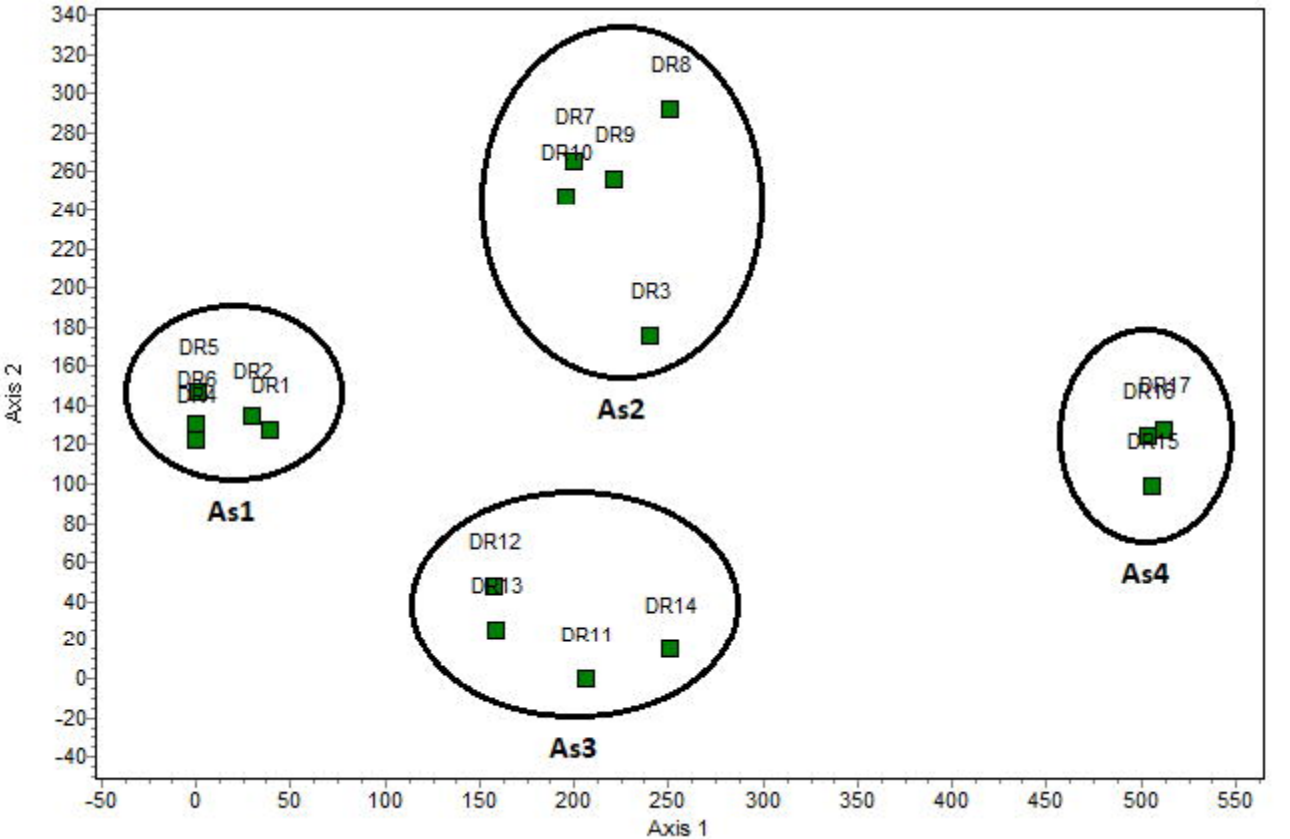
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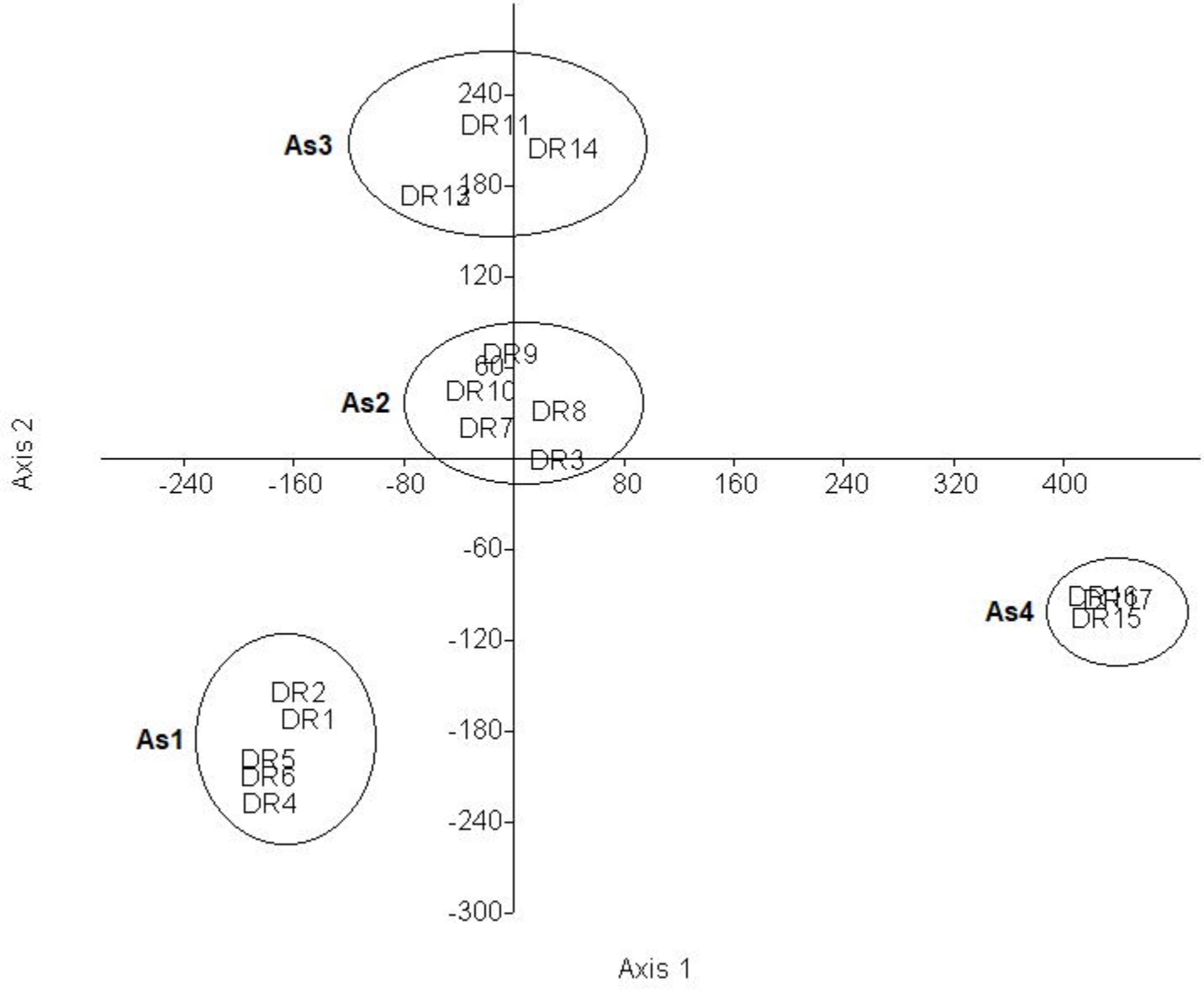
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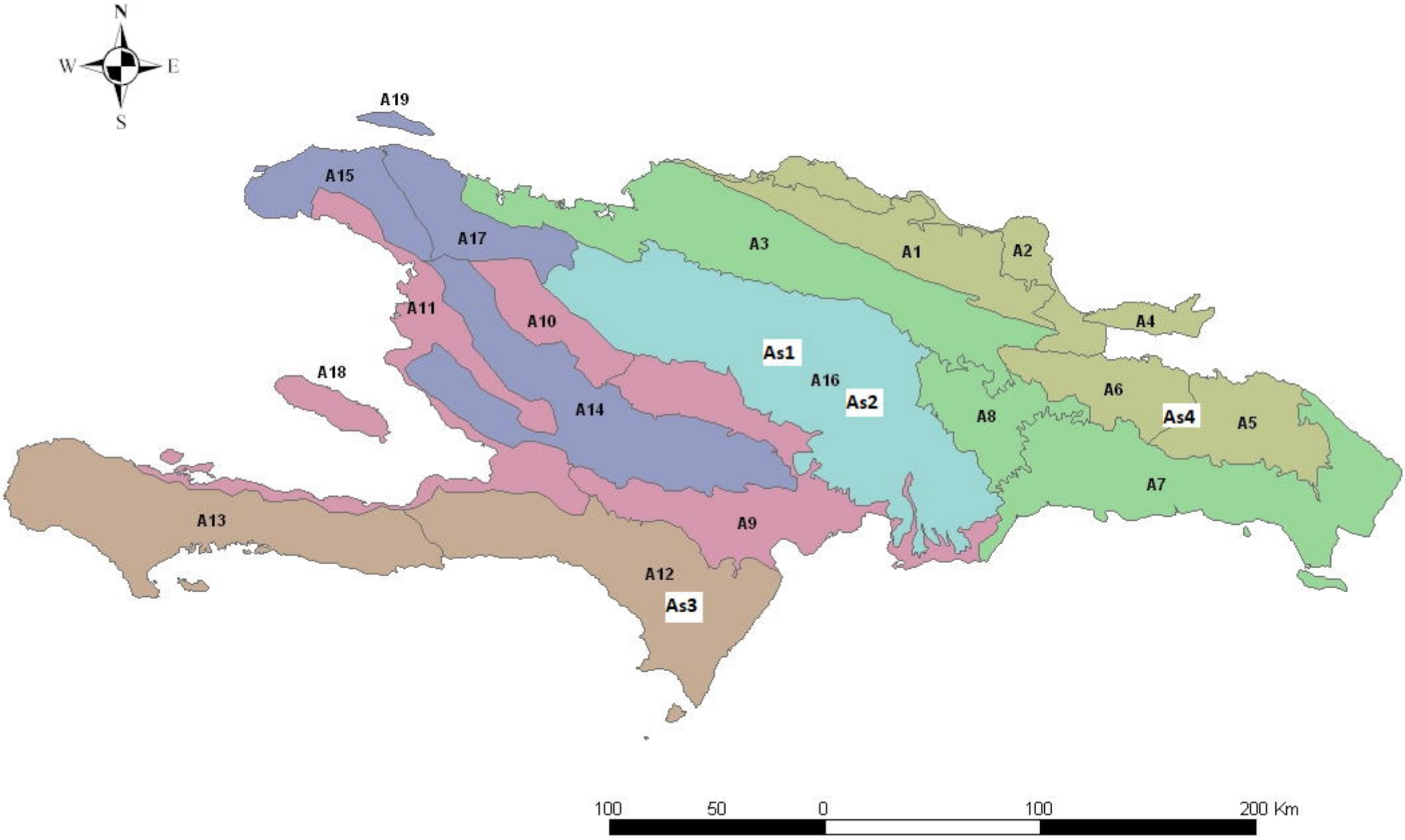
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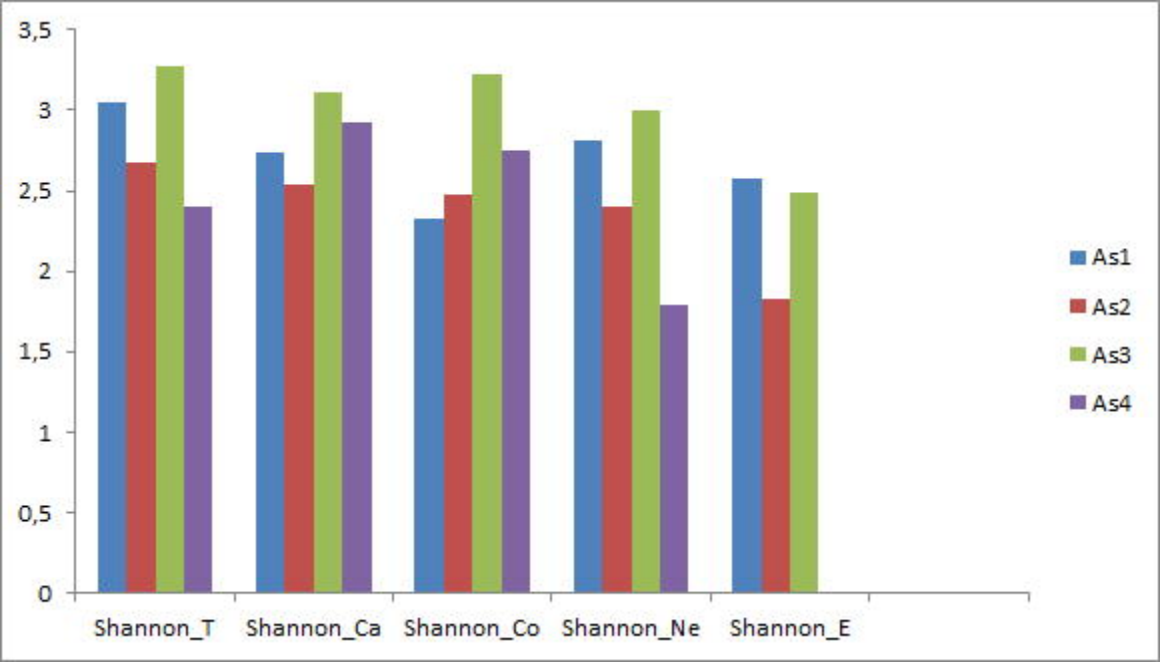
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