Sites as *El Rubí Sur*, *Cima Macagual* and *El Salón Sur* (Fig. 8 and Table 4; see also Appendix VI-A) can be classified as tropical dry forest plots. Indeed, they show a phytocenosis similar to the ones exhibited by evergreen (tropical humid) variants, but foliar caducity of these three plots is larger than 30% during the dry season. The super-dominant strategies among these forests are firstly Invasive Opportunists and secondly Ultimate Austeres (Table 4).

As shown in Figure 9, tropical dry forests growing at *Carapachibey* and *Punta del Este*, fit the IASd strategy in Figure 4, the only difference being that *Carapachibey* have taller trees than Punta del Este. Subsequent analysis of Table 5 allows noting that, as it occurs on tropical humid forests, EP dominates early successional stages. However, super-dominants can not be found in *Carapachibey* whereas they are represented by Invasive Austeres in *Punta del Este* (see also Appendix VI-B).

Table 4. Characterization of functional groups (successional strategies) along a gradient of successional and/or functionally different forest plots belonging to the assembly of Humid Forest Ecosystems (HFE). Those strategies represented by more than 5% are considered as dominant while those represented by more than 30% are considered to be super-dominants (in bold and underlined, at the table's bottom). H and R, Hypothetical or Real estimations, respectively; SNs, Successional Numbers for each case; CSI, Ceno-Successional Index; EKSA (%), Ecosystem's *K*-Strategist Areas, where *K* refers to the functional carrying capacity in the *r*-*K* continuum.

		H	H	H	H	R	R	H	R	H	R	H	H	H
	SNs	*Yagrumal Joven*	*Yagrumal*	*Majagual*	*Los Jagüeyes*	*Helechal*	*El Ébano*	*El Mulo Sur*	*Macurijal*	*Macagual*	*Bosque Joven*	*El Rubí Sur*	*Cima Macagual*	*El Salón Sur*
EPh	1 & 2	**93.55**	**85.69**	0.00	4.05	4.28	**6.16**	0.00	**5.52**	0.00	1.72	0.00	0.00	0.00
LPh	3 & 4	3.83	3.51	**62.06**	**56.99**	**44.86**	**18.14**	**24.52**	2.76	4.42	0.00	**19.29**	0.67	0.41
SPh	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ESh	6 & 7	0.00	0.00	0.31	0.07	**7.66**	0.32	**16.13**	**15.97**	2.26	1.90	**14.79**	**20.70**	**17.00**
RSh	8 to 10	2.62	2.39	**11.79**	**12.27**	0.82	0.14	**20.32**	2.71	3.87	0.12	4.82	1.85	0.41
ROSh	11 & 12	0.00	3.50	**17.98**	3.26	3.44	**18.91**	3.87	**26.04**	**13.37**	**7.01**	0.00	**6.28**	**7.01**
IOSh	13 to 15	0.00	0.00	0.00	0.01	0.01	1.05	0.00	1.74	0.00	0.02	**36.98**	**31.49**	**31.76**
IASh	16 & 17	0.00	3.16	4.85	**8.66**	**9.49**	**37.21**	**9.68**	**21.70**	**16.59**	**20.76**	**9.00**	4.03	**10.31**
UASh	18 to 23	0.00	1.75	3.01	**14.69**	**29.44**	**18.07**	**25.48**	**23.56**	**59.49**	**68.48**	**15.12**	**34.98**	**33.10**
CSI		1.26	2.43	6.84	7.74	10.38	13.07	10.97	13.16	17.53	19.16	11.82	15.12	15.37
SKA (%)		23.9	25.6	14.8	25.0	29.5	46.0	46.0	49.4	59.7	63.1	39.8	49.4	52.8
Dominant and Super-Dominant Strategies		EP	EP	LP	LP	LP	EP	LP	ES	ROS	ROS	LP	ES	ES
				RS	RS	ES	LP	ES	ROS	IAS	IAS	ES	ROS	ROS
				ROS	IAS	IAS	ROS	RS	IOS	UAS	UAS	IOS	IOS	IOS
					UAS	UAS	IAS	IAS	IAS			UAS	**UAS**	IAS
							UAS	UAS	UAS					UAS

Table 5. Characterization of functional groups (successional strategies) along a gradient of successional and/or functionally different forest plots belonging to the assembly of Dry and/or Saline Ecosystems (DSE). Those strategies represented by more than 5 % are considered as dominant while those represented by more than 30% are considered to be super-dominants (in bold and underlined, at the table's bottom). The three examples are hypothetical estimations; SNs, Successional Numbers for each case; CSI, Ceno-Successional Index; EKSA (%), Ecosystem's *K*-Strategist Areas, where *K* refers to the functional carrying capacity in the *r*-*K* continuum.

	SNs	*El Veral*	*Carapachibey*	*Punta del Este*
EPd	1 & 2	**48.07**	0.00	0.00
LPd	3 & 4	**9.09**	3.60	0.00
SPd	5 to 8	**24.69**	**12.59**	**5.85**
ESd	9 to 12	0.39	**8.99**	0.00
RSd	13 to 16	0.00	0.00	**11.10**
ROSd	17 to 19	0.00	**21.05**	**22.81**
IOSd	20 & 21	**16.58**	**11.51**	**18.72**
IASd	22 to 26	1.18	**23.20**	**39.77**
UASd	27 & 28	0.00	**19.06**	1.75
CSI		6.90	18.92	20.12
ESKA (%)		30.68	49.43	56.82
Dominant and Super-dominant Strategies		**EP** LP SP IOS	SP ES ROS IOS IAS UAS	SP RS ROS IOS **IAS**

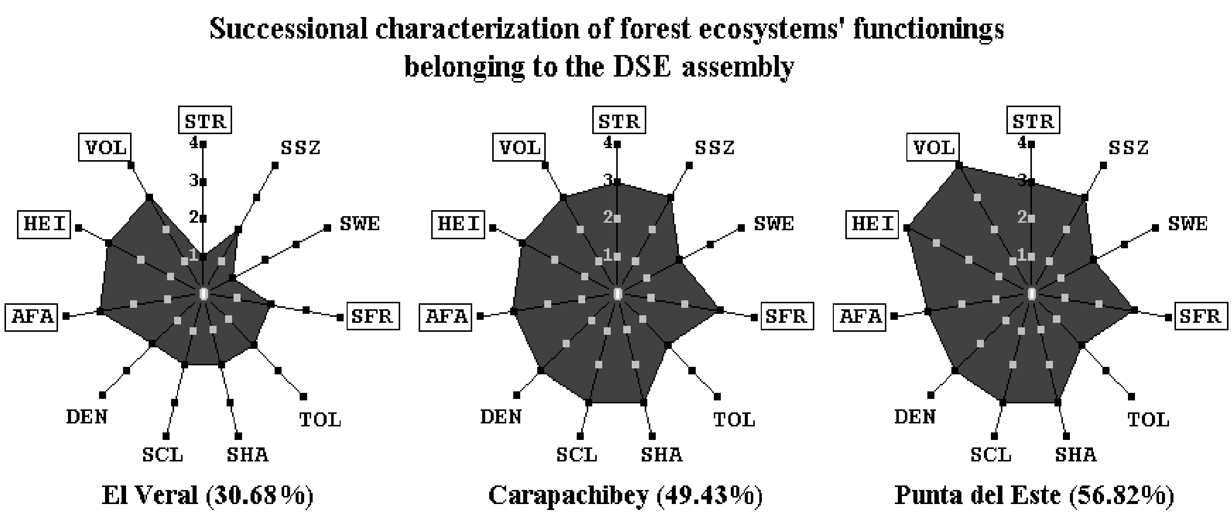

Fig. 9. Polygrams characterizing Dry or Saline Ecosystems (DSE) plots in Western Cuba (see Table 5 for explanation and also Appendixes III-B and V-B). In parenthesis, the Ecosystems "K-Strategist" Area EKSA values.

Finally, Figure 10 show the regression analysis resulting from the comparison between CSI and EKSA values for *Sierra del Rosario* forest plots. As shown in the figure, a high R^2 is obtained, demonstrating that CSI and EKSA are significantly correlated, i.e., for a group of forest plots the higher CSI is the higher carrying capacity (EKSA) results.

DISCUSSION

The numerical values of STR, SFR, AFA, HEI and VOL generally tend to diminish during succession, while values for SSZ, SWE, TOL, SHA, SCL and DEN tend to increase (Clark and Clark, 1987; Jordan 1989; Kageyama and Viana, 1989; Whitmore, 1989; Hubbell and Foster, 1990; Marquez *et al.,* 1990;

Medina *et al.,* 1990; Bazzaz 1991; Gómez-Pompa *et al.,* 1991; Herrera *et al.,* 1991, 1997; Loehle, 2000). We have scored each of the variables from values typical of early successionals to values typical of late successional species and then analyzed these variables to create a refined system of classification of successional strategies that can be viewed as the presentation of a hypothesis.

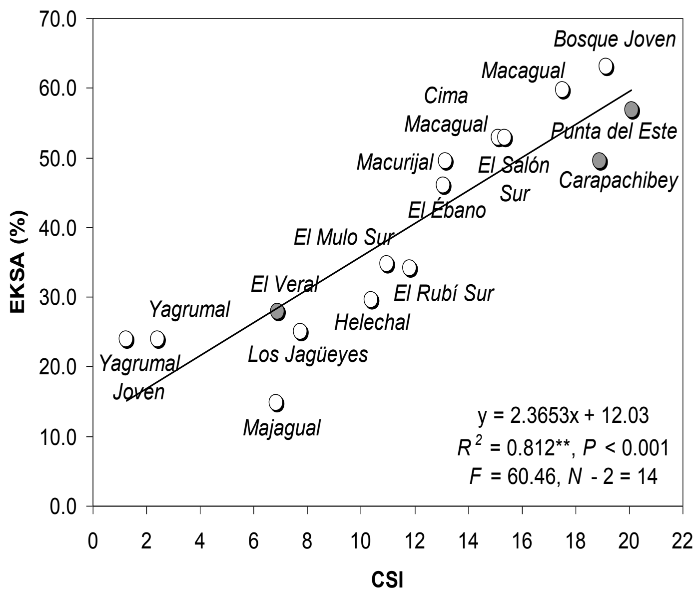

Fig. 10. EKSA (Ecosystem "K-Strategist" Area) *vs.* CSI (Ceno-successional Index) regression analysis for 13 Humid Forest Ecosystems (white dots, see Appendix V-A) and 3 Dry or Saline Ecosystems plots (gray dots, see Appendix V-B).

Classification of species into functional groups can play an important role in the interpretation of biodiversity. As identified by Mooney *et al.* (1995), functional groups are "groups of species that have ecologically similar effects on ecosystem processes." While classification and comparison between functional groups is a first step in describing ecological processes, "no two species or individuals are ecologically identical, so as our understanding improves we expect to recognize situations where species diversity within functional groups or genetic diversity within species has important ecosystem consequences" (Mooney *et al.,* 1995).

In this paper, we have developed a classification scheme for ecological functions that is explicitly based on quantitative analysis of characters known to vary with succession. We consider this classification system to be a refined version of the *r*-*K* continuum for tropical forest ecosystems. This classification scheme then presents a hypothesis concerning the dynamics of species replacement following disturbance. As such these groupings can help facilitate the understanding of tropical forest ecological functioning, the occurring forest stands management and conservation and the restoration of disturbed forest landscapes.

The hierarchical nature of our functional classification proposal (i.e., description of functional groups) is intended to provide adequate flexibility to fit an appropriate level of resolution. Dendrogram branches shape suggests homogeneity or heterogeneity of groups resulting from each cut. Trees showing many clusters at low levels of cutting, branching into many long single lines might indicate larger community heterogeneity. However in our resulting trees, both in HFE and DSE (Fig. 1), a gradient of step-by-step branching is observed at low cutting levels. Those branches are composed by few long and many short single lines (strategies) suggesting the occurrence of very clear and believable functional groups or strategies inside each ecosystem type.

Cutting levels and resulting strategies under each order are approximately the same for HFE and DSE (Fig. 1), suggesting that functional groups exist independently of ecosystem types. Both for HFE and DSE, there are several strategies becoming single and indivisible as early as Order II on. However, Exuberant Stabilizers, Major Stabilizers, Restoring Opportunist Stabilizers, Ultimate Stabilizers, Invasive Opportunist Stabilizers, Austere Stabilizers and Ultimate Austere Stabilizers are still recognizable, from Order II on, as divisible intermediate strategies both in HFE and DSE.

Influence of environment seems to cause humid ecosystems tendencies to be more austere (six Ultimate Austere functional groups) while dry and/or saline ecosystems tend to be more opportunists (two Ultimate Austere functional groups). A reduced number of orders, lack of Ultimate Stabilizers and a delay in the apparition of Austere strategies, the reduction of Ultimate Austere Stabilizers, subdivision of Late Pioneers as early as Order II and an increased richness of Sclerophyllous Pioneers, Exuberants, Restorers, Restoring Opportunists, Invasive Opportunists and Invasive Austeres are significant arguments to reinforce the idea that forest species functional groups in DSE are functionally more opportunist and invasive than those flourishing under humid forest ecosystems.

The Order I classification into Pioneers and Stabilizers (Fig. 1 and 2) is reminiscent of the two strategies for tropical forests distinguished by other authors (e.g., Whitmore, 1989): pioneers and climax (non-pioneers). Indeed, we consider that Pioneer species are the first to colonize forest gaps, subsequently being replaced by Stabilizers. The functional roles of Pioneers and Stabilizers might be described as follows: Pioneers are fast growing species that establish themselves readily in gaps early during succession. They are able to replace grasses and shrubs constituting the immediate phase after the gap opening. Stabilizers might occur in the gap as seedlings or saplings already occurring as a bank of survivor individuals after the gap opening, or might arrive, during gap cicatrisation by dispersal mechanisms. Due to their slower growth rate and larger capabilities to tolerate shade, they are capable of growing underneath and afterwards competitively replace Pioneers. This group includes the so-called "climax" species. However, we avoid this name (climax species) because, depending upon forest functioning and successional stages a smaller or larger proportion of Pioneers can frequently occur in primary forests.

Stabilizers make up the majority of the mature community in humid and dry and/or saline environments. For Stabilizers, the prevailing stress for DSE seems to favor a reduction of SWE and TOL whereas for HFE reduced DEN are favored, due perhaps to a larger water availability.

As mentioned before, users of the present system of classification are free to choose the level of cutting (strategies for a given Order) they believe more appropriate. From a biological point of view, all the orders are valuable and useful to identify different strategic levels. However, we have preferred to use the final strategies (23 for HFE and 28 for DSE), which can be summarized into 9 main strategies but we advise that present results should be accepted rather as a new system of classification based on real or hypothetical data. Once users are convinced of the methods utility they should prepare their own matrix for the species growing in a particular territory and use the system for discovering their own strategies.

A simple look at species listed in Appendix IV tables allow us to observe the causes for the nomenclature used for strategies, as they are based on the species successional behavior in nature. We understand that there might be no doubts about Early, Late and Sclerophyllous Pioneers once the grouped species under these names are considered. We used the name Exuberant with the intention to refer to those species that commonly produce large logs, consequently requiring large nutrient sources to grow and develop.

Restorer Stabilizers include species with the ability to behave as second cycle pioneers and also having the ability to increase their tolerance to shade, but in most cases they are competitively weak. On the other hand, Restoring Opportunists behave reproductively as Austeres, but they seem to keep high growth rates (see Appendix IV's tables).

Many species have invasive abilities and are very well known in Neotropics, e.g., *Abarema obovalis*, *Albizia lebbeck*, *Bursera simaruba*, *Caesalpinia violacea*, *Chrysophyllum cainito*, *Clusia rosea*, *Cordia alliodora*, *Cordia gerascanthus*, *Leucaena leucocephala*, *Pithecellobium obovale*, *Savia sessiliflora*, *Swietenia mahagoni* and *Zuelania guidonia*. In our study, these species are grouped under the name of Invasive Opportunist Stabilizers (Appendix IV). Particularly, their intermediate values (2 to 3) for most variables probably grant their abilities to behave like invading opportunists. They are able to invade man-made gaps easily and belong to the so-called anthropic pioneers (Budowski, 1961). Exceptionally, when favored by environment and low plant competition, they might grow to form large logs being then easily taken for Exuberants.

Invasive and Ultimate Austere Stabilizers behave equally for HFE and DSE. The specialization of UAS lies on their ability to show maximal values for SFR and SCL while the other variables match 3. On the other hand, IAS are just intermediate between IOS and UAS, their particular specialization being based on the production of smaller trees.

A deeper analysis of these nine strategies demonstrates that the successional potentials are similar for HFE and DSE. However, the increased values of SKA for LP, SP, ES, RS, ROS and IOS in DSE, suggest again that this last type of ecosystem constitutes a flourishing environment for early and restoring and invasive strategies (Fig. 5). This last is also demonstrated by the fact that species richness in SP, ES, ROS and IAS is larger in DSE than in HFE.

As shown in Figures 6 and 7, the occurrence of the biologically relevant *r*-*K* continuum is demonstrated by the strategies resulting from our classification system. However, the continuum is not so simple. In fact, it results from many combinations of *r* and *K* tendencies among the biological variables we studied. Consequently, pioneer strategies can be *K* strategists in some respects and stabilizer strategies can be *r* strategists in other respects. Therefore, it seems to be obligatory from a biological standpoint to consider the coexistence of *r* and *K* behaviors not only as a particular property of a given strategy, but also as different levels of biological organization.

The system of classification presented here proves to be useful both for characterizing ecosystem functional groups and for differentiating functioning at the ecosystem level. Using successional numbers is interesting for quantifying mathematically the successional stage (CSI values) at a given forest plot.

In addition, the EKSA values represent the successional status of a particular ecosystem (forest community functioning *sensu* Whittaker, 1975). We also suspect that the EKSA values may relate to the potential energy of the ecosystem (standing crop given by living plant individual components in addition to the un-decomposed necromass), and that the remaining percentage to fill 100% of the polygram area might be related with the kinetic energy, i.e., with the plant community turnover rate (observed in a 0 to 100 scale instead of the commonly used 0 to 1 scale). While this connection is speculative at this point, we know that *Bosque Joven* and *Majagual* show turnover rates of about 45% and 80%, respectively (Herrera *et al.,* 1988; actual figures are 0.45 and 0.80 in a 0 to 1 scale), while those suggested by their EKSA values (Fig. 8) are 39.6% and 85.2% (actual figures might be 0.40 and 0.85 in a 0 to 1 scale), respectively. Consequently, the values resulting from 100 - EKSA seems to correlate with the real standing crop turnover rates for *Bosque Joven* and *Majagual*. The generality of this relationship requires further investigation.

The classification system also demonstrates that species composition grouped inside a given strategy or growing together as a plant community assembly gives enough information to characterize forest ecosystems successional and functional processes. On the other hand, SN, CSI, SKA, and EKSA values, in addition to the advantage of describing successional strategies dominating a particular ecosystem, challenge us for new research directions dealing with mathematical modeling and ecosystems' thermodynamics.

SUPPLEMENTARY INFORMATION

Additional supporting information (six appendices) may be found in the online version of this article.

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APPENDIX I

Appendix I. Species included in the present study listed according to their preferential habitat.

I-A. Humid Habitats. Sites with annual rainfall > 1500 mm and/or relatively to completely protected against desiccation by a higher frequency of cloudiness, a higher proximity to water table and/or water streams, and appropriate sunshine expositions (not directly exposed) or topographies (concave slopes, valleys, etc.).

Scientific Name	Common Name	Family
Albizia berteriana (Balbis) Maza	Abey macho	Mimosaceae
Alchornea latifolia Sw.	Aguacatillo	Euphorbiaceae
Anacardium excelsum (Bert.et Bald.)S.Keels	Mijao, Nariz	Anacardiaceae
Beilschmiedia pendula (Sw.) et Hook	Aceitunillo	Lauraceae
Brosimun alicastrum Sw.	Guáimaro	Moraceae
Brunellia comocladiifolia H. et B.	Unknown	Brunelliaceae
Bucida buceras L.	Júcaro negro	Combretaceae
Buchenavia capitata (Vahl) Eichl.	Júcaro amarillo	Combretaceae
Calycophyllum candidissimum (Vahl) DC.	Dagame	Rubiaceae
Carapa guianensis Aubl.	Najesí	Meliaceae
Cinnamomum triplinerve (R. et P.) Kosterm	Boniato blanco	Lauraceae
Coffea arabica L.	Cafeto	Rubiaceae
Cojoba arborea (L.) Britton et Rose	Moruro rojo	Mimosaceae
Cynometra cubensis A. Rich.	Pico de gallo	Caesalpiniaceae
Cyrilla racemiflora L.	Barril	Cyrillaceae
Chionanthus domingensis Lam	Bayito	Oleaceae
Chione cubensis A. Rich.	Vigueta naranjo	Rubiaceae
Decussocarpus rospigliosii (Pilger) de Laub.	Pino liso	Podocarpaceae
Dendropanax arboreus (L.) Dec. et Planch.	Víbona	Araliaceae
Diospyros caribaea (A. DC.) Standl.	Ébano	Ebenaceae
Diospyros philippensis (Desr.) Guercke	Mabolo	Ebenaceae
Erythrina berteroana Urb.	Piñón de pito	Fabaceae
Erythrina poeppigiana (Walp.) O.F. Cook	Búcare	Fabaceae
Ficus obtusifolia Kunth	Jagüey	Moraceae
Ficus subscabrida Warb.	Jagüey macho	Moraceae
Fraxinus cubensis Griseb.	Búfano	Oleaceae

I-A. Humid Habitats. (cont.)

Scientific Name	Common Name	Family
Guarea guidonia (L.) Sleumer	Yamagua	Meliaceae
Guatteria moralesi (Maza) Urb.	Purio prieto	Annonaceae
Guettarda combsii Urb.	Jagüilla de monte	Rubiaceae
Guibourtia hymenifolia (Moric.) J. Leonard	Quiebra hacha	Caesalpiniaceae
Heliocarpus americanus L.	Majagua	Tiliaceae
Hymenaea courbaril Griseb.	Curbaril	Caesalpiniaceae
Inga vera Willd.	Guabá	Mimosaceae
Juglans insularis Griseb.	Nogal del país	Juglandaceae
Licaria triandra (Sw.) Kostermans	Leviza	Lauraceae
Magnolia cubensis Urb.	Magnolia	Magnoliaceae
Manilkara jaimiqui (Wr. ex Griseb.) Dubard	Jaimiquí	Sapotaceae
Manilkara valenzuelana (A. Rich.) T. D. Penn.	Ácana	Sapotaceae
Manilkara zapota (L.) P. Royen	Níspero	Sapotaceae
Margaritaria nobilis L. f.	Azulejo	Euphorbiaceae
Matayba apetala Sw.	Macurije	Sapindaceae
Miconia elata (Sw.) DC	Cordobán	Melastomataceae
Micropholis polita (Griseb.) Pierre	Sapotillo árbol	Sapotaceae
Ocotea cuneata (Griseb.) Urb.	Canelón	Lauraceae
Ocotea leucoxylon (Sw.) Mez	Judío	Lauraceae
Ochroma lagopus L.	Balsa	Bombacaceae
Oxandra laurifolia (Sw.) A. Rich.	Purio	Annonaceae
Pera bumeliaefolia Griseb.	Jiquí	Euphorbiaceae
Piscidia piscipula (L.) Sargent	Guamá candelón	Fabaceae
Podocarpus angustifolius Griseb.	Sabina cimarrona	Podocarpaceae
Poeppigia procera Presl.	Tengue	Caesalpiniaceae
Pouteria dictyoneura (Griseb.) Radlk.	Cocuyo	Sapotaceae
Pouteria dominigensis (Gaertn.) Baehni	Sapote culebra	Sapotaceae
Protium cubense (Rose) Urb.	Copal	Burseraceae
Prunus myrtifolia (L.) Urb.	Cuajaní hembra	Rosaceae
Prunus occidentalis Sw.	Cuajaní	Rosaceae
Pseudolmedia spuria (Sw.) Griseb.	Macagua	Moraceae
Rheedia aristata Griseb.	Manajú	Clusiaceae
Sapindus saponaria L.	Jaboncillo	Sapindaceae
Sapium jamaicense Sw.	Piniche, Lechero	Euphorbiaceae
Schefflera morototonii (Aubl.) Magu., Stey. et Frodin	Yagruma macho	Araliaceae

I-A. Humid Habitats. (cont.)

Scientific Name	Common Name	Family
Sloanea amygdalina Griseb.	Pico de gallo	Elaeocarpaceae
Syzygium jambos (L.) Alston	Pomarrosa	Myrtaceae
Tabebuia angustata Britt.	Roble blanco	Bignoniaceae
Tabebuia shaferi Britt.	Roble blanco	Bignoniaceae
Talauma orbicularis Britt. et Wils.	Marañón de la Maestra	Magnoliaceae
Theobroma cacao L.	Cacaotero	Sterculiaceae
Trema micrantha (L.) Blume	Guasimilla macho	Ulmaceae
Trichilia havanensis Jacq.	Siguaraya	Meliaceae
Trichospermum grewiifolium (A. Rich.) Kosterm.	Majagüilla	Tiliaceae
Trophis racemosa (L.) Urb.	Ramón	Moraceae
Wallenia laurifolia Sw.	Guacamarí	Myrsinaceae
Zanthoxylum elephantiasis Macfd.	Bayúa	Rutaceae

I-B. Dry-Saline Habitats. Prevalently terrestrial sites with annual rainfall < 1500 mm, enduring seasonally dry periods three or more months. Coastal habitats or highly influenced by salinity are also included. Species growing in semi-deciduous (canopy foliar caducity more than 30%) and deciduous forests commonly reaching 10 to 15 m high and rarely higher than 25 m.

Scientific Name	Common Name	Family
Adelia ricinella L.	Jía blanca	Euphorbiaceae
Albizia cubana Britt. et Wilson	Bacona	Mimosaceae
Alvaradoa amorphoides Liebm.	Tamarindillo	Simaroubaceae
Amyris balsamifera L.	Cuaba	Rutaceae
Ateleia apetala Griseb.	Mierda de gallina	Fabaceae
Avicennia germinans (Jacq.) L.	Mangle prieto	Verbenaceae
Bauhinia divaricata L.	Pata de vaca	Caesalpiniaceae
Belairia mucronata Griseb.	Yamaquey	Fabaceae
Bombacopsis cubensis A. Robyns	Ceibón	Bombacaceae
Bourreria succulenta Jacq.	Ateje de costa	Boraginaceae
Byrsonima crassifolia (L.) HBK	Peralejo	Malpighiaceae
Cameraria retusa Griseb.	Maboa de sabana	Apocynaceae
Canella winterana (L.) Gaertn.	Cúrbana	Canellaceae
Carpodiptera cubensis Griseb.	Majagüilla	Tiliaceae
Casasia calophylla A. Rich.	Jicarita	Rubiaceae
Casearia hirsuta Sw.	Raspa lengua	Flacourtiaceae
Cassia ekmaniana Urb.	Guacamaya	Caesalpiniaceae
Cedrela cubensis Bisse	Cedro macho	Meliaceae

I-B. Dry-Saline Habitats. (cont.)

Scientific Name	Common Name	Family
Celtis trinervia Lam.	Ramón de costa	Ulmaceae
Citharexylum fruticosum L.	Penda	Verbenaceae
Coccoloba uvifera L.	Uva caleta	Polygonaceae
Colubrina arborescens (Mill.) Sarg.	Bijáguara	Rhamnaceae
Conocarpus erectus L.	Yana	Combretaceae
Cordia sebestena L.	Vomitel colorado	Boraginaceae
Curatella americana L.	Vacabuey	Dilleniaceae
Chrysobalanus icaco L.	Icaco	Chrysobalanaceae
Diospyros crassinervis (Krug. et Urb.) Standl.	Ébano	Ebenaceae
Erythroxylum alaternifolium A. Rich.	Arabo prieto	Erythroxylaceae
Ficus aurea Nutt.	Jagüey hembra	Moraceae
Forestiera rhamnifolia Griseb.	Almorranilla	Oleaceae
Genipa americana L.	Jagua	Rubiaceae
Guaiacum officinale L.	Guayacán	Zygophyllaceae
Guaiacum sanctum L.	Guayacán santo	Zygophyllaceae
Haematoxylum campechianum L.	Palo campeche	Caesalpiniaceae
Hamelia patens Jacq.	Ponasí	Rubiaceae
Haematoxylum campechianum L.	Palo campeche	Caesalpiniaceae
Hamelia patens Jacq.	Ponasí	Rubiaceae
Hebestigma cubense (HBK) Urb.	Frijolillo	Fabaceae
Hippomane mancinella L.	Manzanillo	Euphorbiaceae
Hypelate trifoliata Sw.	Hueso de costa	Sapindaceae
Jacaranda coerulea (L.) Griseb.	Abey macho	Bignoniaceae
Krugiodendron ferreum (Vahl.) Urb.	Carey de costa	Rhamnaceae
Laguncularia racemosa (L.) Gaertn.	Patabán	Combretaceae
Luehea speciosa Willd.	Guásima amarilla	Tiliaceae
Lysiloma latisiliqua (L.) Benth.	Soplillo	Mimosaceae
Metopium brownei (Jacq.) Urb.	Guao de costa	Anacardiaceae
Ottoschulzia cubensis (Wr. et Griseb.) Urb.	Cogote de toro	Icacinaceae
Pachyanthus cubensis A. Rich.	Hierro	Melastomataceae
Peltophorum adnatum Griseb.	Moruro abey	Caesalpiniaceae
Phyllostylon brasiliensis Capanema	Jatía	Ulmaceae
Picrodendron macrocarpum (A. Rich..) Britt.	Yana prieta	Euphorbiaceae
Pinus tropicalis Morelet	Pino hembra	Pinaceae
Pithecellobium lentiscifolium (A. Rich.) Wr.	Humo	Mimosaceae

I-B. Dry-Saline Habitats. (cont.)

Scientific Name	Common Name	Family
Polygala cuneata (Griseb.) Blake	Cocuyo blanco	Polygalaceae
Prosopis juliflora (Sw.) DC.	Mezquite	Mimosaceae
Quercus cubana A. Rich.	Encino	Fagaceae
Rhizophora mangle L.	Mangle rojo	Rhizophoraceae
Simarouba glauca DC.	Gavilán	Simaroubaceae
Swartzia cubensis (Britt. et Wils.) Standl.	Pico de gallo	Caesalpiniaceae
Thespesia populnea (L.) Soland	Majagua de Florida	Malvaceae
Ximenia americana L.	Yaná	Olacaceae
Xylopia aromatica (Lam.) Mart.	Malagueta	Annonaceae
Zanthoxylum fagara (L.) Sargent	Chivo	Rutaceae

I-C. Species Indifferent to Habitat. Species able to grow equally on humid or dry and/or saline habitats.

Scientific Name	Common Name	Family
Abarema obovalis (A. Rich.) Wr.	Encinillo	Mimosaceae
Albizia lebbeck (L.) Benth.	Algarrobo de olor	Mimosaceae
Albizia procera Benth.	Algarrobo de la India	Mimosaceae
Allophylus cominia (L.) Sw.	Palo de caja	Sapindaceae
Anacardium occidentale L.	Marañón	Anacardiaceae
Andira inermis (Sw.) HBK	Yaba	Fabaceae
Annona muricata L.	Guanábana	Annonaceae
Bauhinia monandra Kurz	Pata de vaca	Caesalpiniaceae
Brya microphylla Bisse	Granadillo	Fabaceae
Bunchosia media (Ait.) DC	Mierda gallina	Malpighiaceae
Bursera simaruba (L.) Sargent	Almácigo	Burseraceae
Caesalpinia violacea (Mill.) Standl.	Yarúa	Caesalpiniaceae
Calophyllum antillanum Britt.	Ocuje	Clusiaceae
Cassia grandis L.	Cañandonga	Caesalpiniaceae
Casuarina equisetifolia Forst.	Casuarina	Casuarinaceae
Cecropia schreberiana Miq.	Yagruma	Cecropiaceae
Cedrela odorata L.	Cedro	Meliaceae
Ceiba pentandra (L.) Gaertn.	Ceiba	Bombacaceae
Chrysophyllum cainito L.	Caimito	Sapotaceae
Chrysophyllum oliviforme L.	Caimitillo	Sapotaceae
Citrus aurantium L.	Naranjo agrio	Rutaceae

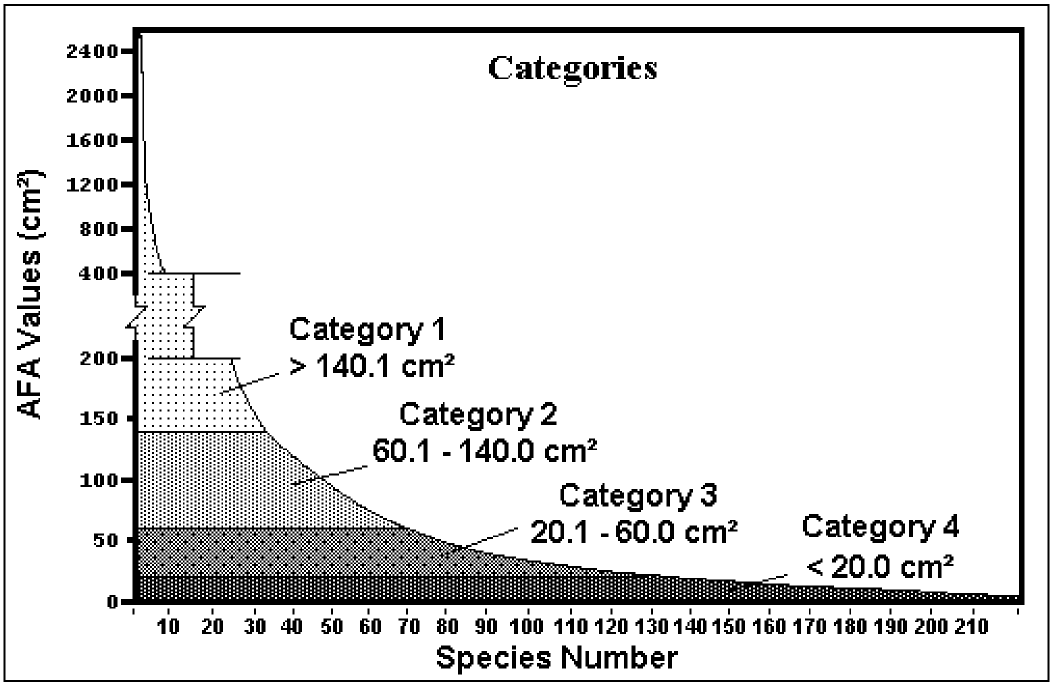
I-C. Species Indifferent to Habitat. (cont.)

Scientific Name	Common Name	Family
Clusia rosea Jacq.	Copey	Clusiaceae
Coccoloba diversifolia Jacq.	Uvilla	Polygonaceae
Coccoloba retusa Griseb. Cat.	Uvilla	Polygonaceae
Comocladia dentata Jacq.	Guao	Anacardiaceae
Cordia alliodora (R. et P.) Cham.	Baría prieta	Boraginaceae
Cordia collococca L.	Ateje	Boraginaceae
Cordia gerascanthus L.	Baría	Boraginaceae
Cupania americana L.	Guara	Sapindaceae
Cupania glabra Sw.	Guara de costa	Sapindaceae
Delonix regia (Bojer.) Raf.	Flamboyant	Caesalpiniaceae
Drypetes alba Poit.	Hueso	Euphorbiaceae
Ehretia tinifolia L.	Roble prieto	Boraginaceae
Enterolobium cyclocarpum (Jacq.) Gris.	Oreja de judío	Mimosaceae
Erythroxylum areolatum L.	Arabo jibá	Erythroxylaceae
Erythroxylum confusum Britt.	Arabo colorado	Erythroxylaceae
Erythroxylum havanense Jacq.	Arabo	Erythroxylaceae
Eucalyptus citriodora Hook	Eucalipto	Myrtaceae
Eugenia axillaris (Sw.) Willd.	Guairaje	Myrtaceae
Eugenia foetida Poir.	Guairaje	Myrtaceae
Exothea paniculata (Juss.) Radlk.	Yaicuaje	Sapindaceae
Faramea occidentalis (L.) A. Rich.	Nabaco	Rubiaceae
Gliricidia sepium (Jacq.) Steud.	Piñón florido	Fabaceae
Gmelina arborea Roxb.	Gemelina	Verbenaceae
Guazuma ulmifolia Lam.	Guásima	Sterculiaceae
Guettarda calyptrata A. Rich.	Guayabillo	Rubiaceae
Guettarda elliptica Sw.	Cigüilla	Rubiaceae
Gymnanthes lucida Sw.	Yaití	Euphorbiaceae
Hura crepitans L.	Salvadera	Euphorbiaceae
Juniperus lucayana Britt.	Sabina	Cupressaceae
Khaya nyassica Stapf.	Caoba africana	Meliaceae
Leucaena leucocephala (Lam.) de Wit	Leucaena	Mimosaceae
Lysiloma sabicu A. Rich	Sabicú	Mimosaceae
Maclura tinctoria (L.) Don	Mora	Moraceae
Mammea americana L.	Mamey Sto. Domingo	Clusiaceae
Mangifera indica L.	Mango	Anacardiaceae

I-C. Species Indifferent to Habitat. (cont.)

Scientific Name	Common Name	Family
Melia azedarach L.	Paraiso	Meliaceae
Muntingia calabura L.	Capulí	Elaeocarpaceae
Nectandra coriacea (Sw.) Griseb.	Sigua	Lauraceae
Oxandra lanceolata (Sw.) Bail.	Yaya	Annonaceae
Persea americana Mill.	Aguacate	Lauraceae
Picramnia pentandra Sw.	Aguedita	Simaroubaceae
Pinus caribaea Morelet	Pino macho	Pinaceae
Plumeria obtusa L.	Lirio	Apocynaceae
Pouteria sapota (Jacq.) H.E. Moore & Stearn.	Mamey colorado	Sapotaceae
Psidium guajava L.	Guayaba	Myrtaceae
Roystonea regia (HBK) O.F. Cook	Palma real	Arecaceae
Samanea saman (Jacq.) Merr.	Algarrobo	Mimosaceae
Savia sessiliflora (Sw.) Willd.	Carbonero	Euphorbiaceae
Sideroxylon foetidissimum (Jacq.) Cronquist	Jocuma	Sapotaceae
Sideroxylon salicifolium (L.) Lam.	Sangre doncella	Sapotaceae
Spathodea campanulata Beauv.	Tulipán africano	Bignoniaceae
Spondias mombin L.	Jobo	Anacardiaceae
Sterculia apetala (Jacq.) Karst.	Anacahuita	Sterculiaceae
Swietenia macrophylla King.	Caoba de Honduras	Meliaceae
Swietenia mahagoni (L.) Jacq.	Caoba antillana	Meliaceae
Talipariti elatum (Sw.) Fryxell	Majagua	Malvaceae
Tamarindus indica L.	Tamarindo	Caesalpiniaceae
Tectona grandis L. f.	Teca	Verbenaceae
Terminalia catappa L.	Almendro de la India	Combretaceae
Terminalia eryostachia A. Rich.	Chicharrón	Combretaceae
Terminalia intermedia (A.Rich.) Urb.	Chicharrón	Combretaceae
Tetrazygia bicolor (Mill.) Cogn.	Cordobancillo	Melastomataceae
Trichilia hirta L.	Cabo de hacha	Meliaceae
Vitex divaricata Sw.	Roble guayo	Verbenaceae
Zanthoxylum martinicense (Lam.) DC.	Ayúa	Rutaceae
Zuelania guidonia (Sw.) Britt. et Millsp.	Guaguasí	Flacourtiaceae

APPENDIX II



Appendix II-A. Figure II-1. Categorization of approximated foliar area **(**AFA) values. Categories 1 to 4 are not shared in four equal ranges, but in ranges which follow the successional placement of forest species.

Appendix II-B. Description of reproductive and vegetative variables.

Seeds per tree (STR). In estimating STR values, we mainly drew upon our practical experience as well as the experience of our collaborators. We estimated the means of species seed productions rather than productions during mast years (Ramírez, 1978; Howe, 1990). We have assumed here that the value given for this variable decreases from early to late successionals.

Seed size (SSZ), **Seed weight (SWE)** and **Seeds per fruit (SFR).** Data for SSZ, SWE and SFR were obtained from the literature (see references above), of the *Herbario Nacional de la Academia de Ciencias de Cuba* and from field sampling. For practical reasons, we measured the size (length, width, and thickness) and dry weight of seeds in a strict sense, i.e., the seed coat surrounding the endosperm, the cotyledons and the embryo. The fruit attributes commonly remaining around the seed after air-dried, *e.g.* the dried, originally fleshy, cover surrounding the seed in *Andira inermis* and *Calophyllum antillanum* drupes, or seed attributes as wings, trichomas, arils, etc., were not considered within our measure of seeds. According to our experience, SSZ and SWE increase from early to late successionals, while SFR decreases.

Tolerance to shade (TOL). Tolerance to shade tends to increase from early to late successionals (Clark and Clark, 1987; Whitmore, 1989; Marquez *et al.,* 1990; Medina *et al.,* 1990; Bazzaz, 1991; Gómez-Pompa *et al.* 1991; Herrera *et al.* 1991). Our assessment of tree species TOL values was subjective and based on our experience with these species. The deepest shade in which trees grow is in the understory of HFE. In this environment, light intensity penetrating through the forest canopy can be reduced to about 10% of incident sunlight (Vilamajó *et al.* 1988). We decided to reserve values 4 of TOL only for those species, which preferring humid habitats are able to fully develop from seedlings to saplings in the understory under reduced sources of sunlight (Appendix I). For species preferring humid habitats value 1 of TOL was not used because they cannot be omniheliophilous. For these species, the minimal level of TOL, i.e., their maximal degree of heliophily, was 2, since in humid forest environments shade-intolerant species are able to survive and grow when partially shaded. Following similar reasoning, values 4 for TOL were not assigned to species preferring DSE. In these environments – including dry forests, subdeciduous forests, mangrove, savannas, etc. – sunlight reaching the understory or topsoil is surely more intense than in tropical wet or humid forest environments.

Selectivity to habitat (SHA). Selectivity to habitat was subjectively assigned based on the establishment success of a species under different environments. It therefore refers to the water and nutrient requirements of the species and other environmental conditions necessary for their successful establishment. We have assumed that the selectivity of tree species to habitat increases successionally, since generalists are commonly considered to be successionally earlier than specialists (e.g., Gómez-Sal *et al.,* 1986).

Sclerophylly (SCL). Causes of sclerophylly among plants have been commonly associated with the lack of water or nutrients (Medina *et al.*, 1990). In addition, it has been generally accepted that in tropical forest SCL tends to increase from early to late successional species (Herrera *et al.*, 1991). In a very broad sense the categories defined for SCL are concurrent with the classification of leaves and leaflet texture into membranaceous, papyraceous, chartaceous and coriaceous, though different authors do not consistently use these terms. However, careful consideration is to be had when classifying SCL based on the texture of leaves and leaflets since species as *Clusia rosea* and *Coccoloba retusa* may falsely appear to be sclerophyllous and hard-leaved due to their thick cuticles, epidermis thickness, brightness and dark glossy green color, though they show low SCL values according to our definition (Herrera *et al.*, 1991, see also comments below).

Our measure of SCL was based on fresh weight: dry weight (FW:DW) ratios. The FW:DW ratios were obtained by collecting mature leaves or leaflets from sunshine exposed branches of three individuals for each species. Depending upon their size 10 to 100 leaves or leaflets were collected for each of the three replicates. Leaves were collected prior to midday and the plant material was stored inside a sealed polyethylene bag. All bags were refrigerated prior to being weighed (maximum two days). Condensed water adhering to the inner plastic bag wall was included in the measurement of fresh weights. Petioles and rachis were eliminated except for very small ones, *e.g.* in *Matayba apetala*. Dry weights were assessed after oven drying at 90°C to constant weight. The FW:DW ratios were assessed for 158 (72%) of 221 analyzed species and published in Herrera and Rodríguez (1988) and Herrera *et al.* (1991). For the remaining species the level of SCL was estimated according to the characteristics observed on the herbarium vouchers, available literature and practical field experience of the authors and collaborators.

Wood density (DEN). The values of DEN for 183 of our species were obtained from a published work (Fors, 1965). The rest of the values were estimated based on our experience and that of Rigoberto Pérez (pers. comm.). In general, DEN seems to correlate with SCL, i.e., wood density increases from early to late successional species.

Approximated foliar area (AFA). Generally AFA (i.e., the area of a leaf or leaflet) and SCL are negatively correlated (Medina *et al.* 1990; Herrera *et al.,* 1991), i.e., foliar area decreases while sclerophylly increases from early to late successionals. In the case of AFA, the values were estimated from published or observed field and herbarium mean values for leaves or leaflets length (l) and width (w). With these values, we estimated foliar area using the equation for the area of an ellipse ($= \pi \times l \times w$). If the categories listed for this variable in Table 1 are going to be used in botanical nomenclature, we recommend the Greek suffix -*foliaceous* instead of -*phyllus* to avoid comparisons with Raunkiaer´s classification (Raunkiaer, 1934).

Tree height (HEI) and Tree volume (VOL). According to our experience and the published literature (Leigh *et al.,* 1990; Gómez-Pompa *et al.,* 1991; McDade *et al.,* 1994; Bullock *et al.,* 1995), HEI and VOL decrease from early to late successional species. Tree volumes were estimated from the maximal height and diameter at breast height (i.e., 1.30 m). Approximate tree volume was then calculated according to the equation for the volume of a cylinder ($=\pi \times r^2 \times h$, where h and 2r are the height and diameter respectively). In this calculation, we assumed that the whole volume of a tree log, branches and leaves fit a cylinder volume of constant diameter. The ranges for tree height and tree volume qualification are listed in Table 1. As individual tree species grow differently when growing in HFE or DSE, their values for HEI and VOL were emended accordingly when necessary.

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APPENDIX III

Appendix III-A. Estimation of ceno-successional index (CSI) and the ecosystem *K*-strategist area (EKSA, %) for a particular forest plot belonging to the HFE (humid forest ecosystems) assembly.

Once the forest plot is examined and the trees heights and BHD (breath height diameters) are listed in a table, data are grouped by species and the trees phytomass (as trees volumes) estimated in m^3. For tree volume (V) the equation of a cylinder is considered to be $V = \pi r^2 h$, where r = BHD/2.

The following table gives an example corresponding to a 20 x 20 m forest plot named "*El Ébano*", Reserve of Biosphere *Sierra del Rosario*, *Pinar del Río*, Western Cuba. SP refers to the species proportion, in %, with respect to the total phytomass for the plot (100%), SN refers to the successional number according to the present study, SP x SN list the products resulting from multiplying SP and SN, and CSI (ceno-successional index) is estimated by dividing the products total for the plot (SP x SN) by 100.

FOREST TREE SPECIES	Phytomass (m^3)	SP	SN	SP x SN	CSI
Guazuma ulmifolia	0.004	0.016	1	0.0	
Tabebuia shaferi	1.336	6.143	2	12.3	
Ficus subscabrida	0.182	0.837	3	2.5	
Talipariti elatum	3.763	17.298	4	69.2	
Sideroxylon foetidissimum	0.070	0.321	7	2.2	
Dendropanax arboreus	0.031	0.141	8	1.1	
Alchornea latifolia	3.344	15.371	11	169.1	
Trophis racemosa	0.705	3.239	11	35.6	13.07
Ocotea floribunda	0.066	0.303	12	3.6	
Lonchocarpus domingensis	0.227	1.045	14	14.6	
Matayba apetala	8.095	37.211	16	595.4	
Sysygium jambos	0.001	0.003	16	0.0	
Margaritaria nobilis	0.001	0.004	20	0.1	
Calophyllum antillanum	0.304	1.395	21	29.3	
Nectandra coriacea	0.100	0.459	21	9.6	
Oxandra lanceolata	0.001	0.005	21	0.1	

Table. Cont.

FOREST TREE SPECIES	Phytomass (m^3)	SP	SN	SP x SN	CSI
Beilschmiedia pendula	0.002	0.008	22	0.2	
Pseudolmedia spuria	2.272	10.442	22	229.7	
Chionanthus domingensis	0.053	0.243	22	5.4	
Diospyros caribaea	1.199	5.513	23	126.8	
Pouteria chrysophyllifolia	0.001	0.003	23	0.1	
	21.754	100.000		1307.0	

In humid forest ecosystems CSI lower values mean that the forest plot is integrated mostly by pioneers and or exuberants while higher values mean that the forest plot is dominated by opportunists and/or austeres *sensu lato*. In a second step, the phytomass values for the considered species are grouped according to their particular strategies. In the example we use the Order VI strategies for HFE which include one to several successional numbers (SN) as showed in the column for "Grouped SN values" in the next table. Consequently, the strategies' proportions for each case are grouped as showed in the column "Strategy proportions in the plot" (next table).

Chosen Order VI Strategies	Grouped SN values	Strategy's proportions in the plot	Average Reproductive and Vegetative Variables for each Order VI Strategy										
			STR	SSZ	SWE	SFR	TOL	SHA	SCL	DEN	AFA	HEI	VOL
EPh	1 & 2	6.16	1	1	1	2	2	2	2	2	2	3	3
LPh	3 & 4	18.14	1	2	1	2	2	2	1	2	2	1	1
SPh	5	0.00	2	2	1	1	2	1	4	3	3	1	1
ESh	6 & 7	0.32	3	4	3	3	2	3	3	2	2	1	1
RSh	8 to 10	0.14	2	3	2	3	3	2	2	2	2	3	3
ROSh	11 & 12	18.91	3	3	3	3	3	2	3	2	1	3	3
IOSh	13 to 15	1.05	2	3	2	3	2	2	3	2	3	3	3
IASh	16 & 17	37.21	3	3	2	3	3	2	3	3	3	4	4
UASh	18 to 23	18.07	3	3	3	4	3	3	4	3	3	3	3
Total		100.00											

Once the "Strategies proportions in the plot" (third column in former table) are grouped, the resulting values are multiplied by the corresponding category (1 to 4) for each of the considered variables (average reproductive and vegetative variables for each Order VI Strategy in the former table). The results appear in the next table:

	STR	SSZ	SWE	SFR	TOL	SHA	SCL	DEN	AFA	HEI	VOL
EPh	6.2	6.2	12.3	12.3	12.3	12.3	12.3	12.3	12.3	18.5	18.5
LPh	18.1	36.3	18.1	36.3	36.3	36.3	18.1	36.3	36.3	18.1	18.1
SPh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESh	1.0	1.3	1.0	1.0	0.6	1.0	1.0	0.6	0.6	0.3	0.3
RSh	0.3	0.4	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.4	0.4
ROSh	56.7	56.7	56.7	56.7	56.7	37.8	56.7	37.8	18.9	56.7	56.7
IOSh	2.1	3.2	2.1	3.2	2.1	2.1	3.2	2.1	3.2	3.2	3.2
IASh	111.6	111.6	74.4	111.6	111.6	74.4	111.6	111.6	111.6	148.8	148.8
UASh	54.2	54.2	54.2	72.3	54.2	54.2	72.3	54.2	54.2	54.2	54.2
Σ	250.2	269.9	219.2	293.8	274.3	218.4	275.5	255.3	237.4	300.3	300.3
Σ/100	2.5	2.7	2.2	2.9	2.7	2.2	2.8	2.6	2.4	3.0	3.0
Rounded	3	3	2	3	3	2	3	3	2	3	3

Finally, the EKSA (ecosystem *K*-strategist area, in %) is estimated from rounded values at the table bottom using the same equation as for the strategy *K* area (SKA):

$$\text{EKSA} = \frac{\sum_{1}^{10}(\text{Var}_i * \text{Var}_{i+1}) + (\text{Var}_{11} * \text{Var}_1)}{(\text{MVA})^2 * \text{Nr.Vars}.}$$

The EKSA value in the given example from rounded values is 46.02%.

Appendix III-B. Estimation of ceno-successional index (CSI) and the ecosystem *K*-strategist area (EKSA, %) for a particular forest plot belonging to the DSE (dry and/or saline ecosystems) assembly.

Once the forest plot is examined and the trees heights and BHD (breath height diameters) are listed in a table, data are grouped by species and the trees phytomass (as trees volumes) estimated in m^3. For tree volume (V) the equation of a cylinder is considered to be $V = \pi r^2 h$, where r = BHD/2.

The following table gives a hypothetical example corresponding to a forest plot named "*Punta del Este*", localized in the Southeast of *Isla de la Juventud*, Western Cuba. SP refers to the species proportion, in %, with respect to the total phytomass for the plot (100%), SN refers to the successional number according to Figure 3 showing the strategies for dry and or saline ecosystems (DSE), SP x SN list the products resulting from multiplying SP and SN, and CSI (ceno-successional index) is estimated by dividing the products' total for the plot (SP x SN) by 100.

Punta del Este (Hypothetical example)

FOREST TREE SPECIES	Phytomass (m^3)	SP	SN	SP x SN	CSI
Cordia gerascanthus	1.00	5.85	8	46.78	
Ateleia apetala	1.00	5.85	15	87.72	
Simarouba glauca	0.90	5.26	16	84.21	
Citharexylum fruticosum	0.20	1.17	17	19.88	
Adelia ricinella	2.00	11.70	18	210.53	
Krugiodendron ferreum	0.50	2.92	18	52.63	
Lysiloma latisiliqua	1.20	7.02	19	133.33	
Swietenia mahagoni	2.00	11.70	20	233.92	20.12
Gymnanthes lucida	1.20	7.02	21	147.37	
Lysiloma sabicu	2.00	11.70	23	269.01	
Bursera simaruba	3.00	17.54	23	403.51	
Diospyros crassinervis	0.20	1.17	26	30.41	
Amyris balsamifera	1.60	9.36	26	243.27	
Guaiacum sanctum	0.30	1.75	28	49.12	
	17.10	100.00		2011.70	

In dry and/or saline ecosystems, CSI lower values mean that the forest plot is integrated mostly by pioneers and/or exuberants while higher values means that the forest plot is dominated by opportunists and/or austeres *sensu lato*. In a second step, the Phytomass values for the considered species are grouped according to their particular strategies. In the example we use the Order V strategies for DSE which include one to several successional numbers (SN) as showed in the column for "Grouped SN values" in the next table. Consequently, the strategies proportions in each case are grouped as showed in the column "Strategy proportions in the plot" (next table).

Chosen Order V Strategies	Grouped SN values	Strategy's proportions in the plot	Average Reproductive and Vegetative Variables for each Order VI Strategy										
			STR	SSZ	SWE	SFR	TOL	SHA	SCL	DEN	AFA	HEI	VOL
EPd	1 & 2	0.00	1	2	1	2	2	2	1	2	2	3	3
LPd	3 & 4	3.60	1	2	1	1	1	3	2	2	3	2	2
SPd	5 to 8	12.59	2	2	1	2	2	2	3	3	3	3	3
ESd	9 to 12	8.99	3	4	3	3	2	2	3	2	2	2	2
RSd	13 to 16	0.00	3	3	3	3	1	3	3	2	3	3	3
ROSd	17 to 19	21.05	3	3	2	3	1	3	3	3	3	3	3
IOSd	20 & 21	11.51	2	3	2	3	3	1	3	2	3	4	4
IASd	22 to 26	23.20	3	3	2	3	2	3	3	3	3	4	4
UASd	27 & 28	19.06	3	3	3	4	3	3	4	3	3	3	3
Total		100.00											

Once the "Strategies proportions in the plot" (third column in former table) are grouped, the resulting values are multiplied by the corresponding category (1 to 4) for each of the considered variables (average reproductive and vegetative variables for each Order V Strategy in the former table). The results appear in the next table:

	STR	SSZ	SWE	SFR	TOL	SHA	SCL	DEN	AFA	HEI	VOL
EPh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LPh	3.6	7.2	3.6	3.6	3.6	10.8	7.2	7.2	10.8	7.2	7.2
SPh	25.2	25.2	12.6	25.2	25.2	25.2	37.8	37.8	37.8	37.8	37.8
ESh	27.0	36.0	27.0	27.0	18.0	18.0	27.0	18.0	18.0	18.0	18.0
RSh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ROSh	63.2	63.2	42.1	63.2	21.1	63.2	63.2	63.2	63.2	63.2	63.2
IOSh	23.0	34.5	23.0	34.5	34.5	11.5	34.5	23.0	34.5	46.0	46.0
IASh	69.6	69.6	46.4	69.6	46.4	69.6	69.6	69.6	69.6	92.8	92.8
UASh	57.2	57.2	57.2	76.2	57.2	57.2	76.2	57.2	57.2	57.2	57.2
Σ	268.7	292.8	211.9	299.3	205.9	255.4	315.5	275.9	291.0	322.1	322.1
Σ/100	2.7	2.9	2.1	3.0	2.1	2.6	3.2	2.8	2.9	3.2	3.2
Rounded	3	3	2	3	3	2	3	3	2	3	3

Finally, the EKSA (ecosystem *K*-strategist area, in %) is estimated from rounded values at the table's bottom using the same equation as for the strategy *K* area (SKA):

$$\mathrm{EKSA} = \frac{\sum_{1}^{10}(\mathrm{Var}_i * \mathrm{Var}_{i+1}) + (\mathrm{Var}_{11} * \mathrm{Var}_1)}{(\mathrm{MVA})^2 * \mathrm{Nr.Vars.}}$$

The EKSA value in the given example from rounded values is 49.43%.

APPENDIX IV

Appendix IV-A. Clustering of species belonging to each of 23 Order VI strategies for humid (h) forest ecosystems. TD (taxonomic distance) values at each major differentiation tie are in underlined. SN, Successional Number; EPh, Early Pioneers; LPh, Late Pioneers; SPh, Sclerophyllous Pioneers; ESh, Exuberant Stabilizers; RSh, Restoring Stabilizers; ROSh & IOSh, Restoring & Invasive Opportunist Stabilizers; IASh & UASh, Invasive and Ultimate Austere Stabilizers. Pr, species preference for humid habitats (H) or being indifferent (I) to the habitat type.

SN	O-VI	TREE SPECIES	Pr	TD	SN	O-VI	TREE SPECIES	Pr	TD
1	EPh1	*Cecropia schreberiana*	I	0.56	7	ESh2	*Hymenaea courbaril*	H	0.42
		Heliocarpus americanus	H	0.80			*Micropholis polita*	H	0.87
		Ochroma lagopus	H	1.01			*Juglans insularis*	H	0.67
		Guazuma ulmifolia	I	0.76			*Mammea americana*	I	1.46
		Muntingia calabura	I	0.55	8	RSh1	*Bauhinia monandra*	I	1.28
		Spathodea campanulata	I	1.13			*Dendropanax arboreus*	H	1.04
		Trema micrantha	H	1.33			*Guarea guidonia*	H	1.18
2	EPh2	*Brunellia comocladifolia*	H	0.90			*Erythrina berteroana*	H	0.71
		Calycophyllum candidissimum	H	0.70			*Cordia collococca*	I	0.92
		Cyrilla racemiflora	H	0.98			*Plumeria obtusa*	I	1.07
		Casuarina equisetifolia	I	1.09			*Shefflera morotottonii*	H	0.59
		Psidium guajava	I	0.63			Gmelina arborea	I	1.20
		Tetrazygia bicolor	I	0.86			*Melia azedarach*	I	1.39
		Tabebuia angustata	H	0.43	9	RSh2	*Eugenia foetida*	I	1.29
		Tabebuia shaferi	H	1.21	10	RSh3	*Sloanea amygdalina*	H	0.71
		Miconia elata	H	1.54			*Sapium jamaicense*	H	0.90
3	LPh1	*Ficus subscabrida*	H	0.65			*Juniperus lucayana*	I	0.81
		Ficus cf. obtusifolia	H	1.03			*Guettarda elliptica*	I	0.98
		Ceiba pentandra	I	1.27			*Fraxinus cubensis*	H	1.25
4	LPh2	*Trichospermum grewiifolius*	H	0.93	11	ROSh1	*Roystonea regia*	I	0.62
		Talipariti elatum	I	1.05			*Tectona grandis*	I	0.84
		Erythrina poeppigiana	H	1.46			*Hura crepitans*	I	0.99
5	SPh	*Eucalyptus citriodora*	I	0.90			*Alchornea latifolia*	H	0.60
		Pinus caribaea	I	1.81			*Trophis racemosa*	H	0.84
6	ESh1	*Cedrela odorata*	I	0.58			*Diospyros philippensis*	H	0.93
		Zanthoxylum martinicense	I	0.88			*Guettarda combsii*	H	0.87
		Albizia procera	I	0.89			*Coccoloba diversifolia*	I	1.12
		Samanea saman	I	0.35	12	ROSh2	*Cinnamomum triplinerve*	H	0.53
		Enterolobium cyclocarpum	I	0.65			Ocotea leucoxylon	H	0.65
		Khaya nyassica	I	0.56			*Persea americana*	I	0.82
		Swietenia macrophylla	I	0.74			*Theobroma cacao*	H	0.56
		Spondias mombin	I	1.20			*Annona muricata*	I	0.96
		Cassia grandis	I	1.24			*Anacardium occidentale*	I	1.18
7	ESh2	*Prunus occidentalis*	H	0.72	13	IOSh1	*Maclura tinctoria*	I	0.70
		Carapa guianensis	H	0.89			*Albizia berteriana*	H	0.61
		Anacardium excelsum	H	0.56			*Zuelania guidonia*	I	0.89
		Sterculia apetala	I	0.69			*Cordia gerascanthus*	I	0.74
		Pouteria sapota	I	0.98			*Cordia alliodora*	I	0.93
		Mangifera indica	I	0.92			*Clusia rosea*	I	0.99
		Terminalia catappa	I	1.10	14	IOSh2	*Piscidia piscipula*	H	0.50
		Sideroxylon foetidissimum	I	0.83			*Savia sessiliflora*	I	0.60
		Decussocarpus rospigliosii	H	0.60			*Vitex divaricata*	I	0.74

Appendix IV-A. (cont.)

SN	O-VI	TREE SPECIES	Pr	TD	SN	O-VI	TREE SPECIES	Pr	TD
14	IOSh2	*Poeppigia procera*	H	0.49	20	UASh3	*Guettarda calyptrata*	I	0.50
		Abarema obovalis	I	0.60			*Bunchosia media*	I	0.18
		Caesalpinia violacea	I	0.36			*Coccoloba retusa*	I	0.29
		Swietenia mahagoni	I	0.78			*Sideroxylon salicifolium*	I	0.41
		Bucida buceras	H	0.59			*Faramea occidentalis*	I	0.66
		Chrysophyllum cainito	I	0.93			*Magnolia cubensis*	H	0.45
15	IOSh3	*Leucaena leucocephala*	I	0.62			*Talauma orbicularis*	H	0.53
		Albizia lebbeck	I	0.19			*Protium cubense*	H	0.71
		Trichilia hirta	I	0.42	21	UASh4	*Drypetes alba*	I	0.48
		Delonix regia	I	0.73			*Exothea paniculata*	I	0.21
		Bursera simaruba	I	1.09			*Oxandra lanceolata*	I	0.37
16	IASh1	*Allophylus cominia*	I	0.60			*Tamarindus indica*	I	0.40
		Cupania americana	I	0.43			*Chione cubensis*	H	0.37
		Cupania glabra	I	0.66			*Rheedia aristata*	H	0.54
		Chrysophyllum oliviforme	I	0.48			*Calophyllum antillanum*	I	0.37
		Syzygium jambos	H	0.77			*Nectandra coriacea*	I	0.63
		Coffea arabica	H	0.64			*Buchenavia capitata*	H	0.38
		Trichilia havanensis	H	0.85			*Guibourtia hymenifolia*	H	0.46
		Matayba apetala	H	0.77			*Andira inermis*	I	0.65
		Gymnanthes lucida	I	0.65	22	UASh5	*Sapindus saponaria*	H	0.34
		Citrus aurantium	I	0.98			*Prunus myrtifolia*	H	0.41
17	IASh2	*Erythroxylum areolatum*	I	0.45			*Licaria triandra*	H	0.46
		Picramnia pentandra	I	0.69			*Ocotea cuneata*	H	0.28
		Wallenia laurifolia	H	0.62			*Beilschmiedia pendula*	H	0.00
		Erythroxylum havanense	I	0.48			*Brosimun alicastrum*	H	0.36
		Erythroxylum confusum	I	0.77			*Oxandra laurifolia*	H	0.25
		Brya microphylla	I	0.55			*Pseudolmedia spuria*	H	0.58
		Comocladia dentata	I	0.28			*Chionanthus domingensis*	H	0.47
		Eugenia axillaris	I	0.47			*Manilkara zapota*	H	0.60
		Gliricidia sepium	I	0.93	23	UASh6	*Pera bumeliaefolia*	H	0.41
18	UASh1	*Terminalia intermedia*	I	0.37			*Cojoba arborea*	H	0.50
		Terminalia eryostachia	I	0.87			*Cynometra cubensis*	H	0.52
19	UASh2	*Lysiloma sabicu*	I	0.70			*Manilkara valenzuelana*	H	0.29
		Guatteria moralesi	H	0.77			*Diospyros caribaea*	H	0.33
20	UASh3	*Ehretia tinifolia*	I	0.50			*Manilkara jaimiqui*	H	0.37
		Zanthoxylum elephantiasis	H	0.40			*Pouteria dominigensis*	H	0.25
		Inga vera	H	0.42			*Pouteria dictyoneura*	H	-----
		Margaritaria nobilis	H	0.59					
		Podocarpus angustifolius	H	0.44					

Appendix IV-B. Clustering of species belonging to each of 28 Order V strategies for dry (d) and/or saline forest ecosystems. TD (taxonomic distance) values at each major differentiation tie are in underlined. SN, Successional Number; EPd, Early Pioneers; LPd, Late Pioneers; SPd, Sclerophyllous Pioneers; ESd, Exuberant Stabilizers; RSd, Restoring Stabilizers; ROSd & IOSd, Restoring & Invasive Opportunist Stabilizers; IASd & UASd, Invasive and Ultimate Austere Stabilizers. Pr, species preference for dry and/or saline habitats (DS) or being indifferent (I) to the habitat type.

SN	O-V	TREE SPECIES	Pr	TD	SN	O-V	TREE SPECIES	Pr	TD
1	EPd1	*Cecropia schreberiana*	I	1.00	12	ESd4	*Persea americana*	I	0.44
		Talipariti elatum	I	1.12			*Pouteria sapota*	I	1.47
		Guazuma ulmifolia	I	0.80	13	RSd1	*Melia azedarach*	I	1.18
		Muntingia calabura	I	0.66			*Avicennia germinans*	DS	1.02
		Spathodea campanulata	I	1.42			*Laguncularia racemosa*	DS	0.41
2	EPd2	*Bauhinia monandra*	I	1.23			*Rhizophora mangle*	DS	1.46
		Plumeria obtusa	I	0.55	14	RSd2	*Coccoloba uvifera*	DS	1.43
		Hamelia patens	DS	0.99	15	RSd3	*Ateleia apetala*	DS	0.58
		Luehea speciosa	DS	0.71			*Hippomane mancinella*	DS	0.81
		Thespesia populnea	DS	1.56			*Phyllostylon brasiliensis*	DS	0.58
3	LPd1	*Conocarpus erectus*	DS	1.50			*Pinus tropicalis*	DS	1.03
4	LPd2	*Ceiba pentandra*	I	0.98			*Genipa americana*	DS	1.30
		Ficus aurea	DS	1.17	16	RSd4	*Anacardium occidentale*	I	0.75
		Cedrela cubensis	DS	1.52			*Annona muricata*	I	1.08
5	SPd1	*Eugenia foetida*	I	1.38			*Bombacopsis cubensis*	DS	0.73
6	SPd2	*Psidium guajava*	I	0.70			*Simarouba glauca*	DS	1.23
		Tetrazygia bicolor	I	0.94	17	ROSd1	*Citharexylum fruticosum*	DS	0.66
		Pachyanthus cubensis	DS	1.34			*Cordia sebestena*	DS	0.62
7	SPd3	*Casuarina equisetifolia*	I	0.75			*Hebestigma cubense*	DS	0.50
		Eucalyptus citriodora	I	0.93			*Metopium brownei*	DS	0.81
		Pinus caribaea	I	1.16			*Polygala cuneata*	DS	0.51
8	SPd4	*Clusia rosea*	I	0.81			Picrodendron macrocarpum	DS	0.42
		Cordia gerascanthus	I	0.88			Quercus cubana	DS	0.71
		Cordia alliodora	I	0.75			*Ximenia americana*	DS	0.90
		Zanthoxylum martinicense	I	0.66			*Albizia cubana*	DS	0.57
		Zuelania guidonia	I	0.93			*Peltophorum adnatum*	DS	0.69
		Maclura tinctoria	I	1.67			*Celtis trinervia*	DS	1.05
9	ESd1	*Albizia procera*	I	0.93	18	ROSd2	*Byrsonima crassifolia*	DS	0.40
		Cedrela odorata	I	0.89			*Colubrina arborescens*	DS	0.55
		Enterolobium cyclocarpum	I	0.66			*Curatella americana*	DS	0.79
		Samanea saman	I	0.78			*Adelia ricinella*	DS	0.43
		Khaya nyassica	I	0.59			*Zanthoxylum fagara*	DS	0.52
		Swietenia macrophylla	I	1.08			*Krugiodendron ferreum*	DS	0.70
		Cassia grandis	I	1.27			*Belairia mucronata*	DS	0.93
10	ESd2	*Gmelina arborea*	I	1.21	19	ROSd3	*Alvaradoa amorphoides*	DS	0.71
11	ESd3	*Sideroxylon foetidissimum*	I	0.90			*Cassia ekmaniana*	DS	0.45
		Terminalia catappa	I	1.12			*Prosopis juliflora*	DS	0.58
12	ESd4	*Hura crepitans*	I	0.37			*Forestiera rhamnifolia*	DS	0.43
		Sterculia apetala	I	0.91			*Xylopia aromatica*	DS	0.52
		Tectona grandis	I	0.98			*Jacaranda coerulea*	DS	0.63
		Roystonea regia	I	0.63			*Lysiloma latisiliqua*	DS	0.49
		Calophyllum antillanum	I	0.50			*Pithecellobium lentiscifolium*	DS	0.70
		Chrysophyllum cainito	I	0.70			*Cameraria retusa*	DS	0.58
		Mammea americana	I	0.79			*Haematoxylum campechianum*	DS	0.84
		Cordia collococca	I	0.60			*Carpodiptera cubensis*	DS	1.13
		Spondias mombin	I	0.93	20	IOSd1	*Bursera simaruba*	I	1.03
		Mangifera indica	I	0.79					

Appendix IV-B. (Cont.)

SN	O-V	TREE SPECIES	Pr	TD	SN	O-V	TREE SPECIES	Pr	TD
21	IOSd2	*Albizia lebbeck*	I	0.20	26	IASd5	*Eugenia axillaris*	I	0.47
		Trichilia hirta	I	0.49			*Erythroxylum confusum*	I	0.39
		Delonix regia	I	0.70			*Erythroxylum alaternifolium*	DS	0.51
		Leucaena leucocephala	I	0.87			*Gliricidia sepium*	I	0.68
		Allophylus cominia	I	0.60			*Erythroxylum areolatum*	I	0.45
		Chrysophyllum oliviforme	I	0.66			*Picramnia pentandra*	I	0.84
		Cupania americana	I	0.45	27	UASd1	*Bunchosia media*	I	0.19
		Cupania glabra	I	0.81			*Coccoloba retusa*	I	0.38
		Gymnanthes lucida	I	0.68			*Sideroxylon salicifolium*	I	0.45
		Citrus aurantium	I	1.10			*Faramea occidentalis*	I	0.56
22	IASd1	*Guettarda elliptica*	I	0.85			*Guettarda calyptrata*	I	0.63
		Juniperus lucayana	I	1.08			Amyris balsamifera	DS	0.37
23	IASd2	*Caesalpinia violacea*	I	0.35			*Canella winterana*	DS	0.51
		Swietenia mahagoni	I	0.76			*Hypelate trifoliata*	DS	0.69
		Lysiloma sabicu	I	0.77			*Drypetes alba*	I	0.58
		Diospyros crassinervis	DS	1.01			*Exothea paniculata*	I	0.21
24	IASd3	*Coccoloba diversifolia*	I	0.99			*Oxandra lanceolata*	I	0.39
25	IASd4	*Ehretia tinifolia*	I	0.63			*Tamarindus indica*	I	0.46
		Vitex divaricata	I	0.72			*Nectandra coriacea*	I	0.74
		Abarema obovalis	I	0.42	28	UASd2	*Andira inermis*	I	0.57
		Bourreria succulenta	DS	0.38			*Terminalia eryostachia*	I	0.35
		Casasia calophylla	DS	0.57			*Swartzia cubensis*	DS	0.48
		Savia sessiliflora	I	0.51			*Terminalia intermedia*	I	0.42
		Bauhinia divaricata	DS	0.28			*Guaiacum officinale*	DS	0.62
		Casearia hirsuta	DS	0.85			*Chrysobalanus icaco*	DS	0.40
26	IASd5	*Brya microphylla*	I	0.52			*Ottoschulzia cubensis*	DS	0.46
		Erythroxylum havanense	I	0.63			*Guaiacum sanctum*	DS	-----
		Comocladia dentata	I	0.29					