

Supplementary Material

Appendix 1 - Botanical sources and references.

1. Systematics and nomenclature

Genera and species following: Instituto de Botánica Darwinion (**IBODA**). (2018). *Flora del Conosur. Catálogo de plantas vasculares*. Continuously updated. < <http://www2.darwin.edu.ar/Proyectos/FloraArgentina/FA.asp> >; further details in Zuloaga & Belgrano (2015), *Rodriguésia* 66(4): 989-1024.

Orders and Families updated following: Stevens PF (2001-). Angiosperm Phylogeny Website. Version 12, VII-2012 [± continuously updated since] < <http://www.mobot.org/MOBOT/research/APweb/> >

2. Sources used for botanical identification

2.1. Regional Floras

Antón AM & Zuloaga FO (dirs.). (2003-2008). *Flora Fanerogámica Argentina* (Fascículos 80-106). IMBIV - Programa PROFLOA. Disponibles (p.p.) < www.floraargentina.edu.ar > **Antón AM & Zuloaga FO** (dirs.) (2012 -onwards). *Flora Argentina. Plantas Vasculares de la República Argentina*. IBODA – IMBIV – INTA. **Arbo MM & Tressens SG** (eds.) (2002). *Flora del Iberá*. EUDENE, Univ. Nac. del Nordeste. **Brussa C & Grell I** (2007). *Flora arbórea del Uruguay -con énfasis en las especies de Rivera y Tacuarembó-*. COFUSA. **Burkart A** (dir.). (1969 -onwards). *Flora Ilustrada de Entre Ríos*. Colección Científica del INTA, Tomo VI. [Flora dirigida por A. Burkart: partes II y V; continuada por N. Troncoso y N. Bacigalupo: partes III y VI; y por N. Bacigalupo: parte IV]. **Cabrera AL** (dir.) (1963-1970). *Flora de la provincia de Buenos Aires*. Colección Científica del INTA, Tomo IV, partes I a VI. **Duré Rodas R & Molero Briones J** (2010). Lythraceae. En: Ramella L & Perret P(eds.), *Flora del Paraguay*. Publications Conservatoire Botanique de la Ville de Genève. 40:1-152. **Freire SE & Molina AM** (eds.) (2008). *Flora Chaqueña – Argentina (Chaco, Formosa y Santiago del Estero). Familia Compositae*. Colección Científica del INTA. **Freire SE**, Urtubey E, Sancho G, Bayón ND, Katinas L, Gutiérrez DG, Giuliano DA, Sáenz AA, Iharlegui L & Delucchi G (2006). Inventario de la biodiversidad vegetal de la provincia de Misiones: Asteraceae. *Darwiniana* 44(2): 375–452. **Hunziker TH** (dir.). (1995-2001). *Flora Fanerogámica Argentina, fascículos 1-79*. IMBIV - PROFLOA. Disponibles (p.p.) < www.floraargentina.edu.ar > **Hurrell JA** (dir.) (2008 -onwards) *Flora Rioplatense. Sistemática, ecología y etnobotánica de las plantas vasculares rioplatenses*. Parte 3 (Vols. 1 y 4) y 2 (Vol 7a). **Luchetti AM** (2001). Las Solanáceas de la Provincia de Santa Fe. *Nat. Neotrop.* 32(2), 111-132. **Luchetti AM** (2008). Claves para el reconocimiento de las especies santafesinas de Leguminosas Papilionoideas. *Nat. Neotrop.* 39 (1-2), 47-81. **Luchetti AM** (2014). Las Leguminosas Mimosoideas de la provincia de Santa Fe. *Nat. Neotrop.* 45(1-2), 21-43. **Marino et al.** (2006). **Novara LJ** (ed., dir.) (2012). *Flora del Valle de Lerma (edición digital). Aportes Botánicos de Salta - serie Flora*. Herbario MCNS. Facultad De Ciencias Naturales. Universidad Nacional de Salta < <http://cargocollective.com/novara> >

2.2. Taxonomic revisions

Bacigalupo NM (1979). El género *Callitriche* en la flora argentina. *Darwiniana* 22 (1-3), 377-396. **Barros M (1947a).** Cyperaceae: Scirpoideae: Hypolitreae - Cypereae - Scirpeae (Heleocharis, Scirpus). *Genera et Species Plantarum Argentinarum* (HR Descole dir.), IV (I). Kraft. **Barros M (1947b).** Cyperaceae: Scirpoideae (Scirpeae: Fimbristylis, Bulbostylis - Dichromena - Fuirena) – Rhynchosporoideae - Caricoideae. *Genera et Species Plantarum Argentinarum* (HR Descole dir.), IV (II). Kraft. **Cialdella AM (1989).** Revisión de las especies argentinas de *Polygonum* s.l. (Polygonaceae). *Darwiniana* 29(1-4): 179-246. **Cristóbal CL (2007)** Sterculiaceae del Paraguay. I. *Ayenia*, *Byttneria*, *Guazuma*, *Helicteres*, *Melochia* y *Sterculia*. *Bonplandia* 16 (1-2): 5-142. **Evrard C & Van Hove C (2004).** Taxonomy of the American *Azolla* species (Azollaceae): a critical review. *Syst. Geogr.Pl.* 74: 301-318. **Gutiérrez HF & Pensiero JF (1998).** Sinopsis de las especies argentinas del género *Bromus* (Poaceae). *Darwiniana* 35(1-4): 75-114. **Harley RM & Pastore JFB (2012).** A generic revision and new combinations in the Hyptidinae (Lamiaceae), based on molecular and morphological evidence. *Phytotaxa* 58(1), 1-55. **Heiden G, Iganci JRV & Macias L (2009).** *Baccharis* sect. Caulopterae (Asteraceae, Astereae) no Rio Grande do Sul, Brasil. *Rodriguésia* 60(4): 943-983. **Krapovickas A & Fryxell PA (2004)** Las especies sudamericanas de *Hibiscus* Secc. Furcaria DC.(Malvaceae-Hibisceae). *Bonplandia* 13 (1-4), 35-115. **Martínez-Crovetto RN (1949).** Las especies argentinas del género *Melothria* (Cucurbitaceae). *Darwiniana* 8 (4), 496-518. **Martínez-Crovetto RN (1964).** Las especies argentinas del género *Sicyos* (Cucurbitaceae). *Bonplandia*, 335-362. **O'Leary N & Múlgura ME (2012).** A taxonomic revision of the genus *Phyla* (Verbenaceae). *Ann. Missouri Bot. Gard.* 98(4), 578-596. **O'Leary N, Múlgura ME & Morrone O (2007).** Revisión taxonómica de las especies del género *Verbena* (Verbenaceae): serie Pachystachyae. *Ann. Missouri Bot. Gard.* 94(3), 571-621. **Ponce MM (1987).** Revisión de las Thelypteridaceae (Pteridophyta) argentinas. *Darwiniana* 28: 317-390. **Ponce MM (2007)** Sinopsis de las Thelypteridaceae de Brasil central y Paraguay. *Hoehnea* 34(3), 283-333. **Pometti CL, Cialdella AM, Vilardi JC & Saidman BO (2007)** Morphometric analysis of varieties of *Acacia caven* (Leguminosae, Mimosoideae): Taxonomic inferences in the context of other Argentinean species. *Pl. Syst. Evol.* 264(3-4), 239-249. **Rataj K (1970)** Alismataceae de la Republica Argentina. *Darwiniana* 16(1-2), 9-39. **Rúgolo de Agrasar ZE (2006)** Las especies del género *Deyeuxia* (Poaceae, Pooideae) de la Argentina y notas nomenclaturales. *Darwiniana* 44(1), 131-293. **Soraru SB (1972)** Revision de las Urticaceae de Argentina. *Darwiniana* 17: 246-325. **Toledo JM & Barboza GE (2005)** Novedades en *Physalis* (Solanaceae). *Kurtziana* 31(1-2), 69-85. **Turner BL & Cowan CC (1993)** Taxonomic overview of *Stemodia* (Scrophulariaceae) for South America. *Phytologia* 75(4), 281-324. **Zapater MA, Hoc PS, Lozano EC & Sühling SS (2014).** Delimitación de las especies argentinas del genero *Inga* (Mimosoideae) mediante técnicas numéricas. *Darwiniana* 2(2), 248-259. **Zuloaga FO (1989)** El género *Panicum* (Poaceae: Paniceae) en la Republica Argentina III. *Darwiniana* 29 (1-4), 289-370.

2.3. Floristic checklists (related to the study area)

Aceñolaza PG, Manzano A, Rodríguez E, Sánchez L, Ronchi AL, Giménez E, Demonte D & Marchetti ZY (2008). Biodiversidad de la región del complejo deltaico del Río Paraná. *Miscelánea-INSUGEO* 17 (1): 127-152. **Bosisio AC (2007)** Catálogo del Orden Glumiflorales representado en el Herbario del Museo Provincial de Ciencias Naturales “Florentino Ameghino” de Santa Fe. *Serie Catálogos* 20. **Bosisio AC (2007)** Catálogo de la Familia

Fabaceae representada en el Herbario del Museo Provincial de Ciencias Naturales “Florentino Ameghino” de Santa Fe. *Serie Catálogos 17*. **Bosisio AC (2012)**. Catálogo de la Familia Malvaceae representada en el Herbario del Museo Provincial de Ciencias Naturales “Florentino Ameghino” de Santa Fe. *Serie Catálogos 27*. **Bosisio AC & Martínez GH (2016)**. Catálogo de la familia Asteraceae representada en el Herbario del Museo Provincial de Ciencias Naturales “Florentino Ameghino” de Santa Fe. *Serie Catálogos 28*. **Cabrera ÁL, Crisci JV, Delucchi G, Freire SE, Giuliano DA, Iharlegui L, Katinas L, Sáenz AA, Sancho G & Urtubey E (2000)**. *Catálogo Ilustrado de las Compuestas (= Asteraceae) de la Provincia de Buenos Aires, Argentina: sistemática, ecología y usos*. ProBiota 1 - Cobiobo 2. **Casco SL (2003)**. *Poblaciones vegetales centrales y su variabilidad espacio-temporal en una sección del Bajo Paraná influenciada por el régimen de pulsos*. Tesis Doctoral. Univ. Nac. del Nordeste. **Eskuche UG (2004)**. *La vegetación de la vega del río Paraná medio superior, Argentina*. Folia Botanica et Geobotanica Correntesiana 17: 3-59. **Eskuche UG & Fontana JL (1996)**. *La vegetación de las islas argentinas del Alto Paraná. I. Las comunidades de bosque*. Folia Botanica et Geobotanica Correntesiana 12: 3-15. **Kiverling MA (2001)** Flora Fanerogámica de la Reserva Ecológica de la Ciudad Universitaria “Paraje El Pozo” Santa Fe, Argentina. Tesina de Lic. en Biodiversidad (FHUC - UNL). Dirs.: Pensiero JF & D’Angelo C. **Marchetti ZY (2011)**. *Patrones de distribución de la vegetación en un tramo de la planicie de inundación del Bajo Paraná*. Tesis Doctoral. Universidad Nacional de Cuyo. **Marino G & Pensiero JF (2006)**. Catálogo de árboles y arbustos de la provincia de Santa Fe. *Com. Museo Prov. Cs. Nat. Florentino Ameghino* 12 (1): 1-28. **Pensiero JF & Gutiérrez HF (coord) (2005)**. *Flora vascular de la provincia de Santa Fe, Argentina*. Ediciones UNL. **Ragonese AE (1941)** La vegetación de la Provincia de Santa Fe (República Argentina). *Darwiniana* 5, 369-416. **Rodríguez EE (2007)** *Catálogo florístico del Parque Nacional Pre-Delta (Entre Ríos, Argentina)*. Tesina de Lic. en Biología de Ecosistemas Acuáticos (FCyT - Univ. Autónoma de Entre Ríos). Dirs: Aceñolaza PG, de Dios Muñoz J. **Rodríguez EE, Senkman E & Aceñolaza PG (2006)**. Catálogo Florístico de una Reserva Ecológica Urbana: Islote Municipal, Paraná (Entre Ríos, Argentina). *Nat. Neotrop.*, 1(37), 67-75.

2.4. Exsiccata and ilustrations available on virtual herbaria –a few examples- (acronyms in bold and between brackets sensu Thiers B (2017) Index Herbariorum: A global directory of public herbaria and associated staff. New York Botanical Garden’s Virtual Herbarium. < <http://sweetgum.nybg.org/ih/> > [continuosly updated].

- **(CORD, CTES, SI)**: Iris database (Instituto Multidisciplinario de Biología Vegetal, Instituto de Botánica Darwinion, Instituto de Botánica del Nordeste) < <http://www.darwin.edu.ar/Herbario/Bases/BuscarIris.asp> > and images from **IBODA (2018)**.
- **(F)** Muestras Neotropicales de Herbario, Field Museum < <http://fm1.fieldmuseum.org> >.
- **(K)** The Herbarium Catalogue, Kew Botanical Garden < <http://www.kew.org/herbcat> >.
- **(NY)**: C.V. Starr Virtual Herbarium, New York Botanical Garden < <http://sweetgum.nybg.org/science/vh/> >.
- **(MO mainly)**: Tropicos < <http://www.tropicos.org> >.
- **(P)**: Bases de données de collections du Muséum national d’Histoire naturelle, MNHN, Paris. < <http://coldb.mnhn.fr/colweb/form.do?model=SONNERAT>.wwwsonnerat.wwwsonnerat.wwwsonnerat >.
- **(RB mainly)**: Flora do Brasil 2020/Reflora, Jardim Botânico do Rio de Janeiro. < <http://floradobrasil.jbrj.gov.br/> >

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- (103 Brasil herbaria from **ALCB** to **VIES**): Species link em Instituto Nacional de Ciência e Tecnologia Herbario Virtual da Flora e dos Fungos (INCT-HVFF, CNPq) < www.splink.org.br/index >

2.5. Live plants photos –a few examples–

- **Field Museum**, Neotropical Live Plant Photos< http://fm2.fieldmuseum.org/plantguides/color_images.asp >
- **González A.** (2017 continuously updated) *Fotos de flora nativa y adventicias de Uruguay* < <http://floranativadeuruguay.blogspot.com.ar/> >.
- **IBODA (2018).**
- **Radins JA** (continuously updated). *Flora de Misiones* < <http://florademisiones.blogspot.com.ar/> >.
- **UFRGS.** *Flora digital do Rio Grande do Sul e Santa Catarina*
<http://www.ufrgs.br/fitoecologia/florars/index.php?pag=buscar_mini.php >

Appendix 2 - Further details on R package and functions.

This is a summary of the statistic analysis using the R language. In the main text, one study per R-package was cited by using the `citation()` R-function. Here, the main functions and further references on the methods are given. Naturally, further details can be requested by e-mail to the first author.

Package `{coin}` used for two statistical tests

- The main functions used for the non-parametric tests were:
 - `wilcox_test (TOPO ~ FLUV, distribution = "exact", conf.int = TRUE)`
where TOPO is the vector (topographic elevation) and FLUV is a factor with 2 levels (the YI and OI classes).
 - `spearman_test (TOPO ~ EDAD)`
where TOPO and EDAD are the quantitative vectors (topographic elevation and persistence age of islands).
 - `spearman_test (HILL ~ EDAD)`

where HILL and EDAD are the quantitative vectors (forest hill numbers and island persistence ages). Six correlation tests were carried out, as HILL objects were six, i.e., three q-order (q=0, q=1, q=2) per site for each of the YI and OI classes.

- More references on the package/function arguments:
 - Hothorn T, Hornik K, Van De Wiel MA & Zeileis A (2006). A Lego system for conditional inference. *The American Statistician* 60 (3): 257-263.
 - Torsten Hothorn, Kurt Hornik, Mark A. van de Wiel, Achim Zeileis (2008). Implementing a Class of Permutation Tests: The coin Package. *Journal of Statistical Software* 28 (8), 1-23. [online 11 February 2019] URL: <http://www.jstatsoft.org/v28/i08/>
 - Hothorn T (2018). coin: Conditional Inference Procedures in a Permutation Test Framework. Package version 1.2-2. [online 11 February 2019] URL: <http://coin.r-forge.r-project.org/>

Package `{iNEXT}` used for species richness extrapolation curves

- The main function used was:

```
iNEXT(YI_OI, datatype="incidence_freq", size=NULL, endpoint=88, knots=40, se=TRUE, conf=0.95, nboot=999)
```

where YI_OI is the object: an incidence table made of 102 observations (101 species + 1 row of the sum of sampling units; see references) of two variables (the YI and OI classes).

- More references on the package/function arguments:
 - Chao A, Gotelli NJ, Hsieh TC, Sander EL, Ma KH, Colwell RK, Ellison AM (2014). Rarefaction and extrapolation with Hill numbers: a framework for sampling and estimation in species diversity studies. *Ecological Monographs* 84: 45-67.
 - Hsieh TC, Ma KH, Chao A (2016). iNEXT: an R package for interpolation and extrapolation of species diversity (Hill numbers). *Methods in Ecology and Evolution* 7(12): 1451-1456.

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- Hsieh TC, Ma KH, Chao A (2018). iNEXT: iNterpolation and EXTrapolation for species diversity. R package version 2.0.17 [online 11 February 2019] URL: <http://chao.stat.nthu.edu.tw/blog/software-download/>

Package {vegan} used for alpha diversity (effective number of species or Hill numbers)

- The main function used was:

```
renyi (sppAC, hill = T, scales = (0, 1, 2))
```

where sppAC was the object: a matrix of cover-abundance values of the 101 variables (species) in the 11 sites. The scales argument refers to the q values, in the example, the three values were those used in the correlation test with the {coin} pkg.

- More references on the package/function arguments:
 - Gotelli NJ, Chao A (2013). Measuring and estimating species richness, species diversity, and biotic similarity from sampling data. In: “Encyclopedia of Biodiversity vol. 5” (Levin S ed). Academic Press, Waltham, USA, pp. 195-211.
 - Hill MO (1973). Diversity and evenness: a unifying notation and its consequences. *Ecology* 54(2): 427-432.
 - Jost L (2006) Entropy and diversity. *Oikos* 113(2): 363-375.
 - Oksanen J, Blanchet FG, Friendly M, Kindt R, Legendre P, McGlenn D, Minchin PR, O'Hara RB, Simpson GL, Solymos P, Stevens MHH, Szoecs E, Wagner H (2018). *vegan*: Community Ecology Package. R package version 2.5-3. [online 11 February 2019] URL: <https://CRAN.R-project.org/package=vegan>

Package {betapart} used for beta diversity (Baselga approach)

- The main functions used were:

```
beta.pair(sppPA, index.family = "sorensen")  
beta.multi(sppPA_YI)  
beta.multi(sppPA_OI)
```

where sppPA was the full matrix of presence-absence values of the 101 species in the 11 sites. The sub-matrices of each of the YI and OI classes were sppPA_YI and sppPA_OI.

- More references on the package/function arguments:
 - Baselga A (2010). Partitioning the turnover and nestedness components of beta diversity. *Global Ecology and Biogeography* 19(1): 134-143.
 - Baselga A (2012). The relationship between species replacement, dissimilarity derived from nestedness, and nestedness. *Global Ecology and Biogeography* 21: 1223-1232
 - Baselga A & Orme CDL (2012). *betapart*: an R package for the study of beta diversity. *Methods in Ecology and Evolution*, 3(5): 808-812.
 - Baselga A, Orme CDL, Villeger S, De Bortoli J, Leprieur F (2018). *betapart*: Partitioning Beta Diversity into Turnover and Nestedness Components. R package version 1.5.1. [online 11 February 2019] URL: <https://CRAN.R-project.org/package=betapart>

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Note: the remaining analysis (not listed here) were made in PULSO and PC-Ord software, as specified in the main text methods.

Fig. S1 – Proportions of life forms. **(a)** Detailed biological spectrum considering all the forests; in green tones the herbaceous life forms and in brown tones the woody ones. **(b)** Proportion of particular life forms considering all the forests: trees, annual herbs, climbers and aquatic herbs (<25%) and their complement. **(c)** Proportion of particular life-forms considering each forest in the chronological series of islands (left) and groups of islands according to age ranges (right).

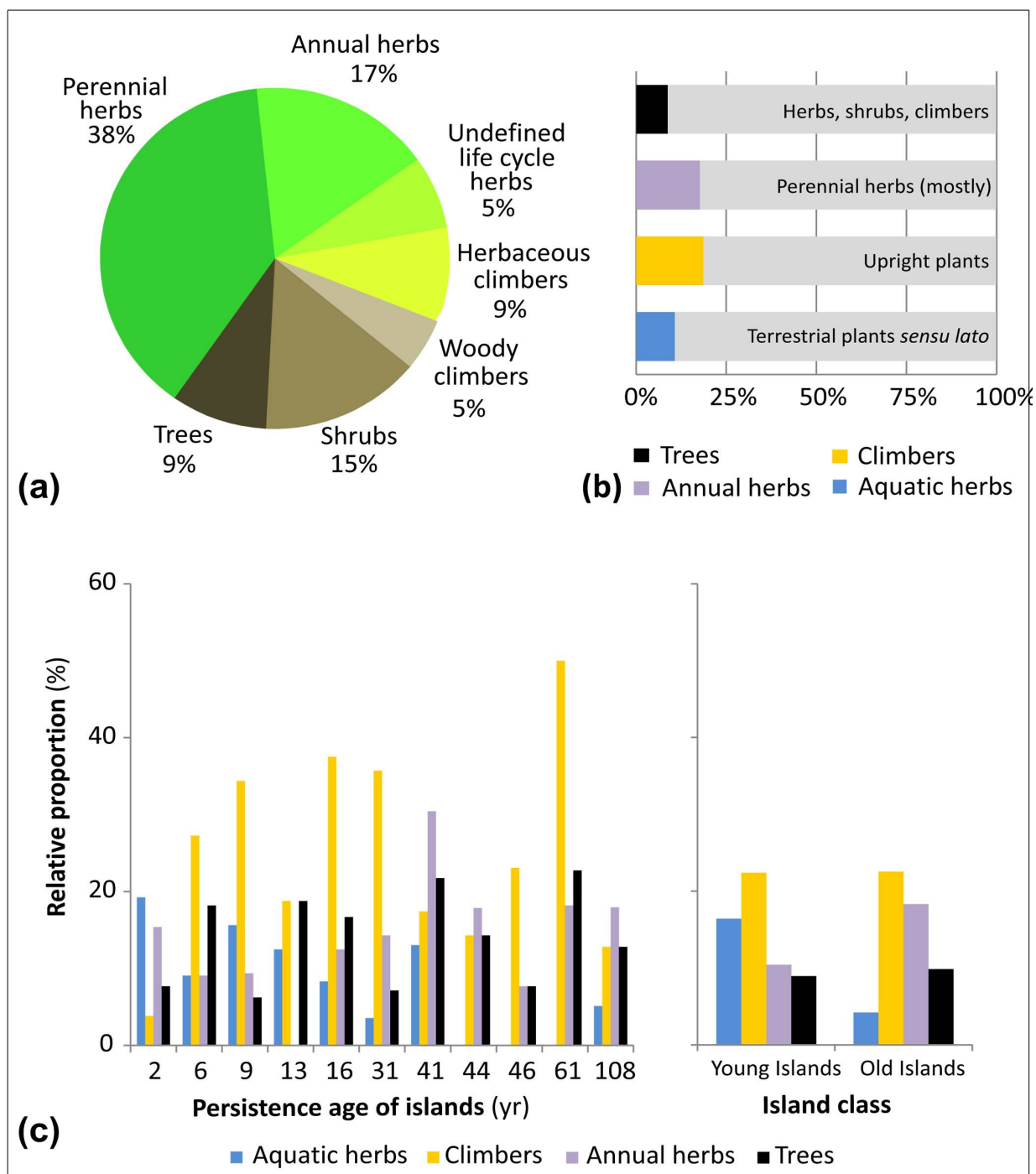


Fig. S2 - Field photos and remarkable features of forests in the oldest bar of each of the Young Islands (YI).

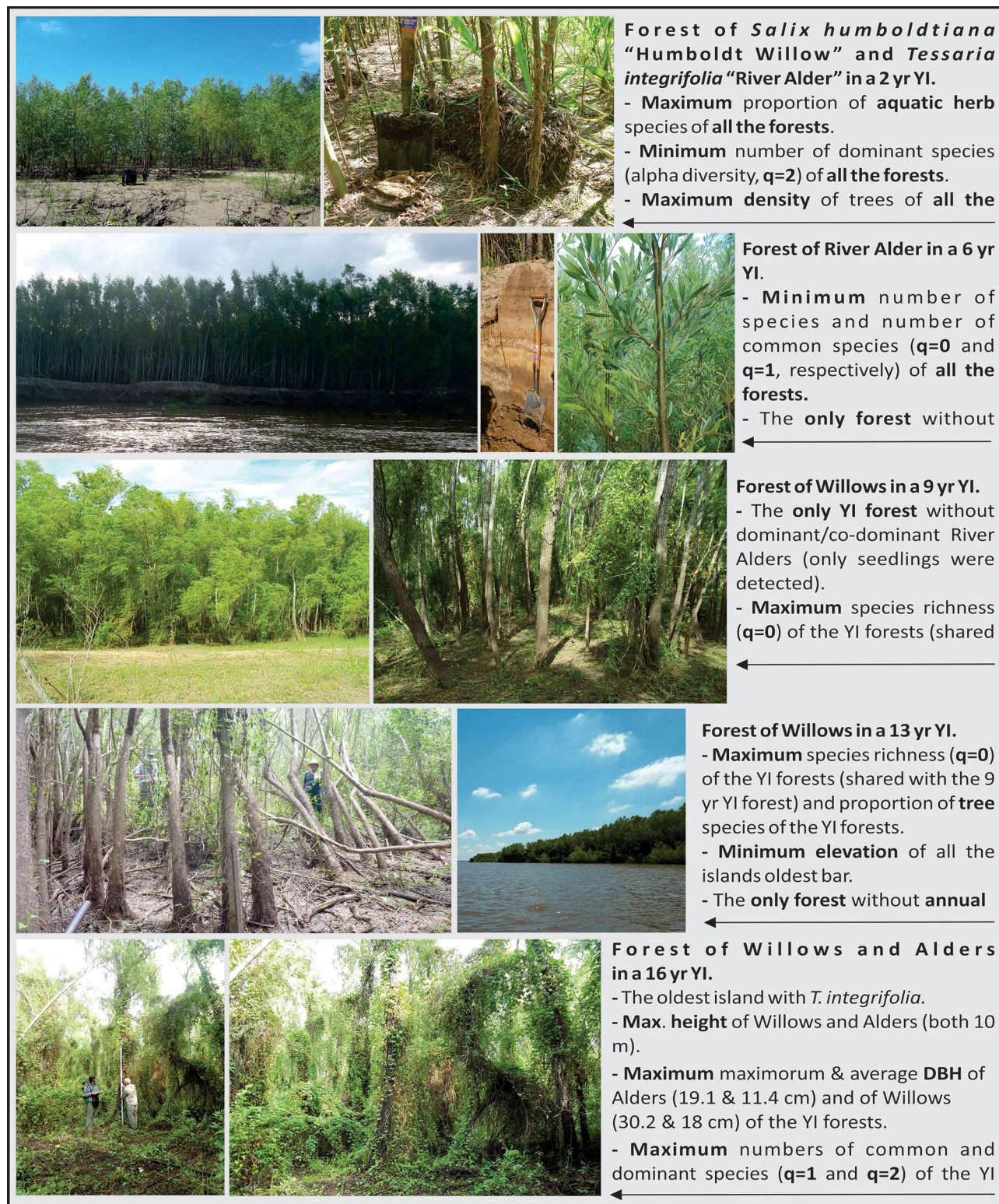


Fig. S3 - Field photos and remarkable features of forests in the oldest bar of each of the Old Islands (OI).



Tab. S1 - Cartographic and satellite imagery sources (see Abbreviations below the Table). The persistence age column shows the source used to estimate the year of colonisation of the oldest bar of each island. The remaining images from those colonization years until the present were used to check such persistence.

Source	Date (yyyy [/mm/dd])	River Level (HHPP)	Persistence age
L-OLI	2015/01/02	3.39 m	
L-OLI	2014/01/15	2.43 m	
m-DG-GE	2013/10/02	2.34 m	Oldest bar colonisation in the 2 yr old YI
m-DG-GE	2013/04/15	3.28 m	
m-DG-GE	2012/12/22	2.66 m	
L-TM	2011/01/16	2.69 m	
m-DG-GE	2009/07/15	2.27 m	Oldest bar colonisation in the 6 yr old YI
L-TM	2009/04/07	2.22 m	
m-DG-GE	2006/01/16	2.74 m	Oldest bar colonisation in the 9 yr old YI
m-DG-GE	2005/12/11	2.68 m	
L-TM	2004/09/16	1.84 m	
m-DG-GE	2002/08/12	2.65 m	Oldest bar colonisation in the 13 yr old YI
L-TM	1999/12/08	1.94 m	Oldest bar colonisation in the 16 yr old YI
L-TM	1995/12/29	2.08 m	
L-TM	1991/09/29	1.99 m	
L-TM	1986/02/19	1.88 m	
L-EVI	1984 to 2015	Lw	
r-IGN	1984/08/16	2.84 m	Oldest bar colonisation in the 31 yr OI
L-MSS	1981/06/17	2.8 m	
L-MSS	1977/09/18	1.85 m	
r-IGN	1974/02/07	2.02 m	Oldest bar colonisation in the 41 yr OI
L-MSS	1972/08/30	2.11 m	
Bathym	1971/10 to 11	0.6-1.35 m	Oldest bar colonisation in the 44 yr OI
C-nav-1969	1969	Lw	Oldest bar colonisation in the 46 yr OI
ap-IGN	1965/08/22	2.93 m	
ap-IGN	1954	Lw	Oldest bar colonisation in the 61 yr OI
C-nav-1939	1939	Lw	
C-nav-1913	1913	Lw	
Comp-nav	1908, -13, -18, -22, -36, -43	Lw	
C-nav-1907	1907	Lw	Oldest bar colonisation in the 108 yr OI
C-nav-1847	1847	Lw	

Abbreviations (Source column): Bat = Bathymetry from a state agency of Argentina (specifically *Dirección Nacional de Construcciones Portuarias y Vías Navegables, Secretaría de Obras Públicas*) surveyed in October-November of 1971. Scale 1:5,000. C-nav-1847= Navigation chart from HMS Philomel, Royal Navy, UK. Scale 1:84,000. C-nav-1907 = Navigation chart from a state agency of Argentina, published in 1907.

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Scale 1:100,000. C-nav-1913 = Navigation chart from a state agency of Argentina (specifically *Dirección General de Obras Hidráulicas, Ministerio de Obras Públicas*), published in 1913. Scale 1:100,000. C-nav-1939 = Navigation chart from a state agency of Argentina (specifically *Dirección General de Navegación y Puertos, Ministerio de Obras Públicas*), published in 1939. Scale 1:100,000. C-nav-1969 = Navigation chart from a state agency of Argentina (specifically *Dirección Nacional de Construcciones Portuarias y Vías Navegables, Secretaría de Obras Públicas*), published in 1969. Scale 1:50,000. Co-nav = comparative navigation charts (years 1908, 1913, 1918, 1922, 1936, 1943) from a state agency of Argentina. Scale 1:250,000. L-EVI = Landsat 4, 5, 7, and 8 EVI (Enhanced Vegetation Index) composite, available on Google Earth Engine < <https://explorer.earthengine.google.com> >. L-MSS = Landsat satellite imagery, Multispectral Scanner sensor. 80m of spatial resolution. L-OLI = Landsat satellite imagery - Operational Land Imager sensor. 30m of spatial resolution. L-TM = Landsat satellite imagery - Thematic Mapper sensor. 30m of spatial resolution. m-DG-GE = DigitalGlobe© mosaics, available on Google Earth. Ca. 0.6-2 m of spatial resolution. Ap-IGN = Aerial photography from a state agency of Argentina (specifically *Instituto Geográfico Nacional*). Ca. 6 m of spatial resolution. Other abbreviations: HHPP = Hydrometric Height of the Paraná River (or river level) in the Paraná city gauge station. Lw = low water phase; although the exact hydrometric heights of the sources were unknown, only those images where emergent bars are distinguished (i.e. a signal of the low water phase) were analyzed. OI = Old Islands. YI = Young Islands.

Tab. S2 - Floristic checklist of the registered *taxa* arranged systematically. It is noteworthy to add that the majority of the 101 species and genera belong to four orders (Poales, Asterales, Lamiales and Solanales) and six families (Asteraceae, Poaceae, Solanaceae, Fabaceae, Cyperaceae, Malvaceae). **Abbreviations:** **YI/OI:** presence (x) in forests of the oldest bar of Young/Old Islands. **Frequency (%):** Relative percentual frequency of each species, considering all the forests. **Categ:** categories of the 4 particular life forms analyzed (**Aq** = aquatic herbs *sensu stricto.*; **an** = annual life cycle herbs; **T** = trees; **C** = climbing) or a noteworthy geographic distribution (**nN** = Non Neotropical, i.e. non native/exotic species in the Middle Paraná floodplain; **e**: endemic species for the Southern Cone of South America). (*) The asterisks denote another 6 species registered outside the sampling plot (but within the same landform), excluded from the analysis.

<i>Taxa</i>	YI	OI	Frequency (%)	Categ.
MONILOPHYTA				
POLYPODIALES				
Thelypteridaceae				
<i>Thelypteris</i> sp.	x		5	
SALVINIALES				
Salviniaceae				
<i>Azolla filiculoides</i> Lam.	x		2	Aq
ANGIOSPERMS MONOCOTS				
ALISMATALES				
Alismataceae				
<i>Sagittaria montevidensis</i> Cham. & Schldtl.	x		9	Aq
COMMELINALES				
Commelinaceae				
<i>Commelina diffusa</i> Burm. f.	x	x	21	C
Pontederiaceae				
<i>Eichhornia crassipes</i> (Mart.) Solms	x		5	Aq
POALES				
Cyperaceae				
* <i>Cyperus imbricatus</i> Retz.	*			
<i>Carex tweediana</i> Nees		x	2	e
<i>Cyperus eragrostis</i> Lam.	x	x	9	
<i>Cyperus pohlii</i> (Nees) Steud.	x		14	
<i>Cyperus</i> sp.#69	x	x	36	
<i>Eleocharis</i> sp. #88	x	x	21	
Juncaceae				
<i>Juncus</i> sp.	x		5	
Poaceae				
<i>Acroceras zizanioides</i> (Kunth) Dandy		x	7	

<i>Taxa</i>	YI	OI	Frequency (%)	Categ.
<i>Bromus catharticus</i> Vahl			2	
<i>Cynodon dactylon</i> (L.) Pers.	x	x	23	an, nN
<i>Deyeuxia viridiflavescens</i> (Poir.) Kunth		x	7	
<i>Echinochloa polystachya</i> (Kunth) Hitchc.		x	9	Aq
<i>Eragrostis hypnoides</i> (Lam.) Britton, Stern & Poggenb.	x		9	an
<i>Hymenachne amplexicaulis</i> (Rudge) Nees	x		7	Aq
<i>Leptochloa fusca</i> (L.) Kunth ssp. <i>uninervia</i> (J. Presl) N.W. Snow	x		2	
<i>Lousiella elephantipes</i> (Nees ex Trin.) Zuloaga	x		14	Aq
* <i>Panicum dichotomiflorum</i> Michx.	*			
<i>Paspalum inaequivalve</i> Raddi	x		2	
<i>Setaria parviflora</i> (Poir.) Kerguelen		x	30	
<i>Steinchisma laxa</i> (Sw.) Zuloaga	x	x	41	
LILIALES				
Smilacaceae				
<i>Smilax campestris</i> Griseb.	x		2	C
ANGIOSPERMS Magnoliids				
LAURALES				
Lauraceae				
<i>Nectandra angustifolia</i> (Schrad.) Nees & Mart. ex Nees		x	27	T, e
ANGIOSPERMS EUDICOTS				
APIALES				
Apiaceae				
<i>Cyclospermum leptophyllum</i> (Pers.) Sprague		x	27	an
<i>Hydrocotyle bonariensis</i> Lam.	x	x	23	Aq
ASTERALES				
Asteraceae				
<i>Acmella decumbens</i> (Sm.) R.K. Jansen	x		2	
<i>Ageratum conyzoides</i> L.		x	5	an
<i>Baccharis penningtonii</i> Heering	x		2	e
<i>Baccharis salicifolia</i> (Ruiz & Pav.) Pers.	x	x	18	
<i>Bidens subalternans</i> DC		x	14	an
<i>Cirsium vulgare</i> (Savi) Ten.		x	7	an, nN
<i>Conyza bonariensis</i> (L.) Cronquist		x	7	an
<i>Eclipta prostrata</i> (L.) L.	x	x	11	an
<i>Erechtites hieraciifolius</i> (L.) Raf. ex DC. var. <i>cacalioides</i> (Fisch. ex Spreng.) Griseb.		x	9	an, E
<i>Gamochaeta calviceps</i> (Fernald) Cabrera		x	2	
<i>Melanthera latifolia</i> (Gardner) Cabrera	x	x	9	an
<i>Mikania cordifolia</i> (L. f.) Willd.	x	x	48	C

<i>Taxa</i>	YI	OI	Frequency (%)	Categ.
<i>Mikania periplocifolia</i> Hook. & Arn.	x	x	43	C
<i>Sphagneticola brachycarpa</i> (Baker) Pruski		x	16	
<i>Tessaria integrifolia</i> Ruiz & Pav.	x		39	T
<i>Urolepis hecatantha</i> (DC.) R.M. King & H. Rob.		x	21	an
BORAGINALES				
Boraginaceae				
* <i>Heliotropium indicum</i> L.		*		
CARYOPHYLLALES				
Amaranthaceae				
<i>Alternanthera kurtzii</i> Schinz ex Pedersen		x	5	
<i>Alternanthera philoxeroides</i> (Mart.) Griseb.	x		7	Aq
<i>Dysphania ambrosioides</i> (L.) Mosyakin & Clemants	x	x	14	
<i>Stellaria media</i> (L.) Cirillo	x		2	an, nN
Polygonaceae				
<i>Polygonum persicaria</i> L.	x	x	41	an, nN
<i>Polygonum punctatum</i> Elliott	x	x	16	Aq, an
CUCURBITALES				
Cucurbitaceae				
<i>Cayaponia</i> sp.	x		18	C
* <i>Melothria candolleana</i> Cogn.		*		
<i>Sicyos polyacanthus</i> Cogn.		x	5	an, C
FABALES				
Fabaceae				
<i>Albizia inundata</i> (Mart.) Barneby & J.W. Grimes	x	x	21	T
<i>Erythrina crista-galli</i> L.	x	x	16	T
* <i>Inga uraguensis</i> Hook. & Arn.		*		e
<i>Mimosa pigra</i> L.	x	x	16	
<i>Sesbania virgata</i> (Cav.) Pers.	x	x	18	
<i>Vachellia caven</i> (Molina) Seigler & Ebinger		x	5	T
<i>Vigna luteola</i> (Jacq.) Benth.	x	x	16	C
GENTIANALES				
Apocynaceae				
<i>Funastrum clausum</i> (Jacq.) Schltr.	x		11	C
Rubiaceae				
* <i>Cephalanthus glabratus</i> (Spreng.) K. Schum.		*		
LAMIALES				
Lamiaceae				
<i>Cantinoa mutabilis</i> (Rich.) Harley & J.F.B. Pastore		x	30	
<i>Leonurus japonicus</i> Houtt.		x	2	an, nN
*Cf. <i>Stachys gilliesii</i> Benth.				

<i>Taxa</i>	YI	OI	Frequency (%)	Categ.
<i>Teucrium vesicarium</i> Mill.	x	x	52	
Plantaginaceae				
<i>Callitriche</i> sp.	x		2	an
<i>Plantago tomentosa</i> Lam.			2	
<i>Scoparia montevidensis</i> (Spreng.) R.E. Fr.	x		7	
Cf. <i>Stemodia lanceolata</i> Benth.	x		2	
Verbenaceae				
<i>Lippia alba</i> (Mill.) N.E. Br. ex Britton & P. Wilson	x	x	30	
<i>Phyla nodiflora</i> (L.) Greene var. <i>reptans</i> (Kunth) Moldenke	x	x	30	C
<i>Verbena</i> sp.	x		2	
MALPIGHIALES				
Euphorbiaceae				
<i>Croton urucurana</i> Baill.		x	48	T
<i>Euphorbia serpens</i> Kunth		x	2	
<i>Ricinus communis</i> L.		r	7	nN
<i>Sapium haematospermum</i> Müll. Arg.	x		7	T
Passifloraceae				
<i>Passiflora misera</i> Kunth	x	x	16	C
Salicaceae				
<i>Salix humboldtiana</i> Willd.	x	x	89	T
MALVALES				
Malvaceae				
<i>Abutilon grandifolium</i> (Willd.) Sweet	x		2	
<i>Byttneria filipes</i> Mart. ex K. Schum.		x	9	C
<i>Hibiscus striatus</i> Cav.	x		5	
<i>Modiolastrum malvifolium</i> (Griseb.) K. Schum.		x	5	
<i>Sida rhombifolia</i> L.		x	7	
MYRTALES				
Lythraceae				
<i>Cuphea racemosa</i> (L. f.) Spreng. var. <i>palustris</i> Lourteig	x	x	32	
Onagraceae				
<i>Ludwigia bonariensis</i> (Micheli) H. Hara	x		2	
<i>Ludwigia elegans</i> (Cambess.) H. Hara	x	x	27	
<i>Ludwigia peploides</i> (Kunth) P.H. Raven	x		9	Aq
OXALIDALES				
Oxalidaceae				
<i>Oxalis paludosa</i> A. St.-Hil.	x		2	
RANUNCULALES				
Ranunculaceae				

<i>Taxa</i>	YI	OI	Frequency (%)	Categ.
<i>Clematis montevidensis</i> Spreng.		x	5	C
ROSALES				
Moraceae				
<i>Morus alba</i> L.	x	x	21	T, nN
Urticaceae				
<i>Parietaria debilis</i> G. Forst.		x	11	an
<i>Urera aurantiaca</i> Wedd.		x	21	C
SAXIFRAGALES				
Haloragaceae				
<i>Myriophyllum aquaticum</i> (Vell.) Verdc.	x		2	Aq
SOLANALES				
Convulvulaceae				
Cf. <i>Ipomoea indica</i> (Burm. f.) Merr.	x	x	14	C
<i>Ipomoea alba</i> L.	x		7	C
<i>Ipomoea cairica</i> (L.) Sweet	x	x	18	C
Solanaceae				
<i>Cestrum</i> sp.		x	5	
<i>Physalis pubescens</i> L. var. <i>pubescens</i>			2	an
<i>Physalis viscosa</i> L.		x	2	
<i>Solanum amygdalifolium</i> Steud.	x	x	23	C, e
<i>Solanum glaucophyllum</i> Desf.	x		2	
<i>Solanum pilcomayense</i> Morong	x	x	23	
<i>Solanum viarum</i> Dunal	x	x	23	
VITALES				
Vitaceae				
<i>Cissus palmata</i> Poir.	x	x	21	C
<i>Cissus verticillata</i> (L.) Nicolson & C.E. Jarvis	x	x	21	C

Tab. S3 - Species list of the Young Island forests according to the Species Indicator Analysis (ordered from low to high p-values). Abbreviations: IV = observed indicator value; the Mean IV, standard deviations of the IV (S Dev IV) and P values refer to randomized groups (4999 permutations).

Species	IV	Mean IV	S Dev IV	P
<i>Tessaria integrifolia</i>	1	0.266	0.187	0.0032
<i>Eragrostis hypnoides</i>	0.655	0.272	0.164	0.058
<i>Hymenachne amplexicaulis</i>	0.655	0.275	0.167	0.0616
<i>Cyperus eragrostis</i>	0.707	0.258	0.195	0.0642
<i>Panicum elephantipes</i>	0.5	0.232	0.211	0.1678
<i>Juncus</i> sp.	0.5	0.232	0.211	0.1678
<i>Eichhornia crassipes</i>	0.5	0.241	0.212	0.1762
<i>Scoparia montevidensis</i>	0.5	0.238	0.212	0.1768
<i>Ludwigia peploides</i>	0.5	0.238	0.212	0.1768
<i>Mikania periplocifolia</i>	0.577	0.275	0.166	0.1868
<i>Sapium haematospermum</i>	0.5	0.244	0.213	0.1906
<i>Hibiscus striatus</i>	0.5	0.242	0.213	0.1912
<i>Funastrum clausum</i>	0.5	0.242	0.213	0.1912
<i>Alternanthera philoxeroides</i>	0.5	0.242	0.213	0.1912
<i>Eleocharis</i> sp. #88	0.446	0.252	0.195	0.244
<i>Cayaponia</i> sp.	0.446	0.256	0.197	0.2521
<i>Verbena</i> sp.	0.333	0.315	0.016	0.4325
<i>Ludwigia bonariensis</i>	0.333	0.315	0.016	0.4325
<i>Leptochloa fusca</i> ssp. <i>uninervia</i>	0.333	0.315	0.016	0.4325
Cf. <i>Stemodia lanceolata</i>	0.333	0.315	0.016	0.4325
<i>Callitriche</i> sp.	0.333	0.315	0.016	0.4325
<i>Acmella decumbens</i>	0.333	0.315	0.016	0.4325
<i>Smilax campestris</i>	0.333	0.316	0.016	0.4521
<i>Paspalum inaequivalve</i>	0.333	0.316	0.016	0.4521
<i>Ipomoea alba</i>	0.333	0.316	0.016	0.4521
<i>Thelypteris</i> sp.	0.333	0.316	0.016	0.4575
<i>Oxalis paludosa</i>	0.333	0.316	0.016	0.4575
<i>Baccharis penningtonii</i>	0.333	0.316	0.016	0.4575
<i>Azolla filiculoides</i>	0.333	0.316	0.016	0.4575
<i>Abutilon grandifolium</i>	0.333	0.316	0.016	0.4575
<i>Solanum glaucophyllum</i>	0.333	0.316	0.016	0.4621
<i>Sagittaria montevidensis</i>	0.333	0.316	0.016	0.4621
<i>Myriophyllum aquaticum</i>	0.333	0.316	0.016	0.4621
<i>Cyperus pohlii</i>	0.259	0.269	0.163	0.5347
<i>Morus alba</i>	0.259	0.277	0.168	0.5533
<i>Cissus palmata</i>	0.259	0.272	0.162	0.5551

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Species	IV	Mean IV	S Dev IV	P
<i>Af. Ipomoea indica</i>	0.259	0.273	0.163	0.5579
<i>Passiflora misera</i>	0.267	0.262	0.182	0.5719
<i>Solanum pilcomayense</i>	0.101	0.257	0.18	1
<i>Albizia inundata</i>	0.101	0.26	0.183	1
<i>Vigna luteola</i>	0.069	0.255	0.194	1
<i>Solanum amygdalifolium</i>	0.069	0.25	0.189	1
<i>Polygonum punctatum</i>	0.069	0.247	0.189	1
<i>Mimosa pigra</i>	0.069	0.25	0.19	1
<i>Ludwigia elegans</i>	0.069	0.254	0.191	1
<i>Cynodon dactylon</i>	0.069	0.253	0.193	1
<i>Cissus verticillata</i>	0.069	0.248	0.194	1
<i>Melanthera latifolia</i>	0.043	0.235	0.213	1
<i>Erythrina crista-galli</i>	0.043	0.238	0.213	1
<i>Cyperus</i> sp. #69	0.043	0.235	0.212	1

Tab. S4 - Species list of the Old Island forests according to the Species Indicator Analysis (ordered from low to high p-values). Abbreviations: IV = observed indicator value; the Mean IV, standard deviations of the IV (S Dev IV) and P values refer to randomized groups (4999 permutations).

Species	IV	Mean IV	S Dev IV	P
<i>Croton urucurana</i>	1	0.266	0.187	0.0032
<i>Mikania cordifolia</i>	0.655	0.273	0.164	0.0554
<i>Teucrium vesicarium</i>	0.655	0.273	0.165	0.059
<i>Nectandra angustifolia</i>	0.707	0.256	0.193	0.0606
<i>Cantinoa mutabilis</i>	0.707	0.258	0.195	0.0642
<i>Sphagneticola brachycarpa</i>	0.707	0.257	0.196	0.0652
<i>Setaria parviflora</i>	0.707	0.257	0.196	0.0652
<i>Cyclosporum leptophyllum</i>	0.707	0.257	0.196	0.0652
<i>Commelina diffusa</i>	0.634	0.262	0.183	0.0786
<i>Phyla nodiflora</i> var. <i>reptans</i>	0.634	0.26	0.183	0.0796
<i>Byttneria filipes</i>	0.577	0.273	0.165	0.1824
<i>Urolepis hecatantha</i>	0.577	0.274	0.166	0.1858
<i>Urera aurantiaca</i>	0.577	0.275	0.166	0.1868
<i>Solanum viarum</i>	0.471	0.263	0.184	0.2494
<i>Modiolastrum malvifolium</i>	0.447	0.232	0.212	0.4445
<i>Bidens subalternans</i>	0.447	0.232	0.212	0.4445
<i>Salix humboldtiana</i>	0.333	0.316	0.016	0.4535
<i>Acacia caven</i>	0.447	0.236	0.213	0.4535
<i>Parietaria debilis</i>	0.447	0.239	0.213	0.4617
<i>Alternanthera kurtzii</i>	0.447	0.239	0.213	0.4621
<i>Hydrocotyle bonariensis</i>	0.314	0.245	0.19	0.5301
<i>Polygonum persicaria</i>	0.259	0.274	0.166	0.5437
<i>Sesbania virgata</i>	0.314	0.254	0.196	0.5445
<i>Dysphania ambrosioides</i>	0.314	0.256	0.194	0.5571
<i>Lippia alba</i>	0.259	0.273	0.163	0.5579
<i>Cuphea racemosa</i> var. <i>palustris</i>	0.267	0.262	0.18	0.5715
<i>Sida rhombifolia</i>	0.302	0.316	0.016	1
<i>Sicyos polyacanthus</i>	0.302	0.316	0.016	1
<i>Ricinus communis</i>	0.302	0.316	0.016	1
<i>Plantago tomentosa</i>	0.302	0.316	0.016	1
<i>Physalis viscosa</i>	0.302	0.316	0.016	1
<i>Leonurus japonicus</i>	0.302	0.316	0.016	1
<i>Gamochoeta calviceps</i>	0.302	0.316	0.016	1
<i>Euphorbia serpens</i>	0.302	0.316	0.016	1
<i>Erechtites hieracifolius</i> var. <i>cacalioides</i>	0.302	0.316	0.016	1

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Species	IV	Mean IV	S Dev IV	P
<i>Echinochloa polystachya</i>	0.302	0.316	0.016	1
<i>Deyeuxia viridiflavescens</i>	0.302	0.316	0.016	1
<i>Conyza bonariensis</i>	0.302	0.316	0.016	1
<i>Clematis montevidensis</i>	0.302	0.316	0.016	1
<i>Cirsium vulgare</i>	0.302	0.316	0.016	1
<i>Cestrum</i> sp.	0.302	0.316	0.016	1
<i>Carex tweediana</i>	0.302	0.316	0.016	1
<i>Bromus catharticus</i>	0.302	0.316	0.016	1
<i>Ageratum conyzoides</i>	0.302	0.316	0.016	1
<i>Acroceras zizanioides</i>	0.302	0.316	0.016	1
<i>Ipomoea cairica</i>	0.151	0.276	0.166	1
<i>Eclipta prostrata</i>	0.151	0.274	0.167	1
<i>Baccharis salicifolia</i>	0.151	0.27	0.162	1
<i>Steinchisma laxa</i>	0.069	0.255	0.197	1
