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Supplementary information

Ecological network complexity scales with area

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SUPPLEMENTARY INFORMATION:

Ecological network complexity scales with area

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Content

Supplementary Text 1. Dataset specification. Description of different aspects of the datasets used to build networks across spatial scales (i.e. Network-Area Relationships), including locations, area sizes, and sampling methodologies. Datasets are presented grouped into the spatial categories used in the main text: regional and biogeographical. The name that has been assigned to each dataset is given in brackets and that will be used in the appendices which follow.

REGIONAL SPATIAL DOMAIN

1-3. Plant-pollinator and host-parasite interaction networks in Mediterranean scrubland in the Garraf Natural Park, Catalunya, Spain. (Garraf PP, Garraf PP2, Garraf HP)

Three independent datasets were collected within this same area. These are identified by numbers in each section. 1 & 2 = Plant-pollinator networks, 3 = Host-parasite networks.

- **Study area:** Garraf Natural Park, Catalunya, Spain
- **Interaction types:** Plant-pollinator and host-parasite (Cavity-nesting bee/wasps and their cleptoparasites, parasitoids and nest predators) interactions.
- **Type of system:** Mediterranean scrubland.
- **Number and extent of replicated patches:**

  1) 40 local patches of the same size (40x30 m) within a homogeneous landscape connected through dispersal. Total area: 40 km^2. Distance between patches: 520 to 1440 m.

  2) 21 local patches of the same size (40x40 m) within a homogeneous landscape connected through dispersal. Total area: 32 km^2. Distance between patches: 585 to 1345 m.

  3) 25 local patches. Total area: 33 km^2. Distance between patches: 585 to 1354 m.

- **Number of networks:** 1 plant-pollinator or 1 host-parasitoid network per patch. This yields a total of 86 networks
- **Type of networks:** Bipartite.
- **Taxonomic resolution of the nodes:** Species level.
- **Total number of species and links at the regional scale:**

  1) 170 pollinator and 24 plant species. 3577 individual contacts spread across a total of 325 inter-specific interactions.

  2) 303 pollinator and 23 plant species. However, information on interactions available only for 200 species. 900 interactions.

  3) 41 host and 26 parasite species. 654 individuals parasitized spread across a total 72 inter-specific interactions.

- **Sampling procedure (of species and interactions):**

  Plant-pollinator interactions:

  1) Counted number of visits per open flower by each pollinator species.

  2) Sampled pollinator and plant species. Interactions inferred from interactions observed during four years in other plots within the same landscape.

  Host-parasite interactions:

  3) Nests of bees and wasps collected with trap-nests. Hosts and parasites reared from each nest. Interactions quantified as the number of cells of each host species attacked by each parasite species.

Publication references:

1) Reverté S., Bosch J., Arnan X., Roslin T., Stefanescu C., Calleja J. A., Molowny-Horas R., Hernández-Castellano C., Rodrigo A. 2019. Spatial variability in a plant-pollinator community across a continuous habitat: high heterogeneity in the face of apparent uniformity. *Ecography* 42: 1–11, 2019. doi: 10.1111/ecog.04498

2) Unpublished.

3) A. Torné-Noguera, X. Arnan, A. Rodrigo, J. Bosch. 2020. Spatial variability of hosts, parasitoids and their interactions across a homogeneous landscape. *Ecology & Evolution* 10: 3696-3705.

4. Host-parasite interaction networks within a mosaic of forest/agricultural landscape in Olot, Catalunya, Spain. (Olot)

- **Study area:** Olot, Catalunya, Spain
- **Interaction types:** Host-parasite (Cavity-nesting bee/wasps and their associated parasites) interactions
- **Type of system:** Mosaic landscape of mixed forest and extensive agricultural land
- **Number and extent of replicated patches:** 14 local patches. Total area: 100 km^2. Distance between patches 1.4 to 13 km.
- **Number of networks:** 1 host-parasite network per patch. This yields a total of 14 networks
- **Type of networks:** Bipartite
- **Taxonomic resolution of the nodes:** Species level.
- **Total number of species and links at the regional scale:** 29 host and 20 parasitoid species. 1695 contacts (cells parasitized) spread across a total of 80 inter-specific interactions.

- **Sampling procedure (of species and interactions):** Nests of bees and wasps collected with trap-nests. Hosts and parasites reared from each nest. Interactions quantified as the number of cells of each host species attacked by each parasite species.

Publication reference:

S. Osorio, X. Arnan, E. Bassols, N. Vicens, J. Bosch. 2015. Local and landscape effects in a host–parasitoid interaction network along a forest–cropland gradient. *Ecological Applications* 25: 1869–1879.

5. Plant-pollinator interaction networks within dense forest in Montseny Natural Park, Catalunya, Spain. (Montseny)

- **Study area:** Montseny Natural Park, Catalunya, Spain
- **Interaction types:** Plant-pollinator interactions
- **Type of system:** Local patches (clearings) within a dense forest matrix
- **Number and extent of replicated patches:** 18 local patches of the same size (25x25 m). Total area: 18.7 km^2. Distance between patches 550 to 2050 m.
- **Number of networks:** 1 plant-pollinator network per patch. This yields a total of 18 networks
- **Type of networks:** Bipartite.
- **Taxonomic resolution of the nodes:** Species level.
- **Total number of species and links at the regional scale:** 194 pollinator and 61 plant species. 8605 individual flower visits distributed among a total 873 unique inter-specific interactions.
- **Sampling procedure (of species and interactions):** Counted number of visits per open flower by each pollinator species.
- **Publication reference:** C. Hernández-Castellano, A. Rodrigo, J. M. Gómez, C. Stefanescu, J. A. Calleja, S. Reverté, J. Bosch. 2020. A new native plant in the neighborhood: effects on plant-pollinator networks, pollination and plant reproductive success. *Ecology* doi.org/10.1002/ecy.3046

6. Plant-pollinator networks in Nahuel Huapi National Park, Argentina. (Nahuel)

- **Study area:** Nahuel Huapi National Park and surrounding areas in Neuquén and Río Negro provinces, Argentina
- **Interaction types:** Plant-pollinator interactions (flower visits).
- **Type of system:** Eight sites with native temperate forest, four grazed with domestic cattle and four ungrazed, located in an area of ca. 20x50 km.
- **Number and extent of replicated patches:** Eight sites of 6-12 ha.
- **Number of networks:** 8, one per site.
- **Type of networks:** Bipartite

- **Taxonomic resolution of the nodes:** Species level
- **Total number of species and links at the regional scale:** 14 plants, 90 pollinators, 164 links, 5285 flower visits.
- **Sampling procedure (of species and interactions):** Data were collected throughout one flowering season, with weekly sampling of each site (a pair of sites per day), with multiple 5 min observation periods per site and date. Interactions were determined by observed visits to flowers. Links are quantified as the total number of visits recorded in the study.
- **Publication reference:** Vázquez, D. P. & Simberloff, D. 2003. Changes in interaction biodiversity induced by an introduced ungulate Ecology Letters, 6, 1077-1083

7. Trophic marine intertidal networks in the Sanak Archipelago, Alaska. (Sanak)

- **Study area:** The Sanak Archipelago lies in the Eastern Aleutian Islands, south of the Alaska Peninsula, in the North Pacific Ocean.
- **Interaction types:** Trophic interactions.
- **Type of system:** The coastline contains a mix of semi-exposed rocky intertidal habitats interspersed with protected sedimented and boulderstrewn shores.
- **Number and extent of replicated patches:** The data used consists of 339 quadrants of $0.25m^2$ along 39 transects that were laid across the intertidal zones around the Sanak Islands. Transects spanned the entire intertidal zone, and were placed perpendicular to the shoreline at 300m intervals.
- **Number of networks:** 1 food web per quadrant (i.e. 339 local food webs).
- **Type of networks:** Food webs.
- **Taxonomic resolution of the nodes:** Nodes span the entire range from species to phyla. Taxa were identified to the lowest possible resolution in the field. Some taxa were lumped into groups.
- **Total number of species and links at the regional scale:** 100 species and 502 links.
- **Sampling procedure (of species and interactions):** direct observation of the species presences. To determine interactions between species, mixture of direct observation, gut content analysis, stable isotope analysis, literature searches and discussion with experts.
- **Publication reference:** Wood, S. A., Russell, R., Hanson, D., Williams, R. J., & Dunne, J. A. (2015). Effects of spatial scale of sampling on food web structure. *Ecology and evolution*, *5*(17), 3769-3782.

8. Trophic marine intertidal networks in the Bristol Channel, UK. (Bristol)

- **Study area:** Four study sites composed by archipelagos of salt marsh islands located in the intertidal mudflats along the Bristol Channel in the southwest of England.
- **Interaction types:** Plant-pollinator, plant-herbivore, predator-prey interactions.

- **Type of system:** salt marsh islands located in four archipelagos on intertidal mudflats.
- **Number and extent of replicated patches:** 39 small salt marsh islands of 0.2–2 m^2 in size. Larger islands were excluded to be able to treat the data as replicates of the same size.
- **Number of networks:** 1 food web per island (i.e. 39 food webs)
- **Type of networks:** Food webs.
- **Taxonomic resolution of the nodes:** Species level.
- **Total number of species and links at the regional scale:** 57 species and 175 links.
- **Sampling procedure (of species and interactions):** direct observation of the species presences. To determine interactions between species, mixture of direct observation, gut content analysis, stable isotope analysis, literature searches and discussion with experts.
- **Publication reference:** Montoya, D., Yallop, M. L., & Memmott, J. (2015). Functional group diversity increases with modularity in complex food webs. *Nature communications*, *6*, 7379.

9. Host-specific gallers and leaf-miners in pedunculate oaks in Finland. (Quercus)

- **Study area:** natural communities of specialist insect-herbivores and their natural enemies on the pedunculate oak, *Quercus robur* in the southwest coast of Finland.
- **Interaction types:** Host-parasitoid interactions (host-specific gallers and leaf-miners in pedunculate oaks)
- **Type of system:** Naturally fragmented landscape of oak trees in the archipelago of SW Finland.
- **Number and extent of replicated patches:** 22 oak trees.
- **Number of networks:** 1 per tree (i.e. 22 networks).
- **Type of networks:** Bipartite.
- **Taxonomic resolution of the nodes:** Species level.
- **Total number of species and links at the regional scale:** 85 species and 135 links.
- **Sampling procedure (of species and interactions):** sampling was conducted three times in 2006: in May-June, in late July, and in September in 2006. During each sampling event, a standardized volume of foliage (30 half-meter branches per tree) was collected with the aid of a pole pruner, and all galls and leaf-mines present were recorded. Interactions were quantified by rearing of predators.
- **Publication reference:** Kaartinen, R., & Roslin, T. (2011). Shrinking by numbers: landscape context affects the species composition but not the quantitative structure of local food webs. *Journal of Animal Ecology*, *80*(3), 622-631.

10-16. Soil food webs (Soil 1-7)

- **Study area:** managed agroecosystems on sandy soils across The Netherlands. Seven independent datasets were collected within this same area.

- **Interaction types:** Trophic interactions.

- **Type of system:**
  - 19 Scots pine forests, used for traditional agroforestry.
  - 10 certified organic grasslands (including mixed and bio-dynamic regimes), using compost/farmyard manure and no biocides, averaging 60 ha.
  - 19 conventional farms, using mineral fertilisers, with a much smaller amount of farmyard manure, averaging 45 ha.
  - 20 semi-intensive farms, using both organic and mineral fertilisers, averaging 25 ha.
  - 19 intensive farms, using biocides and fertilisers, averaging 20 ha.
  - 28 multi-cropping fields, averaging 63 ha.
  - 10 abandoned meadows.

- **Number and extent of replicated patches:** see above.
- **Number of networks:** 1 network per site: 125 networks.
- **Type of networks:** Soil food webs.
- **Taxonomic resolution of the nodes:** genus level.
- **Total number of species and links at the regional scale:**
  - 130 species; 2647 links
  - 181 species; 5174 links
  - 136 species; 3609 links
  - 144 species; 3888 links
  - 103 species; 2177 links
  - 101 species; 2002 links
  - 102 species; 2044 links

- **Sampling procedure (of species and interactions):**

  Microarthropods were collected in a randomized block design and their four-fold cores (diameter 5.8×5 cm) were kept separate until behavioural extraction using the Tullgren high-gradient canister method with a low wattage bulb.

  Enchytraeids were sampled using six-fold cores (diameter 5.8×15 cm, 6 rings of 2.5 cm height each), extracted using wet funnel extraction, identified, measured and counted. Lumbricids were recovered manually, identified, weighted and counted.

  Nematodes were extracted from 100 g soil using elutriation, sieving and cottonwool extraction. All individuals within two clean 10 ml water suspensions were screened, counted with a stereomicroscope and fixed in 4% formaldehyde. Per sample, at least 150 individuals were identified at genus level by light microscopy (400–600×) and assigned to feeding habits.

Soil community structure was described using food-web data with *M* (dry body mass in μg), *N (animals/m²)* and *B* (dry biomass in μg/ m^2, i.e. log(*B*)=log(*N*)+log(*M*)). A guild-lumped web was established for each site by taking the sub-predation-matrix determined by the trophic guilds that were present. The presence or absence, but not the quantitative extent, of consumer–resource links was established using additional information from the literature.

- **Publication reference:** Mulder C, Den Hollander HA, Hendriks AJ (2008) Aboveground herbivory shapes the biomass distribution and flux of soil invertebrates. PLoS ONE 3(10): e3573. https://doi.org/10.1371/journal.pone.0003573

17-18. Plant-pollinator and host-parasitoid interaction networks on fragmented calcareous grasslands of Germany. (Gottin PP, Gottin HP)

Two independent datasets were collected within this same area.

- **Study area:** Göttingen, central Germany
- **Interaction types:** Plant-pollinator and host-parasitoid interactions
- **Type of system:** Calcareous grassland. Semi-natural habitat of high conservation value due to their high biodiversity (plants and insects in particular). These grasslands are heavily fragmented due to agricultural landscape simplification and intensification.
- **Number and extent of fragments:** 11 fragments. Area size of fragments ranged from 314–1,133 m². Extra available sites of varying sizes were excluded to be able to treat the data as replicates of the same size.
- **Number of networks:** 1 plant-pollinator and 1 host-parasitoid network per fragment. This yields a total of 22 networks.
- **Type of networks:** Bipartite
- **Taxonomic resolution of the nodes:** Species level in most cases (some hosts or parasitoids identified to genus level and then assigned to morphospecies).
- **Total number of species and links at the regional scale:** 227 plant-pollinator interactions among 119 species. 55 host-parasitoid interactions among 48 parasitoid species.
- **Sampling procedure (of species and interactions):**

  Plant-pollinator networks: Flower visitors (wild bees and hoverflies; assumed to be pollinators of visited plants) were sampled via four five-minute-transect walks six times from April to September 2004 within a 4 m corridor. Data from the 5-min-transects of all six sampling events were pooled per grassland fragment. Specimens were either identified on the wing or caught with a net and identified in the lab. The plant species visited was recorded for each specimen.

Host-parasitoid networks: Parasitoids/parasites and hosts were sampled using trap nests at the same sites. Trap nests consisted of bundles of reed internodes of common reed *Phragmites australis* (about 150–180 reed internodes of 2–10 mm diameter in plastic tubes of 10 cm diameter per trap nest) exposed at a height of 100–120 cm. Depending on the fragment size, 4–6 wooden posts with 2 trap nests each were used: 4 posts (8 trap nests) in 11 small fragments, 5 posts (10 trap nests) in 13 medium fragments, 6 posts (12 trap nests) in eight large fragments. The trap nests were spread regularly over study sites and exposed at the beginning of the flowering period (mid-April) until autumn (beginning October). Afterwards, trap nests were stored in a climate chamber at 4°C and occupied reed internodes were opened. For each nest, the number of brood cells and number of parasitized cells were recorded. We identified host and parasitoid identities to genus or species level as far as possible using larvae and nest characteristics. Because *Osmia rufa* overwinter as adults, these cocoons were opened to check for parasitoids. All other nests were stored separately in test tubes closed with a wad of cotton wool. Tubes were exposed to room temperature (ca. 20°C) to end diapause. Reared adults were identified to species level.

- **Publication reference:** Grass, I., Jauker, B., Steffan-Dewenter, I., Tscharntke, T., & Jauker, F. (2018). Past and potential future effects of habitat fragmentation on structure and stability of plant–pollinator and host–parasitoid networks. *Nature ecology & evolution*, 1.

19. Plant-leafminer-parasitoid networks from central Argentina. (Chaco)

- **Study area:** Chaco Serrano District in Argentina, belonging to the most extensive dry forest in South America. The characteristic vegetation is low, open woodland, with a tree layer, shrubs, herbs and grasses, and many vines and epiphytic bromeliads.
- **Interaction types:** Plant-herbivore-parasitoid interactions
- **Type of system:** Woodland sites in a fragmented semi-natural landscape. The woodlands are mainly used for cattle grazing, and are embedded in an agricultural matrix largely dominated by wheat in winter and soy or maize in summer.
- **Number and extent of sites:** 12 woodland sites ranging in area size from 0.13ha to 3.58ha. Extra available sites of varying sizes were excluded to be able to treat the data as replicates of the same size.
- **Number of networks:** 12 networks, one per site.
- **Type of networks:** Unipartite.
- **Taxonomic resolution of the nodes:** Species level.
- **Total number of species and links at the regional scale:** 349 species and 753 links.
- **Sampling procedure (of species and interactions):** At each site, all mined leaves detected were collected along five 50 long, 2 m wide and 2 m high transects (100 m2) in two occasions (November-December 2002 and February-March 2003) within peak period of leafminer activity. Mined leaves were taken to the laboratory and reared adult leafminers and parasitoids, which were identified and counted.

- **Publication reference:** Cagnolo, L., Salvo, A., & Valladares, G. (2011). Network topology: Patterns and mechanisms in plant-herbivore and host-parasitoid food webs. *Journal of Animal Ecology, 80*(2), 342-351. Retrieved from http://www.jstor.org/stable/41059064

BIOGEOGRAPHICAL SPATIAL DOMAIN

1-2. Plant-herbivore and host-parasitoid interactions observed on willow tree species (*Salix* spp.) across Europe (Kopelke et al. Ecology 2017) (Salgal, Galpar)

- **Study area:** Europe - from Italy in the south to Northern Norway
- **Interaction types:** Plant-herbivore and host-parasitoid interactions
- **Type of system:** Different habitats where species belonging to the Salix genus are found
- **Number and extent of sites:** 641 sites. Area size of sites varied between 0.01 and 1 ha depending on the size of individual trees
- **Number of networks:** 1 plant-herbivore and 1 host-parasitoid network per tree. This yields a total of 641 networks of each type.
- **Type of networks:** Bipartite
- **Taxonomic resolution of the nodes:** Trees and herbivores are resolved to the species level. All trees belong to the Salix genus. All herbivores are galling sawflies. Parasitoids are sometimes resolved to the genus level.
- **Total number of species and links at the regional scale:** 52 species of trees from the Salix genus, 96 species of sawflies (herbivores), and 126 parasitoid taxa.
- **Sampling procedure (of species and interactions):** Collection and counting of galls produced by the galling sawflies on the trees to identify the herbivore species, and rearing of parasitoids in the laboratory to identify them.
- **Publication reference:** Kopelke, J. P., Nyman, T., Cazelles, K., Gravel, D., Vissault, S., & Roslin, T. (2017). Food-web structure of willow-galling sawflies and their natural enemies across Europe. *Ecology*, *98*(6), 1730-1730.

3-14. Trophic interactions between terrestrial vertebrates across Europe (unpublished). (Alpine, Anatolian, Arctic, Atlantic, Black Sea, Boreal, Continental, Mediterranean, Pannonian, Steppic)

- **Study area:** Europe - from Portugal in the west to the Ural Mountains in the east and from Iceland in the north to the Mediterranean Sea in the south. Divided into 10 biogeographical regions: Alpine, Anatolian, Arctic, Atlantic, Black Sea, Boreal, Continental, Mediterranean, Pannonian, Steppic.
- **Interaction types:** Trophic interactions.
- **Type of system:** All terrestrial habitats and biogeographical regions in Europe

- **Number and extent of sites:** Maps of the European bioregions were divided in 10x10 km cells. The number of cells varied among bioregions and were always of the same size.
- **Number of networks:** 1 trophic network per aggregation of cells from 1 to the maximum number of cells per bioregion
- **Type of networks:** Unipartite
- **Taxonomic resolution of the nodes:** All terrestrial vertebrates were resolved to the species level
- **Total number of species and links at the regional scale:** 1140 species and 69724 links at the European level, without dividing by biogeographical regions.
- **Sampling procedure (of species and interactions):** Species distribution maps were obtained from expert knowledge and models of habitat cover (as explained in Maiorano et al. 2013) and interactions were collected from literature records (including atlas, books and research articles) and expert knowledge.
- **Publication reference:** Maiorano, L., Montemaggiori, A., Ficetola, G.F., O'connor, L. and Thuiller, W., (2020). TETRA-EU 1.0: A species-level trophic metaweb of European tetrapods. *Global Ecology and Biogeography*, *29*(9), pp.1452-1457

15. Trophic interactions between terrestrial vertebrates in the Pyrenees. (Pyrenees)

- **Study area:** southeastern slopes of the Pyrenees (Iberian Peninsula side), from the highest creeks in the centre of the mountain range to the Mediterranean Sea in the east, covering a region of 900000 ha with elevations between 255 and 3140 m.a.s.l.
- **Interaction types:** Trophic interactions.
- **Type of system:** All terrestrial habitats.
- **Number and extent of sites:** 92 cells of 10x10 km.
- **Number of networks:** 1 trophic network per aggregation of cells from 1 to the maximum number of cells (i.e. 92 food webs).
- **Type of networks:** Unipartite
- **Taxonomic resolution of the nodes:** All terrestrial vertebrates were resolved to the species level.
- **Total number of species and links at the regional scale:** 212 species and 846 interactions.
- **Sampling procedure (of species and interactions): Species presence/absence was extracted** from public databases and extensive bibliography search. Interactions were inferred based on species co-occurrence in space and habitat.
- **Publication reference:** Lurgi, M., López, B. C., & Montoya, J. M. (2012). Novel communities from climate change. *Philosophical Transactions of the Royal Society of London B: Biological Sciences*, *367*(1605), 2913-2922.

Supplementary Table 1. Power function fit for the relationship of each network property analysed with area size for each dataset. P-value significance is shown by: ° < 0.1, *<0.05, ** < 0.01, *** < 0.001. We used nonlinear least squares (NLS) with the 'nls' function in R. The scaling functions described in Table S4 were fitted to each dataset. In the *Model* column the best ranked model based on AIC comparison is shown. For all models selected $R^2 > 0.95$. A) Regional spatial domain. B) Biogeographical spatial domain.

A) REGIONAL SPATIAL DOMAIN

Dataset	**Property**	**Param.**	**Estimate**	**Std. Error**	***t*-value**	**Model**
Gottin HP	species	z	0.615	0.0200	30.134***	Extended Power model 1
Gottin HP	species	d	0.027	0.0101	2.4174**	Extended Power model 1
Chaco	species	z	0.505	0.0089	51.29***	Extended Power model 1
Chaco	species	d	0.118	0.0059	16.546***	Extended Power model 1
Garraf PP	species	z	0.750	0.009	72.259***	Extended Power model 1
Garraf PP	species	d	0.044	0.0023	15.701***	Extended Power model 1
Garraf PP2	species	z	0.451	0.0045	97.316***	Extended Power model 1
Garraf PP2	species	d	0.094	0.0023	36.640***	Extended Power model 1
Bristol	species	z	0.242	0.006	40.059***	Extended Power model 1
Bristol	species	d	0.143	0.004	29.369***	Extended Power model 1
Montseny	species	z	0.595	0.009	68.559***	Extended Power model 1
Montseny	species	d	0.050	0.0034	18.303***	Extended Power model 1
Soil 1	species	z	0.324	0.009	33.927***	Extended Power model 1
Soil 1	species	d	0.071	0.007	9.487***	Extended Power model 1
Soil 2	species	z	0.362	0.0065	57.112***	Extended Power model 1
Soil 2	species	d	0.091	0.0060	15.440***	Extended Power model 1
Soil 3	species	z	0.365	0.0038	90.792***	Extended Power model 1
Soil 3	species	d	0.095	0.0027	31.425***	Extended Power model 1
Soil 4	species	z	0.375	0.005	67.439***	Extended Power model 1
Soil 4	species	d	0.098	0.0037	23.282***	Extended Power model 1
Soil 5	species	z	0.455	0.005	84.377***	Extended Power model 1
Soil 5	species	d	0.114	0.0042	34.242***	Extended Power model 1
Soil 6	species	z	0.472	0.005	84.865***	Extended Power model 1
Soil 6	species	d	0.160	0.0028	53.707***	Extended Power model 1
Soil 7	species	z	0.403	0.0113	36.68***	Extended Power model 1
Soil 7	species	d	0.096	0.0055	17.615***	Extended Power model 1
Gottin PP	species	z	0.644	0.005	54.980***	Extended Power model 1
Gottin PP	species	d	0.074	0.002	16.703***	Extended Power model 1
Olot	species	z	0.580	0.018	29.652***	Extended Power model 1
Olot	species	d	0.129	0.0091	12.192***	Extended Power model 1
Quercus	species	z	0.607	0.011	51.196***	Extended Power model 1

Quercus	species	d	0.127	0.0041	30.868***	Extended Power model 1
Nahuel	species	z	0.580	0.0117	57.227***	Extended Power model 1
Nahuel	species	d	0.082	0.0082	12.696***	Extended Power model 1
Sanak	species	z	0.580	0.0025	230.70***	Extended Power model 1
Sanak	species	d	0.102	0.0003	291.04***	Extended Power model 1

Dataset	**Property**	**Param.**	**Estimate**	**Std. Error**	***t*-value**	**Model**
Garraf HP	links	z	0.871	0.0170	51.0183***	Extended Power model 1
Garraf HP	links	d	0.030	0.0038	8.0898***	Extended Power model 1
Garraf PP	links	z	0.710	0.0056	125.785***	Power
Garraf PP2	links	z	0.639	0.0092	50.4059***	Extended Power model 1
Garraf PP2	links	d	0.082	0.0031	18.8105***	Extended Power model 1
Montseny	links	z	0.713	0.0054	131.265***	Power
Olot	links	z	0.821	0.0183	44.6600***	Extended Power model 1
Olot	links	d	0.110	0.0055	19.740***	Extended Power model 1
Nahuel	links	z	0.808	0.0085	94.672***	Extended Power model 1
Nahuel	links	d	0.091	0.0036	24.956***	Extended Power model 1
Quercus	links	z	0.810	0.0248	32.638***	Extended Power model 1
Quercus	links	d	0.084	0.0062	13.586***	Extended Power model 1
Soil 1	links	z	0.572	0.0177	32.172***	Extended Power model 1
Soil 1	links	d	0.068	0.0072	9.5209***	Extended Power model 1
Soil 2	links	z	0.654	0.0144	42.655***	Extended Power model 1
Soil 2	links	d	0.088	0.0069	12.370***	Extended Power model 1
Soil 3	links	z	0.629	0.0113	55.528***	Extended Power model 1
Soil 3	links	d	0.095	0.0039	24.002***	Extended Power model 1
Soil 4	links	z	0.594	0.0087	68.147***	Extended Power model 1
Soil 4	links	d	0.079	0.0033	23.400***	Extended Power model 1
Soil 5	links	z	0.731	0.0196	37.224***	Extended Power model 1
Soil 5	links	d	0.080	0.0088	9.132***	Extended Power model 1
Soil 6	links	z	0.705	0.0059	181.225***	Extended Power model 1
Soil 6	links	d	0.107	0.0018	57.575***	Extended Power model 1
Soil 7	links	z	0.731	0.0133	54.668***	Extended Power model 1
Soil 7	links	d	0.096	0.0033	28.306***	Extended Power model 1
Gottin HP	links	z	0.746	0.0088	84.571***	Power
Gottin PP	links	z	0.761	0.0096	79.2004***	Power
Chaco	links	z	0.709	0.0116	61.112***	Extended Power model 1
Chaco	links	d	0.050	0.0046	10.953***	Extended Power model 1
Sanak	links	z	0.7632	0.00330	230.689***	Extended Power model 1
Sanak	links	d	0.0983	0.00034	288.339***	Extended Power model 1

Bristol	links	z	0.691	0.0150	45.959***	Extended Power model 1
Bristol	links	d	0.234	0.0033	69.828***	Extended Power model 1

Dataset	**Property**	**Param.**	**Estimate**	**Std. Error**	***t*-value**	**Model**
Garraf HP	Links/species	z	0.143	0.0076	18.801***	Extended Power model 1
Garraf HP	Links/species	d	-0.089	0.0120	-6.673***	Extended Power model 1
Garraf PP	Links/species	z	0.147	0.0016	88.003***	Power
Garraf PP2	Links/species	z	0.214	0.0039	54.754***	Extended Power model 1
Garraf PP2	Links/species	d	0.079	0.0046	17.126***	Extended Power model 1
Montseny	Links/species	z	0.216	0.0089	24.116***	Extended Power model 1
Montseny	Links/species	d	-0.022	0.0011	-1.977***	Extended Power model 1
Olot	Links/species	z	0.274	0.0053	51.182***	Extended Power model 1
Olot	Links/species	d	0.105	0.0058	18.125***	Extended Power model 1
Nahuel	Links/species	z	0.174	0.0058	29.823***	Power
Quercus	Links/species	z	0.274	0.0084	32.366***	Extended Power model 1
Quercus	Links/species	d	0.050	0.0075	6.743**	Extended Power model 1
Soil 1	Links/species	z	0.212	0.0012	151.217***	Extended Power model 2
Soil 1	Links/species	d	-0.229	0.0129	-17.721***	Extended Power model 2
Soil 2	Links/species	z	0.305	0.0089	34.020***	Extended Power model 1
Soil 2	Links/species	d	0.096	0.0104	9.276***	Extended Power model 1
Soil 3	Links/species	z	0.297	0.0106	27.875***	Extended Power model 1
Soil 3	Links/species	d	0.121	0.0088	13.667***	Extended Power model 1
Soil 4	Links/species	z	0.233	0.0030	77.176***	Extended Power model 1
Soil 4	Links/species	d	0.060	0.0034	17.631***	Extended Power model 1
Soil 5	Links/species	z	0.267	0.0029	91.702***	Power
Soil 6	Links/species	z	0.248	0.0026	92.847***	Extended Power model 1
Soil 6	Links/species	d	0.036	0.0028	12.911***	Extended Power model 1
Soil 7	Links/species	z	0.217	0.0018	115.939***	Power
Gottin HP	Links/species	z	0.186	0.0054	34.304***	Power
Gottin PP	Links/species	z	0.262	0.0032	81.110***	Power
Chaco	Links/species	z	0.259	0.0028	90.269***	Power
Sanak	Links/species	z	0.204	0.0015	130.319***	Extended Power model 1
Sanak	Links/species	d	0.093	0.0007	129.887***	Extended Power model 1
Bristol	Links/species	z	0.504	0.0076	66.255***	Extended Power model 1
Bristol	Links/species	d	0.313	0.0024	128.411***	Extended Power model 1

Dataset	Property	Param.	Estimate	Std. Error	*t*-value	Model
Garraf HP	indegree	z	0.074	0.0061	12.159***	Extended Power model 1
Garraf HP	indegree	d	-0.204	0.0219	-9.332***	Extended Power model 1
Garraf PP	indegree	z	0.095	0.0065	14.534***	Extended Power model 1
Garraf PP	indegree	d	-0.030	0.0147	-2.077***	Extended Power model 1
Garraf PP2	indegree	z	0.263	0.0048	54.473***	Extended Power model 1
Garraf PP2	indegree	d	0.097	0.0045	21.496***	Extended Power model 1
Montseny	indegree	z	0.245	0.0031	77.138***	Power
Olot	indegree	z	0.277	0.0052	52.939***	Extended Power model 1
Olot	indegree	d	-0.049	0.0057	-8.717**	Extended Power model 1
Nahuel	indegree	z	0.117	0.0055	21.228***	Power
Quercus	indegree	z	0.189	0.0024	77.959***	Power
Soil 1	indegree	z	0.212	0.0014	151.217***	Extended Power model 2
Soil 1	indegree	d	-0.229	0.0129	-17.721***	Extended Power model 2
Soil 2	indegree	z	0.305	0.0089	34.020***	Extended Power model 1
Soil 2	indegree	d	0.096	0.0104	9.276***	Extended Power model 1
Soil 3	indegree	z	0.297	0.0106	27.875***	Extended Power model 1
Soil 3	indegree	d	0.121	0.0088	13.667***	Extended Power model 1
Soil 4	indegree	z	0.233	0.0037	77.176***	Extended Power model 1
Soil 4	indegree	d	0.060	0.0034	17.631***	Extended Power model 1
Soil 5	indegree	z	0.267	0.0029	91.702***	Power
Soil 6	indegree	z	0.248	0.0026	92.847***	Extended Power model 1
Soil 6	indegree	d	0.036	0.0028	12.911***	Extended Power model 1
Soil 7	indegree	z	0.219	0.0049	44.287***	Power
Gottin HP	indegree	z	0.234	0.0052	44.699***	Power
Gottin PP	indegree	z	0.258	0.0019	132.616***	Power
Chaco	indegree	z	0.259	0.0028	90.269***	Power
Sanak	indegree	z	0.073	0.0019	37.74***	Extended Power model 1
Sanak	indegree	d	0.068	0.0028	24.3013***	Extended Power model 1
Bristol	indegree	z	0.504	0.0076	66.255***	Extended Power model 1
Bristol	indegree	d	0.313	0.0024	128.429***	Extended Power model 1

Dataset	Property	Param.	Estimate	Std. Error	*t*-value	Model
Garraf HP	C:R ratio	z	0.129	0.0094	13.681***	Extended Power model 1
Garraf HP	C:R ratio	d	0.140	0.0714	8.047***	Extended Power model 1
Garraf PP	C:R ratio	z	0.209	0.0042	49.797***	Power
Garraf PP2	C:R ratio	z	-0.357	0.0069	-51.649***	Extended Power model 1
Garraf PP2	C:R ratio	d	0.244	0.0059	41.278***	Extended Power model 1
Montseny	C:R ratio	z	-0.114	0.0020	-57.036***	Power
Olot	C:R ratio	z	-0.133	0.0052	-25.246***	Extended Power model 1
Olot	C:R ratio	d	-0.221	0.0148	-14.920***	Extended Power model 1
Nahuel	C:R ratio	z	0.329	0.0028	116.255***	Extended Power model 2
Nahuel	C:R ratio	d	0.158	0.0199	7.948***	Extended Power model 2
Quercus	C:R ratio	z	0.103	0.0053	19.219***	Power
Soil 1	C:R ratio	z	-0.020	0.0039	-5.063**	Extended Power model 1
Soil 1	C:R ratio	d	-0.134	0.0605	-2.221***	Extended Power model 1
Soil 2	C:R ratio	z	-0.0006	0.0062	-0.099	Power
Soil 3	C:R ratio	z	-1.001	0.0007	-1.167*	Extended Power model 1
Soil 3	C:R ratio	d	-0.8122	0.2816	-3.589**	Extended Power model 1
Soil 4	C:R ratio	z	-0.0667	0.0049	-13.533***	Extended Power model 1
Soil 4	C:R ratio	d	0.1356	0.0217	6.243**	Extended Power model 1
Soil 5	C:R ratio	z	-0.0149	0.0045	-3.305**	Extended Power model 1
Soil 5	C:R ratio	d	-0.4385	0.1322	-3.316**	Extended Power model 1
Soil 6	C:R ratio	z	0.0056	0.0011	4.914***	Extended Power model 1
Soil 6	C:R ratio	d	-0.6046	0.0655	-9.217***	Extended Power model 1
Soil 7	C:R ratio	z	0.0367	0.0152	2.408*	Extended Power model 1
Soil 7	C:R ratio	d	0.6623	0.1418	4.670***	Extended Power model 1
Gottin HP	C:R ratio	z	-0.1161	0.0029	-39.929***	Power
Gottin PP	C:R ratio	z	-0.1770	0.0324	-5.461***	Extended Power model 1
Gottin PP	C:R ratio	d	0.7154	0.0812	8.808***	Extended Power model 1
Chaco	C:R ratio	z	0.0683	0.0018	36.922***	Power
Sanak	C:R ratio	z	-0.4414	0.00674	-65.40***	Power
Bristol	C:R ratio	z	0.2097	0.0093	22.403***	Extended Power model 1
Bristol	C:R ratio	d	0.1093	0.0089	12.165***	Extended Power model 1

B) BIOGEOGRAPHICAL SPATIAL DOMAIN

Dataset	**Property**	**Param.**	**Estimate**	**Std. Error**	***t*-value**	**Model**
Galpar	species	*z*	1.054	0.0170	61.840***	Extended Power model 1
Galpar	species	*d*	0.110	0.0011	96.537***	Extended Power model 1
Salgal	species	*z*	0.985	0.0134	73.112***	Extended Power model 1
Salgal	species	*d*	0.131	0.0008	150.694***	Extended Power model 1
pyrenees	species	*z*	0.3193	0.0060	52.754***	Extended Power model 1
pyrenees	species	*d*	0.0797	0.0025	30.689***	Extended Power model 1
Alpine	species	*z*	0.3653	0.0008	449.367***	Power
Anatolian	species	*z*	0.2532	0.0003	638.069***	Power
Arctic	species	*z*	0.3477	0.0009	382.663***	Extended Power model 2
Arctic	species	*d*	-2.9000	0.1001	-28.968***	Extended Power model 2
Atlantic	species	*z*	0.0036	9.26E-05	39.806***	Extended Power model 1
Atlantic	species	*d*	-0.3530	0.0024	-142.64***	Extended Power model 1
BlackSea	species	*z*	0.0144	0.0005	26.673***	Extended Power model 1
BlackSea	species	*d*	-0.3004	0.0044	-67.334***	Extended Power model 1
Boreal	species	*z*	0.1445	9.85E-05	1467.43***	Power
Continental	species	*z*	0.2257	0.0003	634.261***	Power
Mediterranean	species	*z*	0.3082	0.0007	417.08***	Power
Pannonian	species	*z*	0.0748	0.0002	311.642***	Power
Steppic	species	*z*	0.2453	0.0006	403.907***	Power

Dataset	**Property**	**Param.**	**Estimate**	**Std. Error**	***t*-value**	**Model**
Galpar	links	*z*	1.179	0.0238	49.554***	Extended Power model 1
Galpar	links	*d*	0.068	0.0016	42.119***	Extended Power model 1
Salgal	links	*z*	1.194	0.0142	83.705***	Extended Power model 1
Salgal	links	*d*	0.122	0.0007	159.565***	Extended Power model 1
pyrenees	links	*z*	0.4178	0.0111	37.611***	Extended Power model 1
pyrenees	links	*d*	0.0550	0.0036	15.243***	Extended Power model 1
Alpine	links	*z*	0.0469	0.0008	52.984***	Extended Power model 1
Alpine	links	*d*	-0.207	0.0016	-125.98***	Extended Power model 1
Anatolian	links	*z*	0.4870	0.00068	714.400***	Power
Arctic	links	*z*	1.7132	0.0386	44.2906***	Extended Power model 1
Arctic	links	*d*	0.0672	0.0009	70.120***	Extended Power model 1
Atlantic	links	*z*	0.4803	0.0015	301.554***	Power
BlackSea	links	*z*	0.0228	0.0010	20.9002***	Extended Power model 1
BlackSea	links	*d*	-0.316	0.0056	-56.324***	Extended Power model 1
Boreal	links	*z*	0.2388	0.0001	1789.38***	Power
Continental	links	*z*	0.0068	8.36E-05	81.547***	Extended Power model 1
Continental	links	*d*	-0.311	0.0010	-296.85***	Extended Power model 1
Mediterranean	links	*z*	0.0127	0.0002	43.656***	Extended Power model 1
Mediterranean	links	*d*	-0.314	0.002	-150.32***	Extended Power model 1
Pannonian	links	*z*	0.1569	0.0003	434.917***	Power
Steppic	links	*z*	0.0459	0.0020	22.559***	Extended Power model 1
Steppic	links	*d*	-0.179	0.0037	-48.37***	Extended Power model 1

Dataset	**Property**	**Param.**	**Estimate**	**Std. Error**	***t*-value**	**Model**
Galpar	Links/species	*z*	0.382	0.0060	62.825***	Extended Power model 1
Galpar	Links/species	*d*	0.030	0.0016	18.801***	Extended Power model 1
Salgal	Links/species	*z*	0.074	0.0012	58.870***	Extended Power model 2
Salgal	Links/species	*d*	0.399	0.0254	15.717***	Extended Power model 2
pyrenees	Links/species	*z*	0.14480	0.00622	23.2459***	Extended Power model 1
pyrenees	Links/species	*d*	0.04395	0.00656	6.69805***	Extended Power model 1
Alpine	Links/species	*z*	0.01001	0.00012	82.3263***	Extended Power model 1
Alpine	Links/species	*d*	-0.28188	0.00114	-246.906***	Extended Power model 1
Anatolian	Links/species	*z*	0.05503	0.00041	134.206***	Extended Power model 1
Anatolian	Links/species	*d*	-0.11125	0.00066	-166.331***	Extended Power model 1
Arctic	Links/species	*z*	0.23829	0.00097	244.841***	Extended Power model 2
Arctic	Links/species	*d*	-1.97801	0.08607	-22.9811***	Extended Power model 2
Atlantic	Links/species	*z*	0.00127	2.31E-05	55.2780***	Extended Power model 1
Atlantic	Links/species	*d*	-0.45639	0.00183	-248.401***	Extended Power model 1
BlackSea	Links/species	*z*	0.01429	0.00048	29.1848***	Extended Power model 1
BlackSea	Links/species	*d*	-0.28090	0.00405	-69.1980***	Extended Power model 1
Boreal	Links/species	*z*	0.0894	6.24E-05	1433.02***	Power
Continental	Links/species	*z*	0.0013	1.43E-05	94.6154***	Extended Power model 1
Continental	Links/species	*d*	-0.38806	0.00094	-410.327***	Extended Power model 1
Mediterranean	Links/species	*z*	0.00169	3.35E-05	50.6451***	Extended Power model 1
Mediterranean	Links/species	*d*	-0.44269	0.00192	-230.309***	Extended Power model 1
Pannonian	Links/species	*z*	0.07987	0.0001	500.231***	Power
Steppic	Links/species	*z*	0.00034	9.81E-06	35.187***	Extended Power model 1
Steppic	Links/species	*d*	-0.56893	0.00282	-201.570***	Extended Power model 1

Dataset	**Property**	**Param.**	**Estimate**	**Std. Error**	***t*-value**	**Model**
Galpar	indegree	*z*	0.659	0.0137	48.104***	Extended Power model 1
Galpar	indegree	*d*	0.109	0.0016	68.669***	Extended Power model 1
Salgal	indegree	*z*	0.0307	0.0011	27.322***	Extended Power model 1
Salgal	indegree	*d*	-0.1332	0.0049	-27.120***	Extended Power model 1
pyrenees	indegree	*f*	16.8215	0.12560	133.923***	PowerR
pyrenees	indegree	*z*	-0.4593	0.03980	-11.539***	PowerR
Alpine	indegree	*z*	0.00336	4.84E-05	69.5306***	Extended Power model 1
Alpine	indegree	*d*	-0.40450	0.001411	-286.526***	Extended Power model 1
Anatolian	indegree	*z*	0.04176	0.00035	116.6507***	Extended Power model 1
Anatolian	indegree	*d*	-0.15375	0.000802	-191.6025***	Extended Power model 1
Arctic	indegree	*z*	0.07389	0.00169	43.71005***	Extended Power model 1
Arctic	indegree	*d*	-0.06535	0.00186	-34.9774***	Extended Power model 1
Atlantic	indegree	*z*	0.00073	1.59E-05	46.2338***	Extended Power model 1
Atlantic	indegree	*d*	-0.51445	0.00222	-231.3659***	Extended Power model 1
BlackSea	indegree	*z*	0.00387	0.00017	22.5264***	Extended Power model 1
BlackSea	indegree	*d*	-0.44680	0.00557	-80.1434***	Extended Power model 1
Boreal	indegree	*z*	0.08980	8.46E-05	1061.14***	Power
Continental	indegree	*z*	0.00091	1.07E-05	85.6033***	Extended Power model 1
Continental	indegree	*d*	-0.43943	0.00105	-415.8303***	Extended Power model 1
Mediterranean	indegree	*z*	0.00258	5.62E-05	45.95441***	Extended Power model 1
Mediterranean	indegree	*d*	-0.4135	0.00209	-197.2847***	Extended Power model 1
Pannonian	indegree	*z*	0.07605	0.00018	420.7531***	Power
Steppic	indegree	*z*	0.00042	1.18E-05	35.6991***	Extended Power model 1
Steppic	indegree	*d*	-0.56920	0.00277	-205.2472***	Extended Power model 1

Dataset	**Property**	**Param.**	**Estimate**	**Std. Error**	***t*-value**	**Model**
Galpar	C:R ratio	*z*	0.0002	0.0001	2.623**	Extended Power model 1
Galpar	C:R ratio	*d*	-0.943	0.0633	-14.892***	Extended Power model 1
Salgal	C:R ratio	*z*	0.666	0.0270	24.612***	Extended Power model 1
Salgal	C:R ratio	*d*	0.234	0.0020	113.668***	Extended Power model 1
pyrenees	C:R ratio	*f*	0.0266	0.00268	9.9138***	Extended Power model 1
pyrenees	C:R ratio	*z*	-0.1666	0.01857	-8.972***	Extended Power model 1
Alpine	C:R ratio	*z*	-0.0332	0.00027	-121.49***	Power
Anatolian	C:R ratio	*z*	-0.0018	4.35E-05	-42.587***	Extended Power model 1
Anatolian	C:R ratio	*d*	-0.3089	0.00252	-122.480***	Extended Power model 1
Arctic	C:R ratio	*z*	0.0664	0.00073	90.309***	Power
Atlantic	C:R ratio	*z*	0.0350	0.00085	41.0331***	Extended Power model 1
Atlantic	C:R ratio	*d*	0.1568	0.00079	197.344***	Extended Power model 1
BlackSea	C:R ratio	*z*	-0.0064	0.00034	-18.745***	Power
Boreal	C:R ratio	*z*	0.0548	0.0010	51.513***	Extended Power model 1
Boreal	C:R ratio	*d*	0.1217	0.00037	329.166***	Extended Power model 1
Continental	C:R ratio	*z*	0.3653	0.00138	263.516***	Extended Power model 1
Continental	C:R ratio	*d*	0.1679	0.00026	643.612***	Extended Power model 1
Mediterranean	C:R ratio	*z*	-0.0003	1.41E-05	-21.702***	Extended Power model 1
Mediterranean	C:R ratio	*d*	-0.4193	0.00458	-91.554***	Extended Power model 1
Pannonian	C:R ratio	*z*	0.00077	7.93E-05	9.7198***	Power
Steppic	C:R ratio	*z*	-0.0007	1.33E-05	-55.339***	Extended Power model 1
Steppic	C:R ratio	*d*	-0.352	0.00174	-201.630***	Extended Power model 1

Supplementary Table 2. Power function fit for the links-species relationship for each dataset. P-value significance is shown by: ° < 0.1, *<0.05, ** < 0.01, *** < 0.001. We used nonlinear least squares (NLS) with the 'nls' function in R. A) Regional spatial domain. B) Biogeographical spatial domain.

A) REGIONAL SPATIAL DOMAIN

Dataset	Model	Estimate (z-exponent)	Std. Error	*t*-value
Gottin HP	Power	1.328	0.019	70.949***
Chaco	Power	1.810	0.030	61.262***
Garraf HP	Power	1.412	0.015	90.751***
Garraf PP	Power	1.234	0.002	598.551***
Garraf PP2	Power	1.495	0.005	313.847***
Bristol	Power	1.483	0.058	28.785***
Montseny	Power	1.487	0.006	233.169***
Soil 1	Power	1.778	0.010	174.484***
Soil 2	Power	1.820	0.005	336.906***
Soil 3	Power	1.719	0.006	293.875***
Soil 4	Power	1.719	0.006	262.034***
Soil 5	Power	1.772	0.022	79.800***
Soil 6	Power	1.887	0.030	63.135***
Soil 7	Power	1.813	0.014	130.949***
Gottin PP	Power	1.530	0.012	123.086***
Olot	Power	1.530	0.009	168.703***
Quercus	Power	1.648	0.012	149.296***
Nahuel	Power	1.356	0.009	158.059***
Sanak	Power	1.380	0.001	1366.461***

B) BIOGEOGRAPHICAL SPATIAL DOMAIN

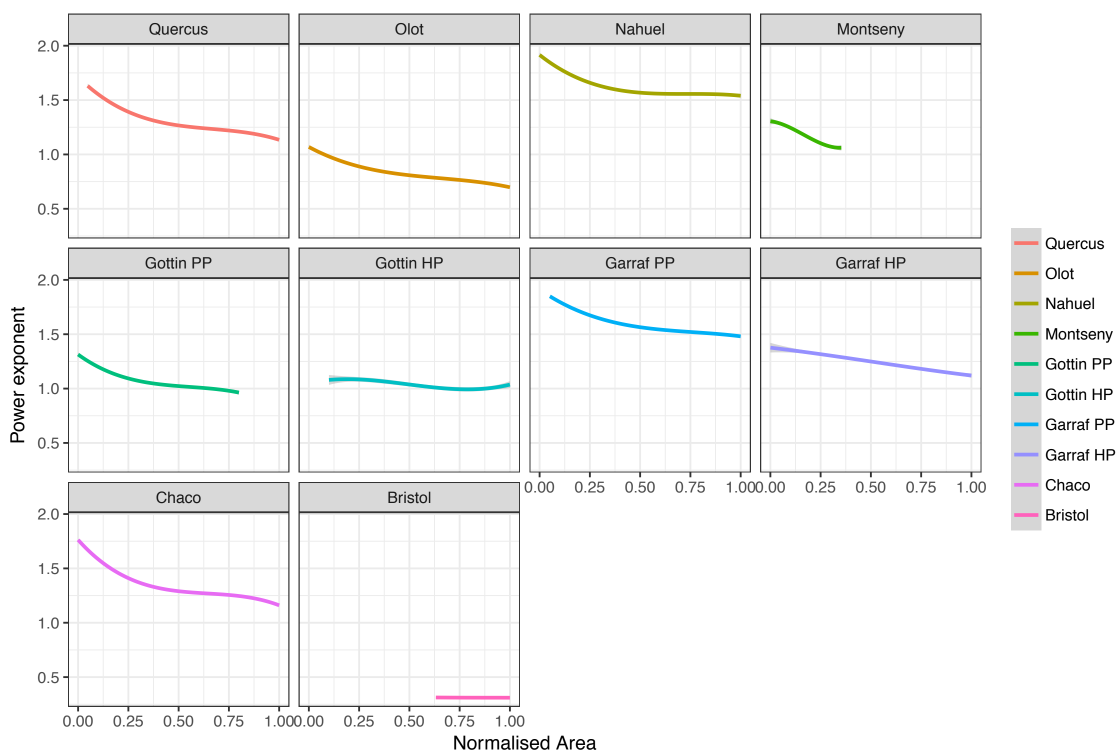
Dataset	Model	Estimate (z-exponent)	Std. Error	*t*-value
Galpar	Power	1.982	0.0077	256.800***
Salgal	Power	1.399	0.0045	309.311***
pyrenees	Power	1.568	0.0084	184.685***
Alpine	Power	1.830	0.0005	3136.601***
Anatolian	Power	1.856	0.0007	2603.746***
Arctic	Power	1.508	0.0006	2291.687***
Atlantic	Power	1.924	0.0005	3259.737***
BlackSea	Power	1.812	0.0008	2115.692***
Boreal	Power	1.608	0.0003	4817.294***
Continental	Power	1.850	0.0002	7814.859***
Mediterranean	Power	1.975	0.0003	5381.265***
Pannonian	Power	2.033	0.0028	720.333***
Steppic	Power	1.933	0.0005	3508.650***

Supplementary Table 3. Coefficient of variation (cv) of each parameter of the best ranked power function across datasets within each spatial domain, regional and biogeographical, to characterize the change of each network property with area. The extended power 1 is the best ranked function across datasets and, therefore, shown in the table. For those cases where there were a significant number of datasets fitting better a power law, the coefficient of variation across those datasets of the z-estimate of the power law is also shown. Datasets from the biogeographical domain show larger coefficient of variation than datasets from the regional domain for all parameters describing the changes with area for all network properties. Exceptions are the d-estimates for Links/species and indegree, which show a larger cv for the regional than for the biogeographical domain, indicating that the concave shape is more consistent across datasets at the biogeographical domain. See supplementary table 4 for the description of each function.

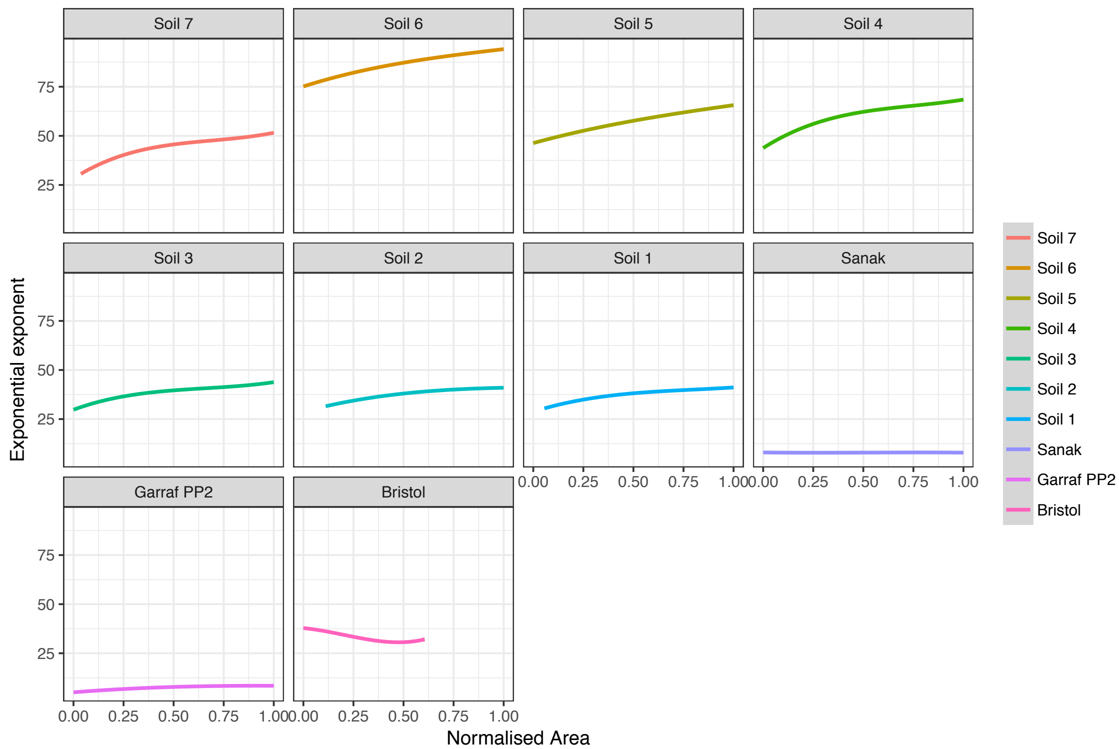
Spatial domain	Network metric	Power Function	N. of datasets	Estimate	cv
Regional	Species	Ext. power 1	17	z	0.24
Regional	Species	Ext. power 1	17	d	0.36
Regional	Links	Ext. power 1	15	z	0.15
Regional	Links	Ext. power 1	15	d	0.51
Regional	Links/Species	Ext. power 1	14	z	0.38
Regional	Links/Species	Ext. power 1	14	d	1.83
Regional	Indegree	Ext. power 1	11	z	0.48
Regional	Indegree	Ext. power 1	11	d	2.08
Regional	Indegree	Power	8	z	0.34
Biogeographical	Species	Ext. power 1	5	z	1.11
Biogeographical	Species	Ext. power 1	5	d	3.77
Biogeographical	Species	Power	7	z	0.42
Biogeographical	Links	Ext. power 1	9	z	1.28
Biogeographical	Links	Ext. power 1	9	d	1.71
Biogeographical	Links/Species	Ext. power 1	9	z	1.87
Biogeographical	Links/Species	Ext. power 1	9	d	0.80
Biogeographical	Indegree	Ext. power 1	10	z	2.50
Biogeographical	Indegree	Ext. power 1	10	d	0.74

Supplementary Figure 4. The degree distribution of each ecological network at each area of the aggregation procedure was fitted to four different functions that have been identified as typical of the shapes observed in degree distributions in ecological networks: power law, truncated power law, lognormal and exponential. The cumulative probabilities $Pc(k)$, for $\geq k$, where $P(k)$ is the probability a species has k prey in the network, and is given by $P(k) \sim k^{-\gamma} e^{-K/\gamma}$ where $e^{-K/\gamma}$ introduces a cut-off at some characteristic scale γ. Although for most datasets the best fitted function did not change as area increases, indicating that the basic structure is preserved, the parameters of the fitted functions did change with area. **A) Changes with area of the power function exponent for regional datasets.** The exponent γ of the power function ($P(k) \sim k^{-\gamma}$) that best described the degree distribution of datasets at regional scales, decreased with area, indicating that as area increases the difference between the most specialist (i.e. smallest number of interacting partners) species in the network and the most generalist (i.e. largest number of interacting partners) decreases. Therefore, it indicates a general increase of the number of interactions. **B) Changes in exponential function parameter with area.** The exponent γ of the power function ($P(k) \sim e^{-K/\gamma}$) that best described the degree distribution of datasets at the regional domain, increased with area, indicating a general increase in the number of interactions each species has. **C) Changes in the parameters of the truncated power law function with area.** The truncated power function ($P(k) \sim k^{-\gamma} e^{-K/\gamma}$) was the function that best described network degree distributions at the biogeographical domain. While the parameter controlling the power law regime did not consistently change with area, the second parameter **(D)** that determines the cut-off after which there is the exponential decay of the tail of the degree distribution, increased with area. This indicates that the characteristic scale of the network changes with area, and thus, as area increases the number of interactions before the cut-off increases.

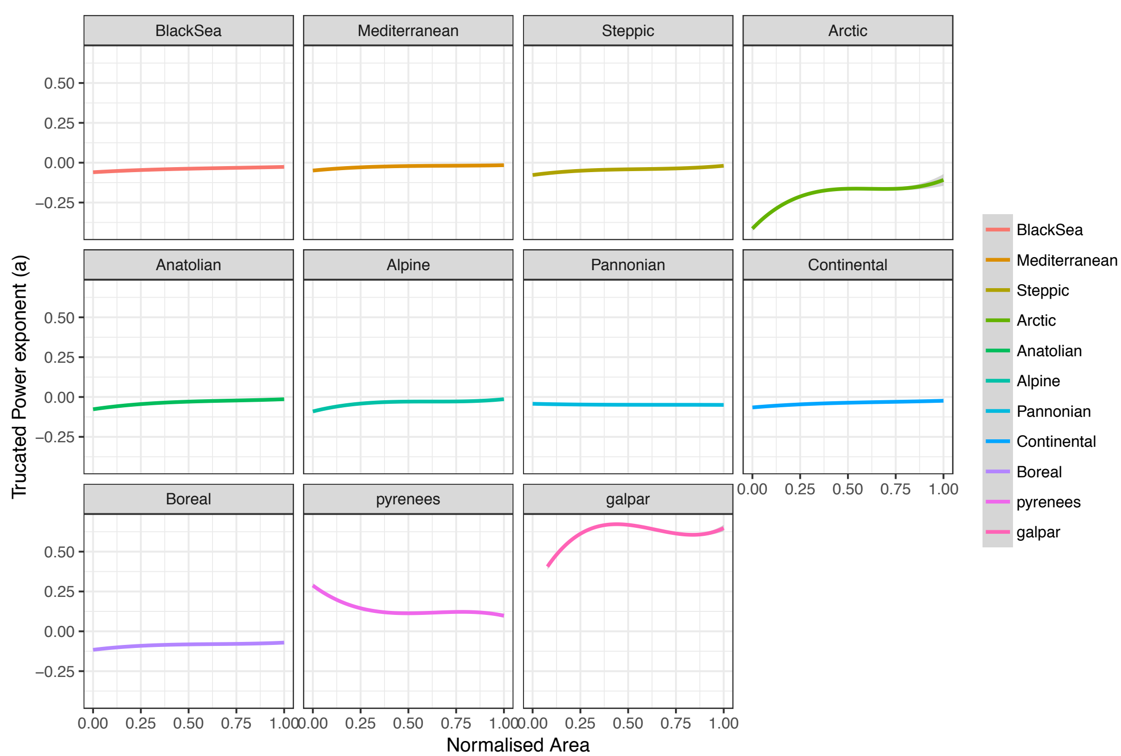
A) Changes with area of the power function exponent for regional datasets.



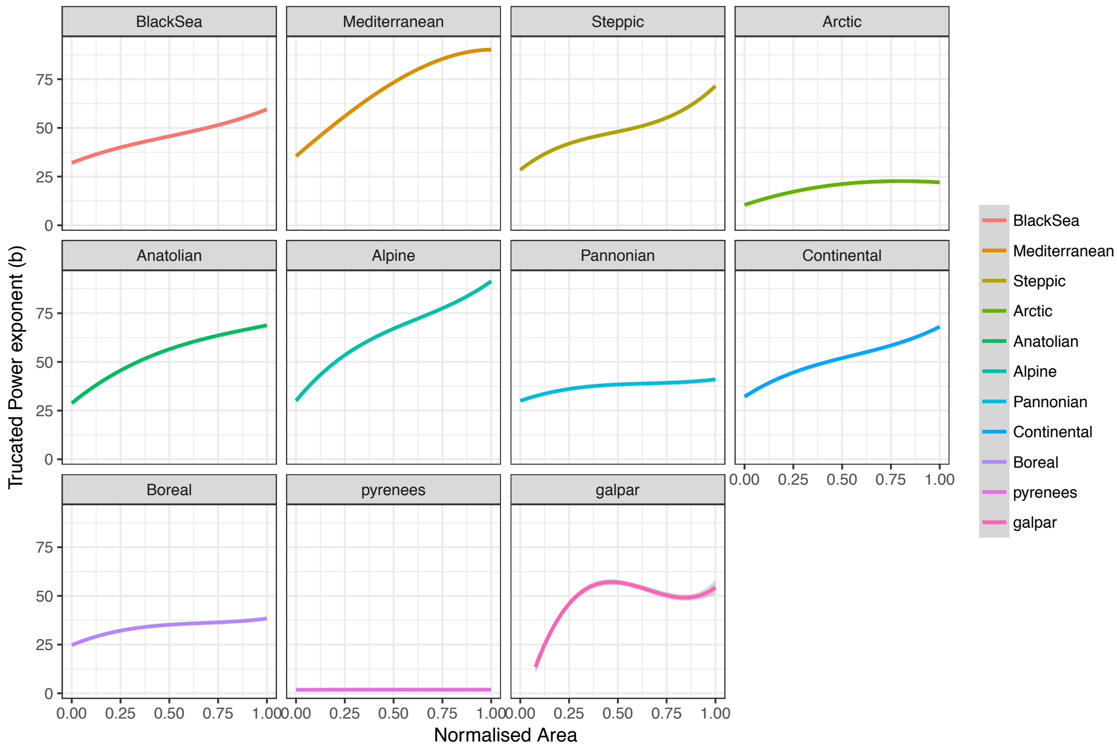
B) Changes in exponential function parameter with area.



C) Changes in the parameter γ of the truncated power law function with area.



D) Changes in the parameter k/γ of the truncated power law function with area.

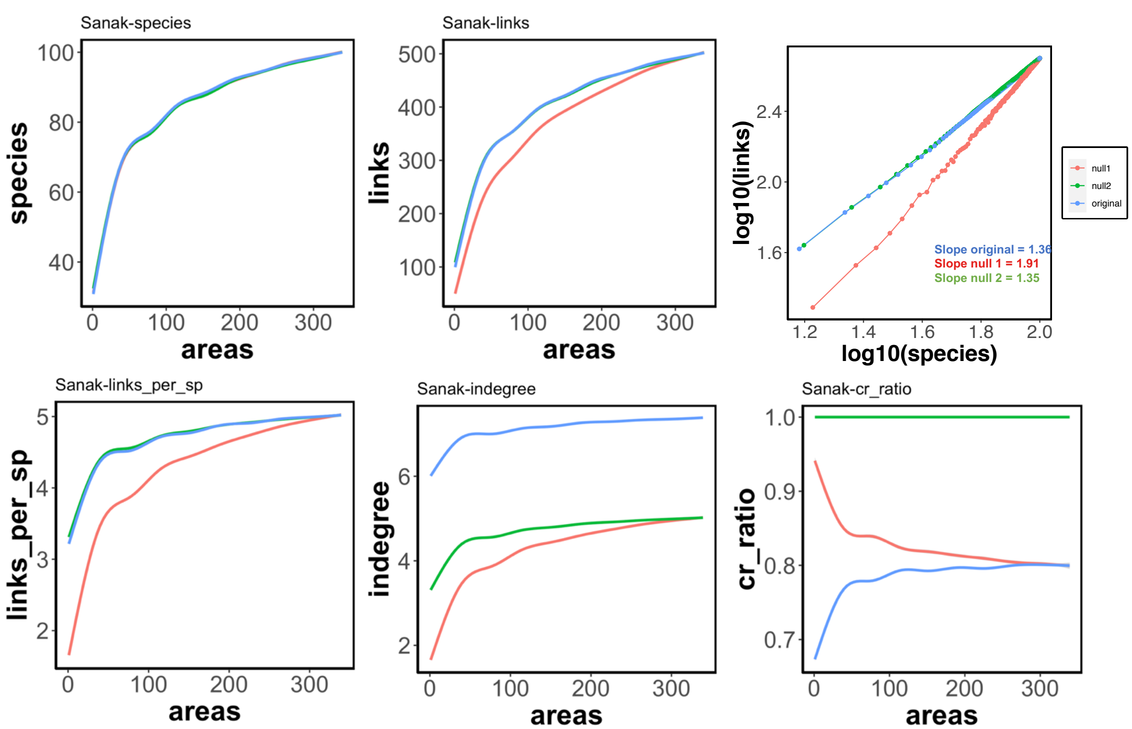


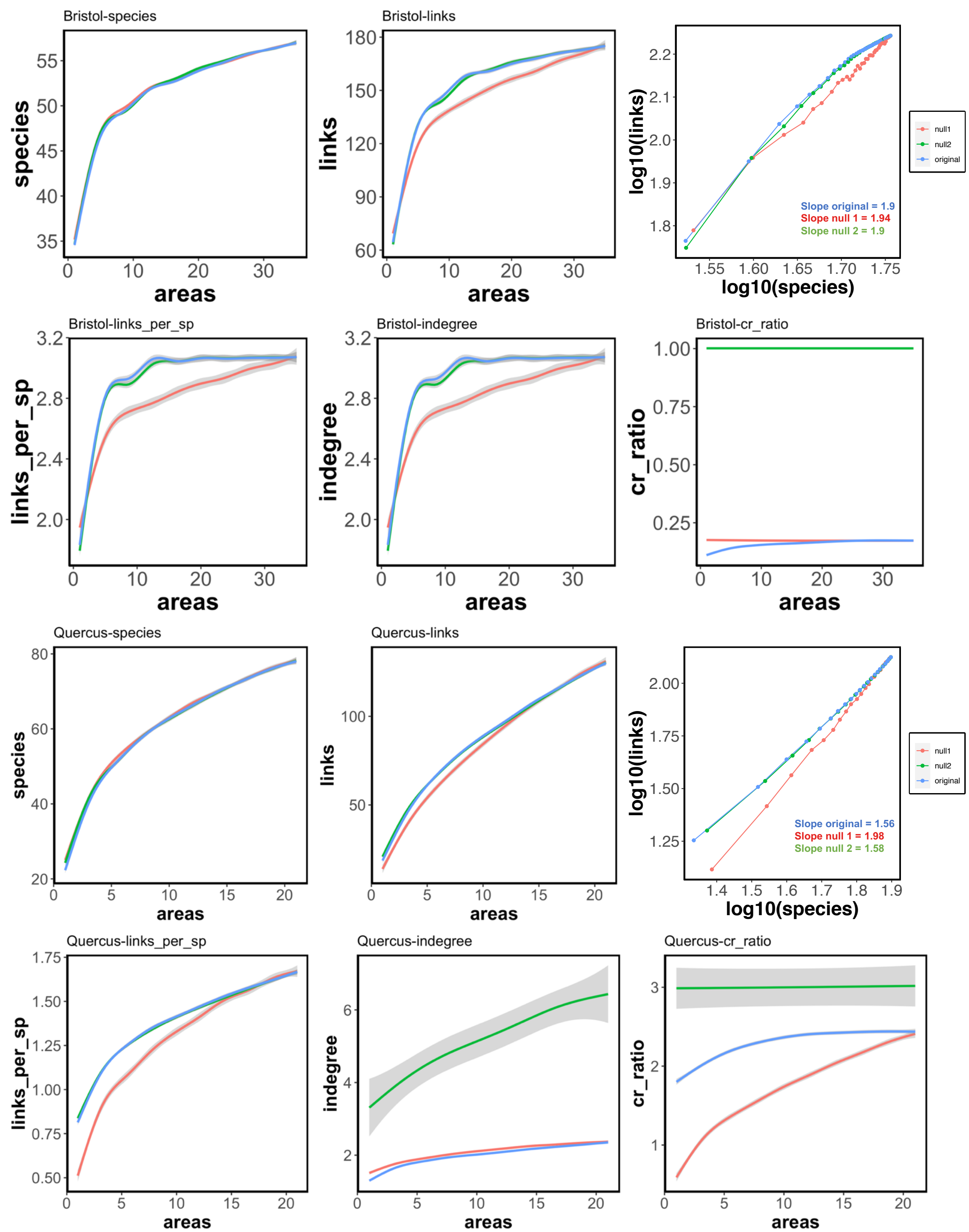
Supplementary Table 4. Set of functions used to test Network-Area relationships using the *sar* package in R**.**

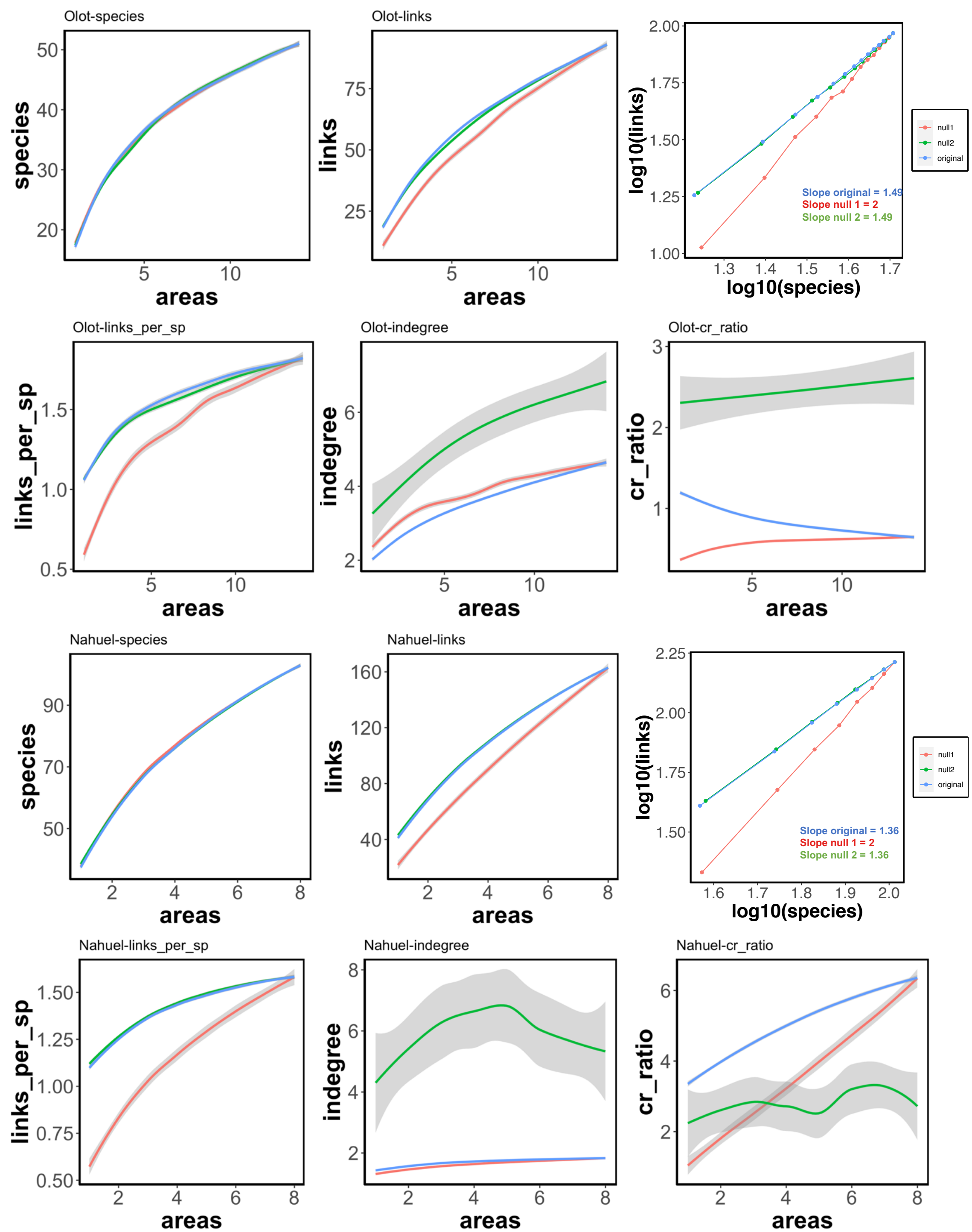
Model	No.parameters	Equation	Model.shape
Asymptotic	3	$d - cz^{A}$	Convex
Beta-P	4	$d(1-(1+(A/c)^{z})^{-f})$	Sigmoid
Chapman_Richards	3	$d(1-e(-zA)^{c})$	Sigmoid
Exponential	2	$c + zl(A)$	Convex
Extended Power 1	3	$cA^{(zA^{-d})}$	Convex/Sigmoid
Extended Power 2	3	$cA^{(z-(d/A))}$	Sigmoid
Gompertz	3	$de(-e(-z(A-c)))$	Sigmoid
Kobayashi	2	$cl(1 + A/z)$	Convex
Linear	2	$c + zA$	Linear
Logistic	3	$\frac{c}{f + A^{-z}}$	Sigmoid
Monod	2	$\frac{d}{1 + cA^{-1}}$	Convex
Morgan_Mercer_Flodin	3	$\frac{d}{1 + cA^{-z}}$	Sigmoid
Negative Exponential	2	$d(1-e(-zA))$	Convex
Persistence Function 1	3	$cA^{z}e(-dA)$	Convex
Persistence Function 2	3	$cA^{z}e(-d/A)$	Sigmoid
Power	2	cA^{z}	Convex
Power Rosenzweig	3	$f + cA^{z}$	Convex
Rational	3	$\frac{c + zA}{1 + dA}$	Convex
Weibull_3	3	$d(1-e(-cA^{z}))$	Sigmoid
Weibull_4	4	$d(1-e(-cA^{z}))^{f}$	Sigmoid

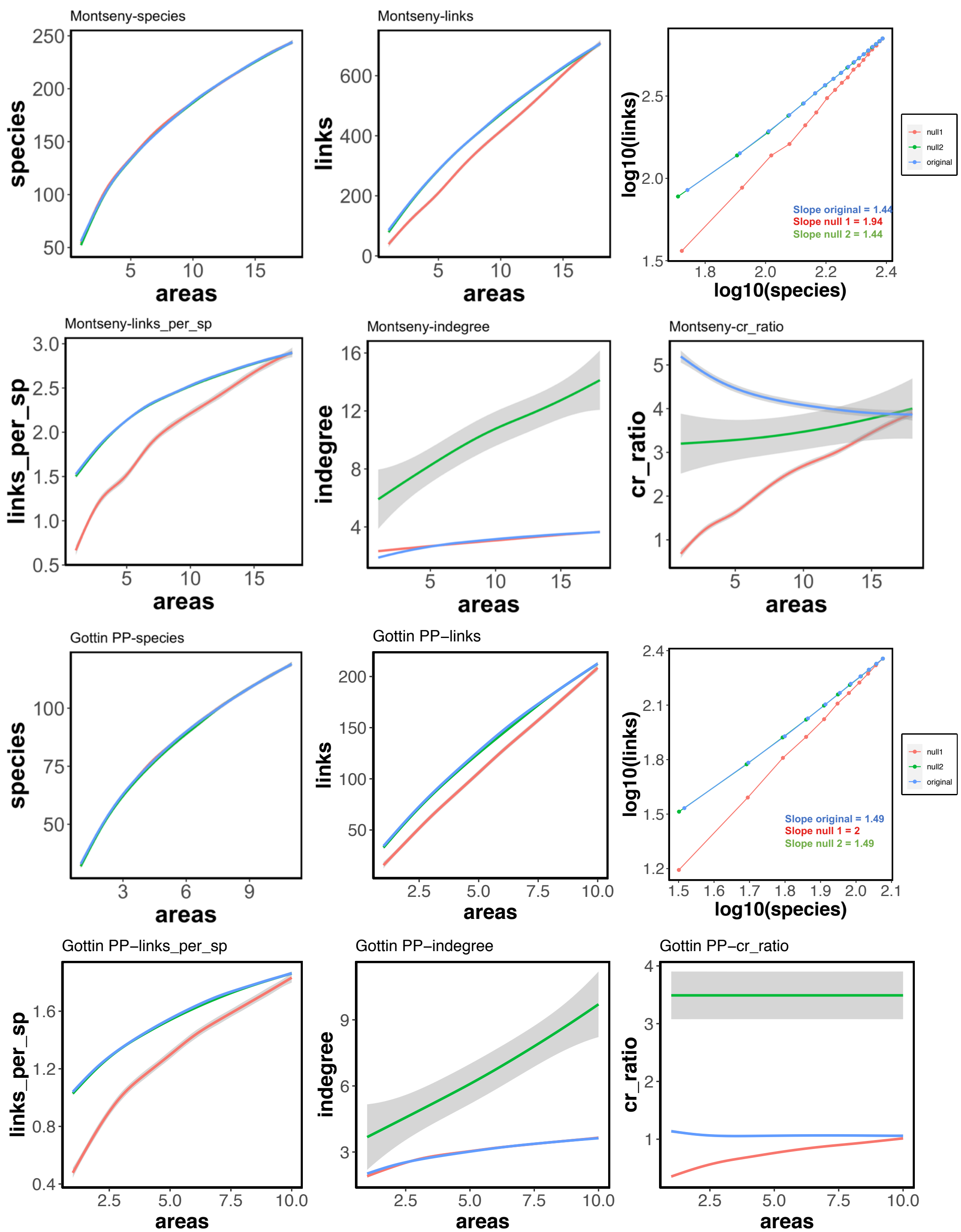
Supplementary Figure 5. Null model comparison. For each dataset we show the spatial scaling of species, links, links/species, indegree and consumer:resource ratio for the original data (blue), null model 1 (red) and null model 2 (green) (see Methods for a description of each null model). The scaling of the number of links with the number of species is also shown. We provide the slope of the links-species relationship to be able to compare with the constant connectance hypothesis (slope=2; the number of links in a web increases approximately as the square of the number of trophic species: $L \approx S^2$) and the link–species scaling law (slope=1; the number of links per species in a web is constant and scale invariant at roughly two: $L \approx 2S$). The slope was calculated performing a linear model fit, which can slightly differ from the values obtained when performing a power law fit to the data when the data does not behave as a perfect power law. Notice that many of the instances of null model 1, show a relationship between the number of links and the number of species with a slope close to 2. The reason for this is that since in null model 1 the number of links is not fix, when randomly picking a given number of species, at small spatial scales the number of links associated to the selected species is much lower than in the original networks. As a consequence of this low connectivity at small spatial scales in the random networks in comparison with the original ones, the number of links increases faster when increasing the number of species to reach the total number of links in each metaweb. The total number of links has to be reached because when all species are sampled at the largest spatial scale, all their links are also necessarily sampled. **A) Null model comparison for the regional spatial domain.** Notice that for the Soil networks we show the comparison only for one of them due to space constraints. All soil datasets showed the same patterns than the one illustrated below. **B) Null model comparison for the biogeographical spatial domain.**

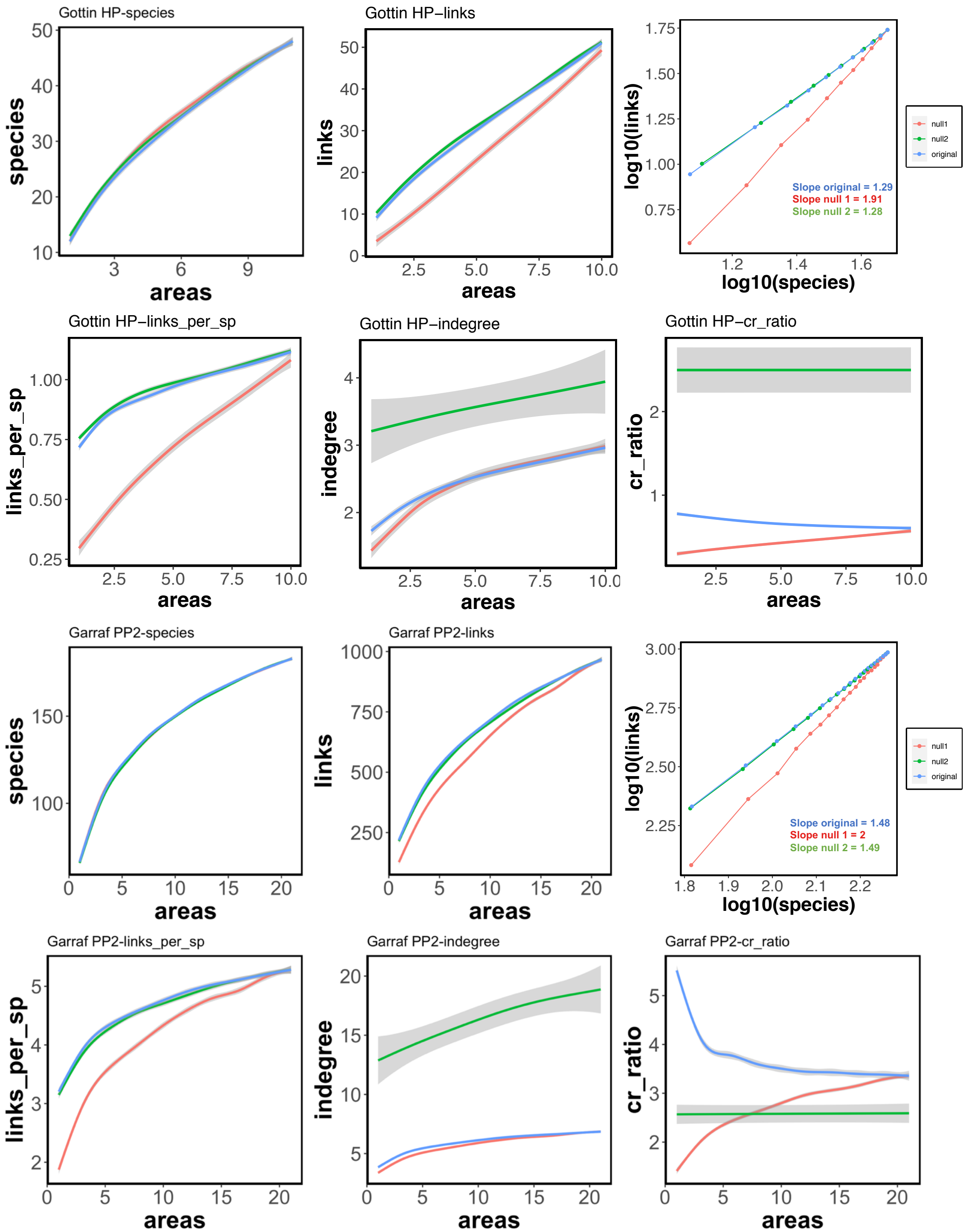
A) Regional spatial domain



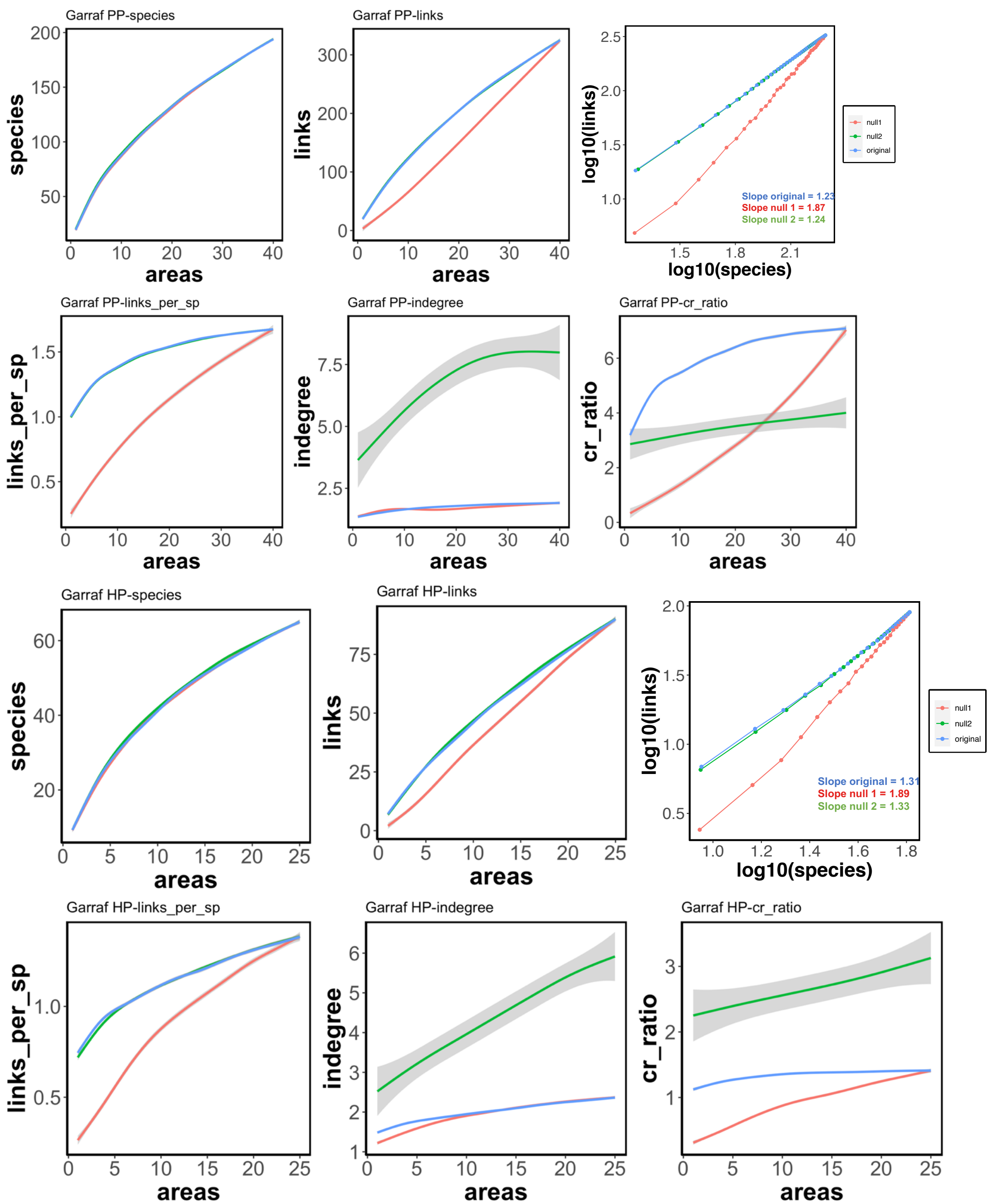

Bristol-species
species
areas
Bristol-links
links
areas
log10(links)
log10(species)
null1
null2
original
Slope original = 1.9
Slope null 1 = 1.94
Slope null 2 = 1.9
Bristol-links_per_sp
links_per_sp
areas
Bristol-indegree
indegree
areas
Bristol-cr_ratio
cr_ratio
areas
Quercus-species
species
areas
Quercus-links
links
areas
log10(links)
log10(species)
null1
null2
original
Slope original = 1.56
Slope null 1 = 1.98
Slope null 2 = 1.58
Quercus-links_per_sp
links_per_sp
areas
Quercus-indegree
indegree
areas
Quercus-cr_ratio
cr_ratio
areas

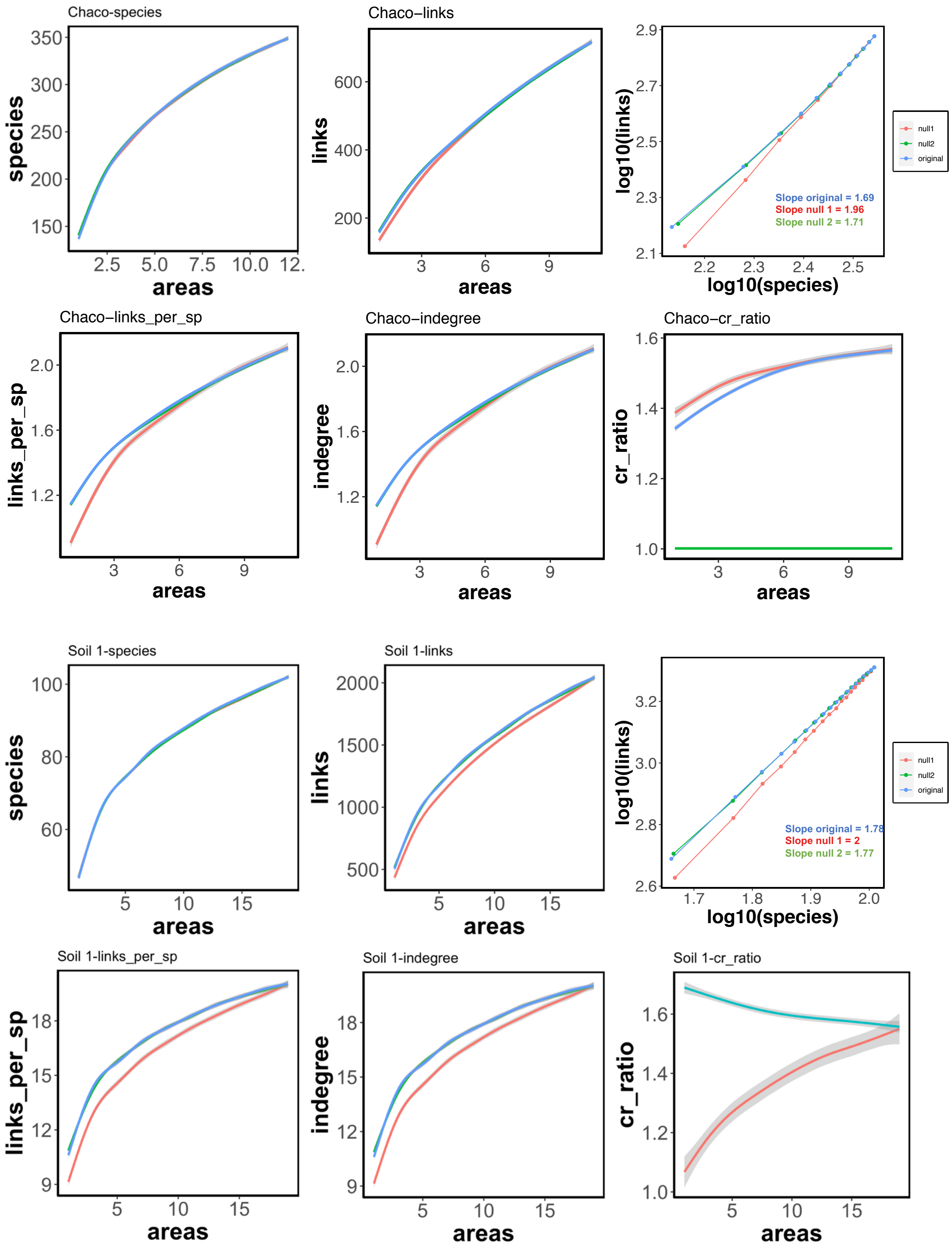

Olot-species
species
areas
Olot-links
links
areas
log10(links)
log10(species)
null1
null2
original
Slope original = 1.49
Slope null 1 = 2
Slope null 2 = 1.49
Olot-links_per_sp
links_per_sp
areas
Olot-indegree
indegree
areas
Olot-cr_ratio
cr_ratio
areas
Nahuel-species
species
areas
Nahuel-links
links
areas
log10(links)
log10(species)
null1
null2
original
Slope original = 1.36
Slope null 1 = 2
Slope null 2 = 1.36
Nahuel-links_per_sp
links_per_sp
areas
Nahuel-indegree
indegree
areas
Nahuel-cr_ratio
cr_ratio
areas


Montseny-species
species
areas
Montseny-links
links
areas
log10(links)
log10(species)
Slope original = 1.44
Slope null 1 = 1.94
Slope null 2 = 1.44
null1
null2
original
Montseny-links_per_sp
links_per_sp
areas
Montseny-indegree
indegree
areas
Montseny-cr_ratio
cr_ratio
areas
Gottin PP-species
species
areas
Gottin PP–links
links
areas
log10(links)
log10(species)
Slope original = 1.49
Slope null 1 = 2
Slope null 2 = 1.49
null1
null2
original
Gottin PP–links_per_sp
links_per_sp
areas
Gottin PP–indegree
indegree
areas
Gottin PP–cr_ratio
cr_ratio
areas



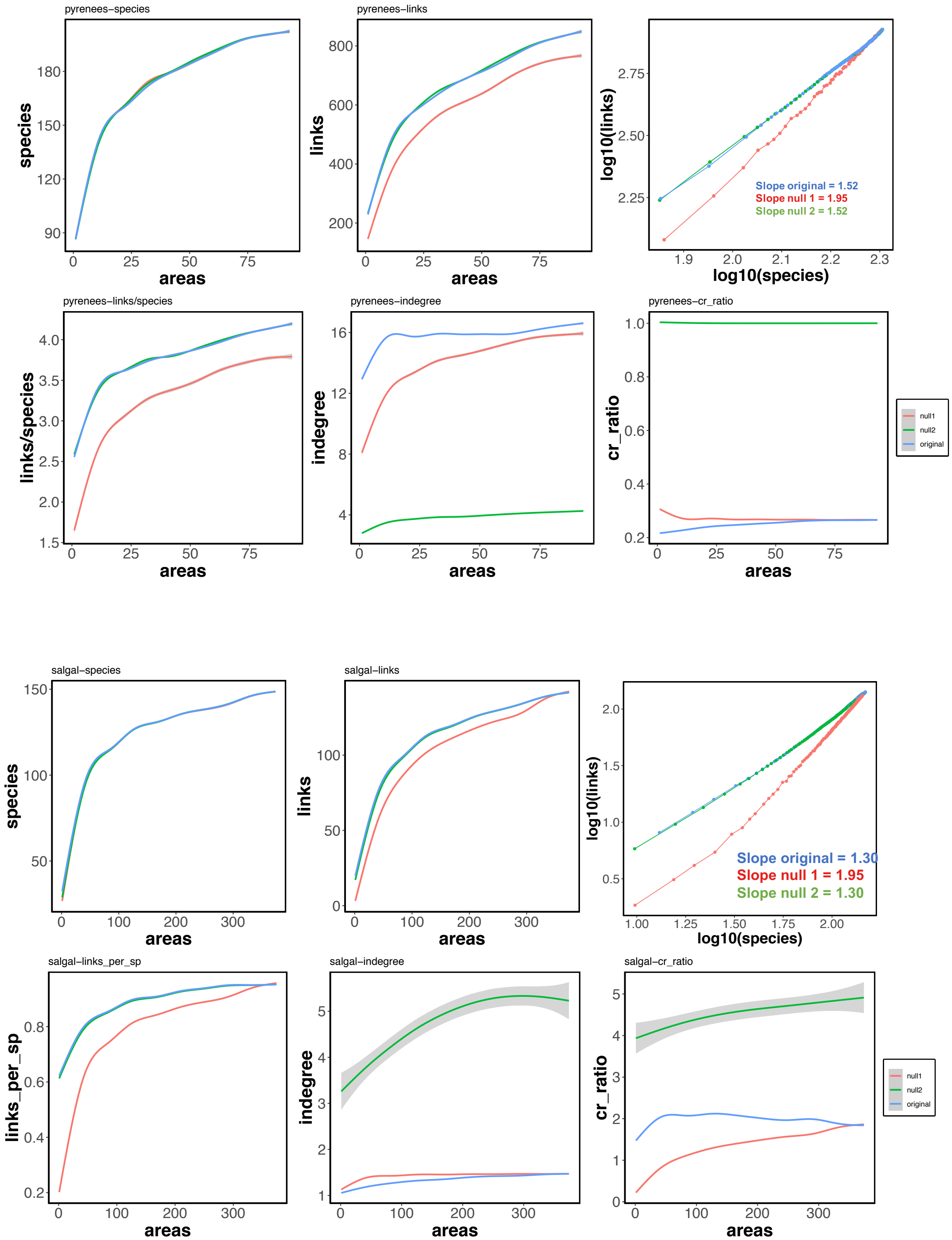
Gottin HP-species
species
areas
Gottin HP–links
links
areas
log10(links)
log10(species)
null1
null2
original
Slope original = 1.29
Slope null 1 = 1.91
Slope null 2 = 1.28
Gottin HP–links_per_sp
links_per_sp
areas
Gottin HP–indegree
indegree
areas
Gottin HP–cr_ratio
cr_ratio
areas
Garraf PP2-species
species
areas
Garraf PP2-links
links
areas
log10(links)
log10(species)
null1
null2
original
Slope original = 1.48
Slope null 1 = 2
Slope null 2 = 1.49
Garraf PP2-links_per_sp
links_per_sp
areas
Garraf PP2-indegree
indegree
areas
Garraf PP2-cr_ratio
cr_ratio
areas

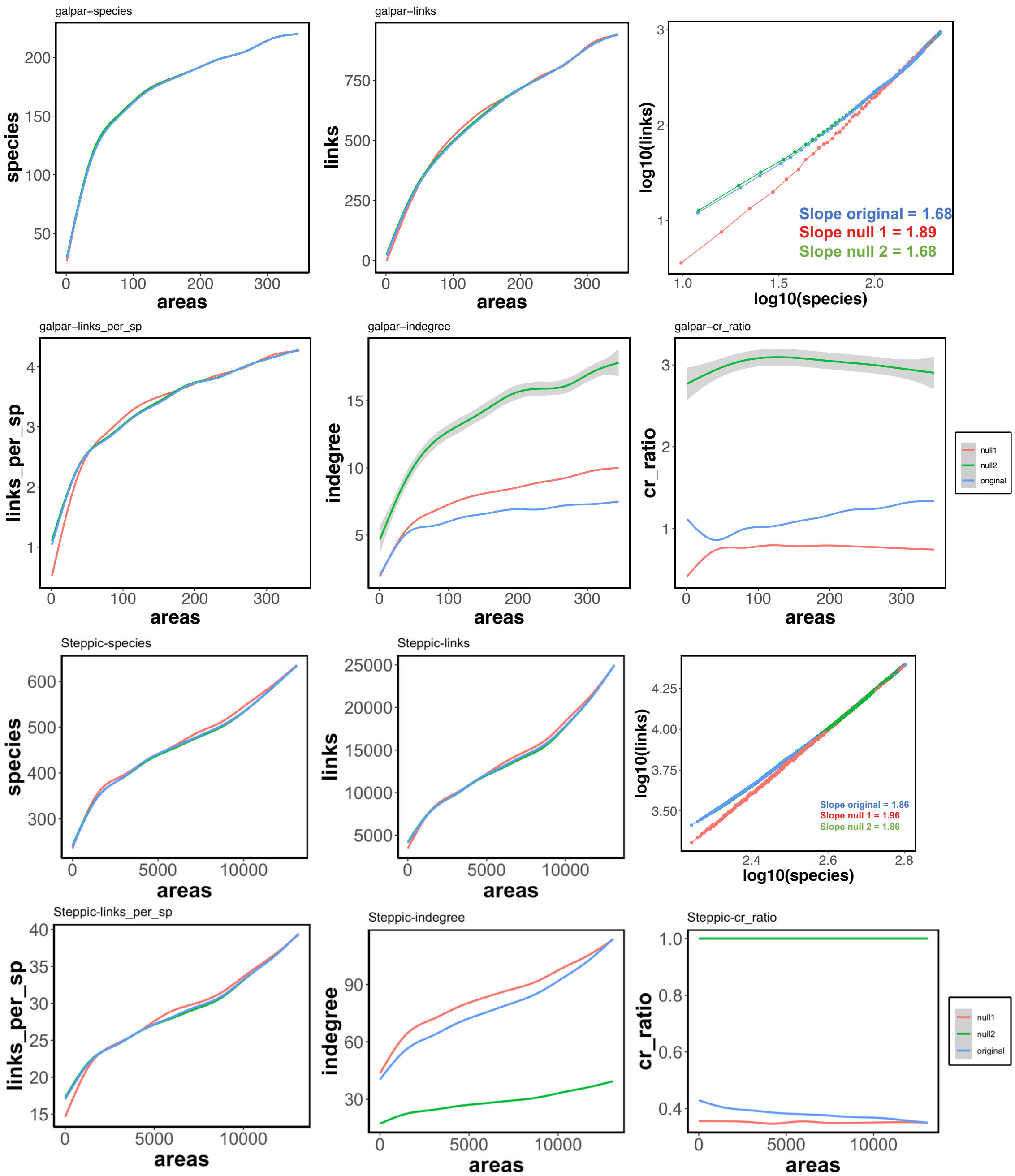

Garraf PP-species
species
areas
Garraf PP-links
links
areas
log10(links)
log10(species)
null1
null2
original
Slope original = 1.23
Slope null 1 = 1.87
Slope null 2 = 1.24
Garraf PP-links_per_sp
links_per_sp
areas
Garraf PP-indegree
indegree
areas
Garraf PP-cr_ratio
cr_ratio
areas
Garraf HP-species
species
areas
Garraf HP-links
links
areas
log10(links)
log10(species)
null1
null2
original
Slope original = 1.31
Slope null 1 = 1.89
Slope null 2 = 1.33
Garraf HP-links_per_sp
links_per_sp
areas
Garraf HP-indegree
indegree
areas
Garraf HP-cr_ratio
cr_ratio
areas

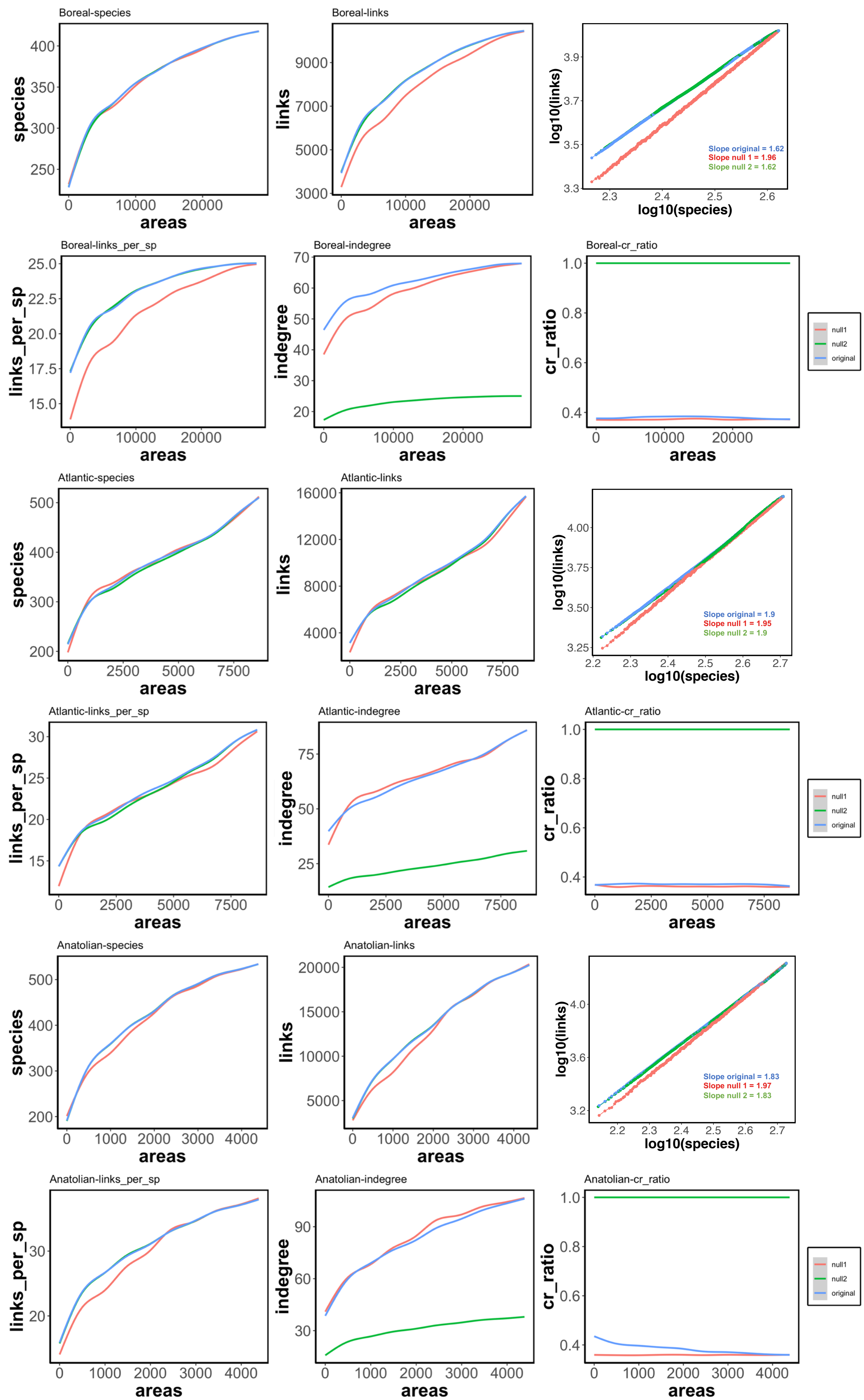


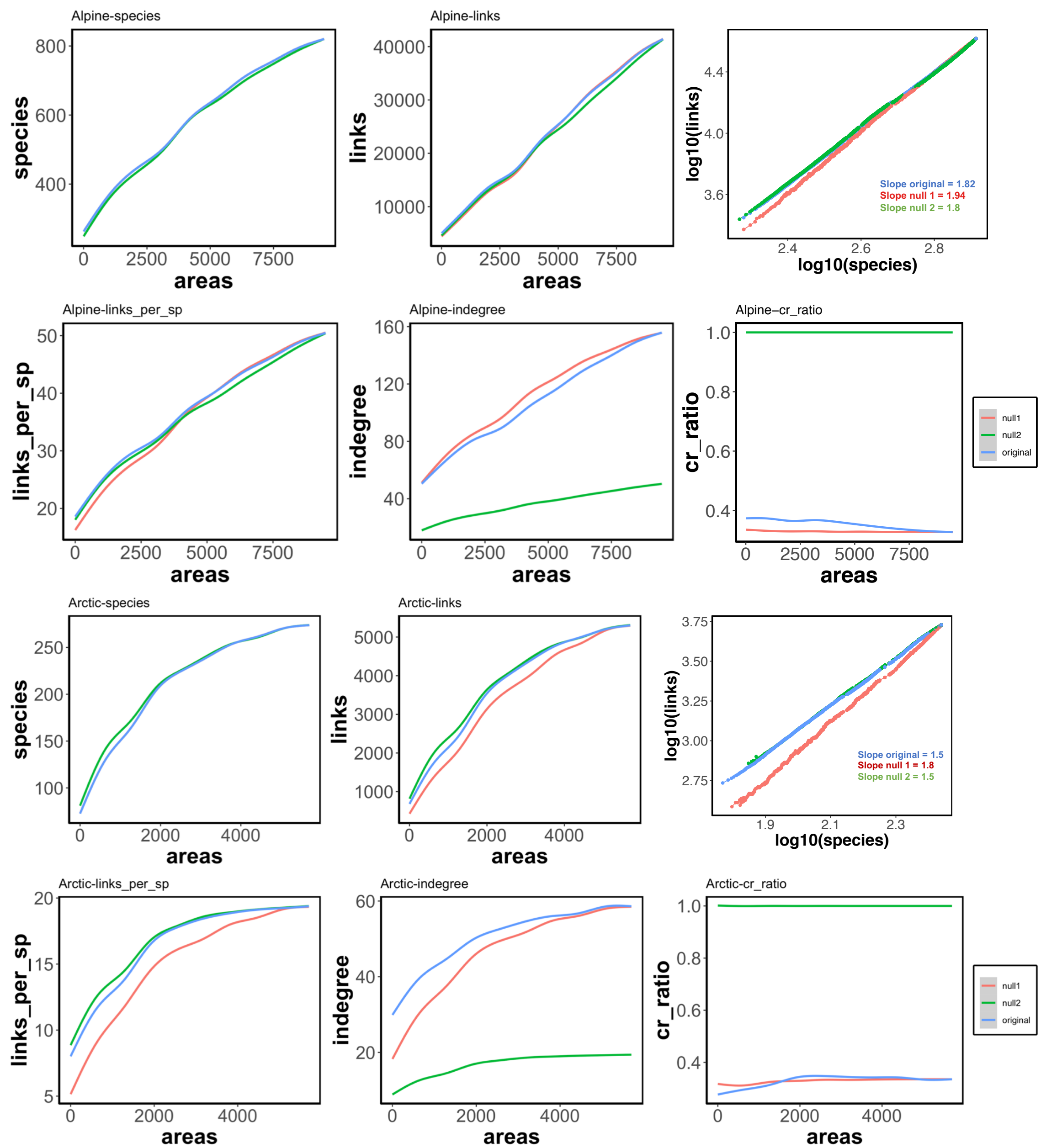
Chaco-species
species
areas
Chaco–links
links
areas
log10(links)
log10(species)
Slope original = 1.69
Slope null 1 = 1.96
Slope null 2 = 1.71
null1
null2
original
Chaco–links_per_sp
links_per_sp
areas
Chaco–indegree
indegree
areas
Chaco–cr_ratio
cr_ratio
areas
Soil 1-species
species
areas
Soil 1-links
links
areas
log10(links)
log10(species)
Slope original = 1.78
Slope null 1 = 2
Slope null 2 = 1.77
null1
null2
original
Soil 1-links_per_sp
links_per_sp
areas
Soil 1-indegree
indegree
areas
Soil 1-cr_ratio
cr_ratio
areas

B) BIOGEOGRAPHICAL SPATIAL DOMAIN

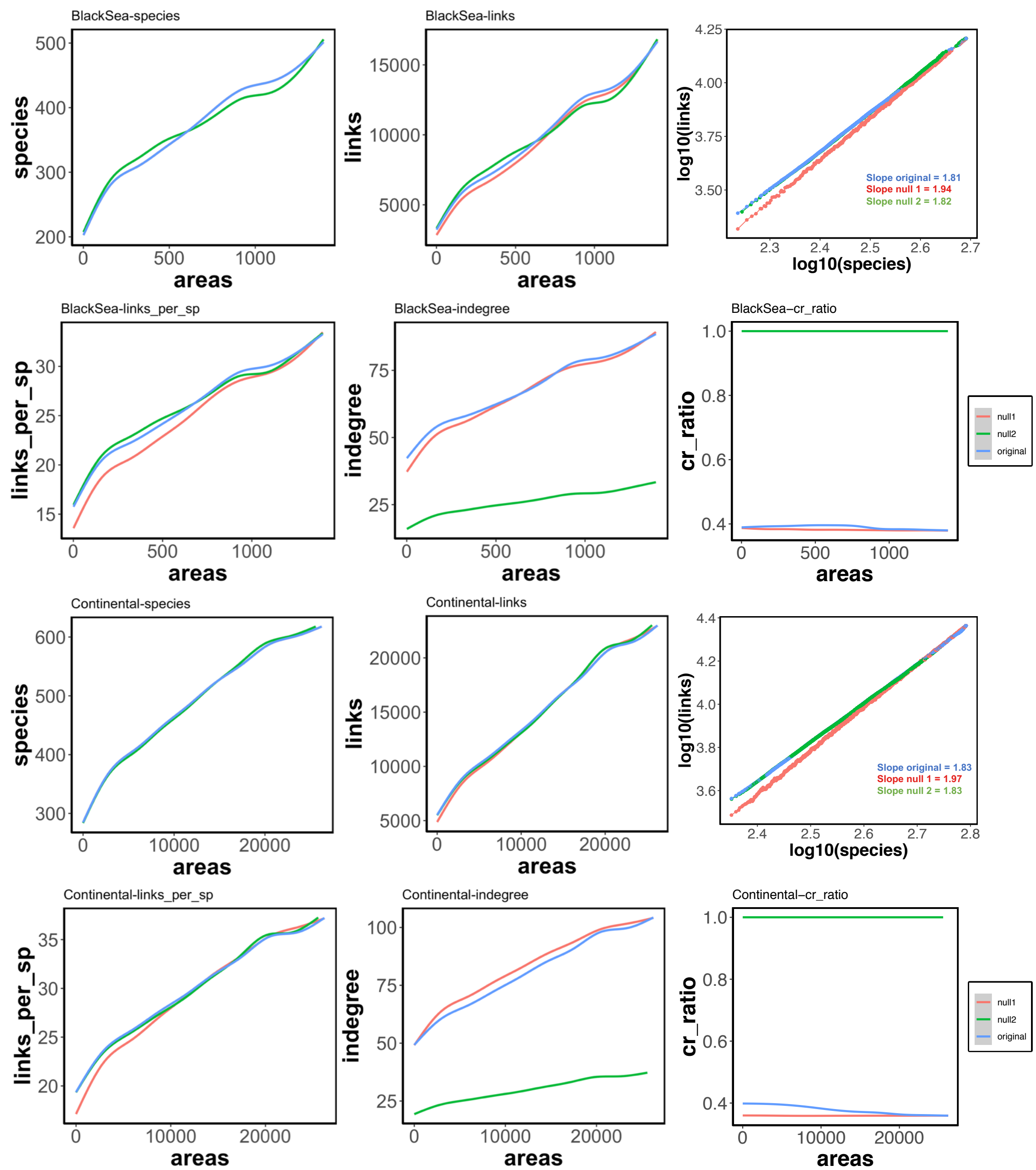


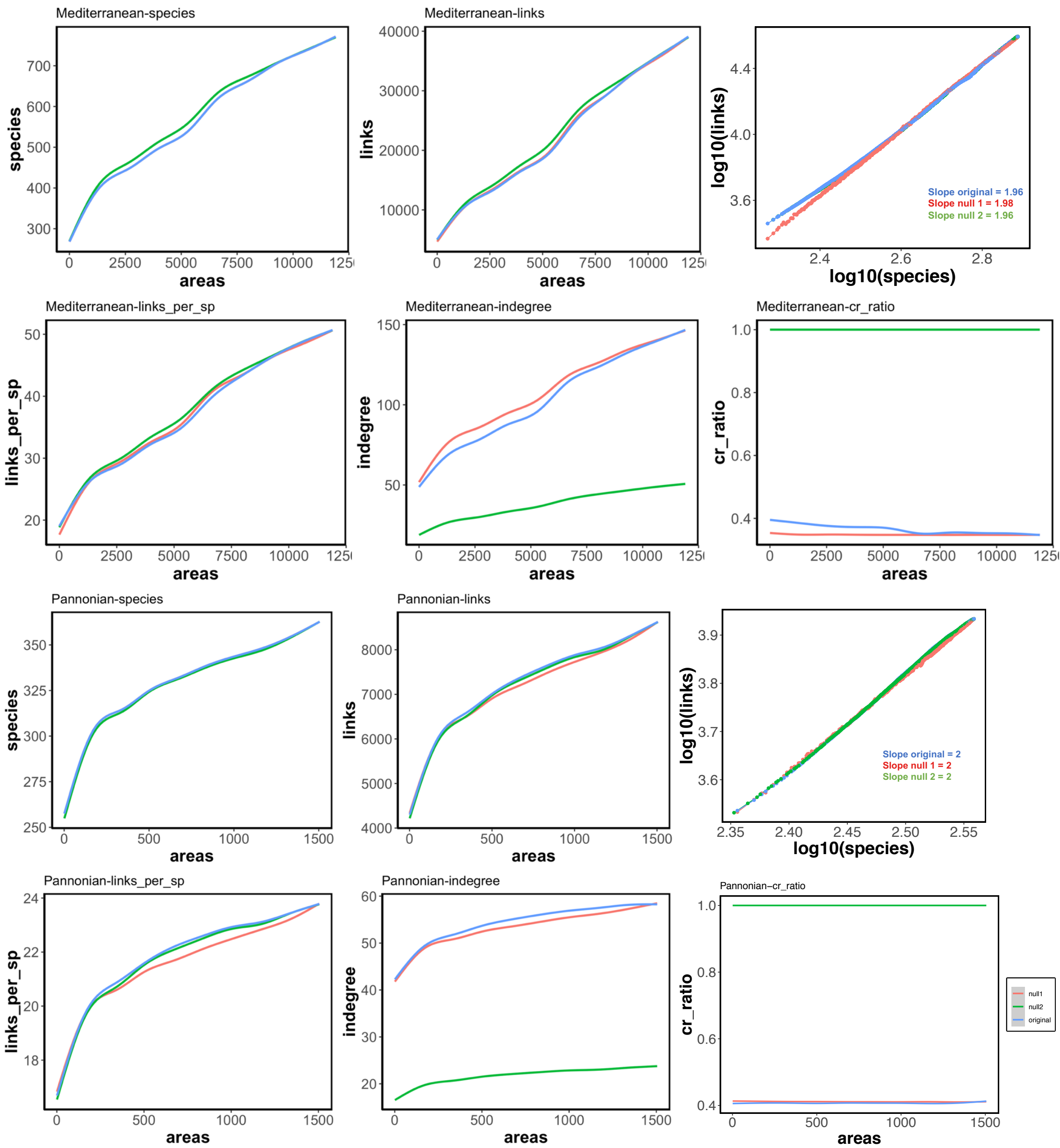

galpar–species
species
areas
galpar–links
links
areas
log10(links)
log10(species)
Slope original = 1.68
Slope null 1 = 1.89
Slope null 2 = 1.68
galpar–links_per_sp
links_per_sp
areas
galpar–indegree
indegree
areas
galpar–cr_ratio
cr_ratio
areas
null1
null2
original
Steppic-species
species
areas
Steppic-links
links
areas
log10(links)
log10(species)
Slope original = 1.86
Slope null 1 = 1.96
Slope null 2 = 1.86
Steppic-links_per_sp
links_per_sp
areas
Steppic-indegree
indegree
areas
Steppic-cr_ratio
cr_ratio
areas
null1
null2
original


Boreal-species
species
areas
Boreal-links
links
areas
log10(links)
log10(species)
Slope original = 1.62
Slope null 1 = 1.96
Slope null 2 = 1.62
Boreal-links_per_sp
links_per_sp
areas
Boreal-indegree
indegree
areas
Boreal-cr_ratio
cr_ratio
areas
null1
null2
original
Atlantic-species
species
areas
Atlantic-links
links
areas
log10(links)
log10(species)
Slope original = 1.9
Slope null 1 = 1.95
Slope null 2 = 1.9
Atlantic-links_per_sp
links_per_sp
areas
Atlantic-indegree
indegree
areas
Atlantic-cr_ratio
cr_ratio
areas
null1
null2
original
Anatolian-species
species
areas
Anatolian-links
links
areas
log10(links)
log10(species)
Slope original = 1.83
Slope null 1 = 1.97
Slope null 2 = 1.83
Anatolian-links_per_sp
links_per_sp
areas
Anatolian-indegree
indegree
areas
Anatolian-cr_ratio
cr_ratio
areas
null1
null2
original



Alpine-species
Alpine-links
Slope original = 1.82
Slope null 1 = 1.94
Slope null 2 = 1.8
log10(links)
log10(species)
Alpine-links_per_sp
Alpine-indegree
Alpine–cr_ratio
null1
null2
original
Arctic-species
Arctic-links
Slope original = 1.5
Slope null 1 = 1.8
Slope null 2 = 1.5
Arctic-links_per_sp
Arctic-indegree
Arctic-cr_ratio
species
links
links_per_sp
indegree
cr_ratio
areas


BlackSea-species
BlackSea-links
Slope original = 1.81
Slope null 1 = 1.94
Slope null 2 = 1.82
log10(links)
log10(species)
BlackSea-links_per_sp
BlackSea-indegree
BlackSea−cr_ratio
null1
null2
original
Continental-species
Continental-links
Slope original = 1.83
Slope null 1 = 1.97
Slope null 2 = 1.83
Continental-links_per_sp
Continental-indegree
Continental−cr_ratio
species
links
links_per_sp
indegree
cr_ratio
areas



Mediterranean-species
species
areas
Mediterranean-links
links
areas
log10(links)
log10(species)
Slope original = 1.96
Slope null 1 = 1.98
Slope null 2 = 1.96
Mediterranean-links_per_sp
links_per_sp
areas
Mediterranean-indegree
indegree
areas
Mediterranean-cr_ratio
cr_ratio
areas
Pannonian-species
species
areas
Pannonian-links
links
areas
log10(links)
log10(species)
Slope original = 2
Slope null 1 = 2
Slope null 2 = 2
Pannonian-links_per_sp
links_per_sp
areas
Pannonian-indegree
indegree
areas
Pannonian-cr_ratio
cr_ratio
areas
null1
null2
original

Supplementary Table 5. Proportion of values that fell within the 95% confidence interval of the original data for each null model for regional datasets. The 95% confidence interval of the original data was calculated for each network property at each spatial extent. Then we calculated the proportion of values of each null model that fell within this confidence interval. **A) Null model 1 for regional datasets. B) Null model 2 for regional datasets.** Notice that for null model 1 almost all values of species richness (proportion close to 1) were within the confidence interval since the number of species was explicitly set to be the same as in the original data. The proportion of number of links, links per species, indegree and consumer:resource ratio was much more variable across datasets and smaller. Similarly, for null model 2, the proportion of values of species, links and links of species that fell within the confidence interval was close to 1, while for indegree and consumer:resource ratio was much smaller (specially for bipartite networks).

A) Null model 1 for regional domain

Dataset	species	links	links_per_sp	indegree	cr_ratio
Bristol	0.96	0.80	0.80	0.80	0.86
Chaco	0.96	0.82	0.59	0.59	0.77
Garraf HP	0.95	0.65	0.51	0.82	0.36
Garraf PP	0.96	0.41	0.27	0.57	0.27
Garraf PP2	0.96	0.78	0.68	0.90	0.46
Gottin HP	0.98	0.69	0.39	0.81	0.57
Gottin PP	0.94	0.52	0.37	0.74	0.41
Montseny	0.96	0.65	0.42	0.77	0.43
Nahuel	0.98	0.46	0.47	0.81	0.44
Olot	0.96	0.61	0.66	0.64	0.36
Quercus	0.95	0.71	0.61	0.64	0.41
Sanak	0.96	0.67	0.53	0.00	0.78
Soil 1	0.97	0.86	0.77	0.77	0.78
Soil 2	0.97	0.91	0.84	0.84	0.72
Soil 3	0.97	0.82	0.68	0.68	0.61
Soil 4	0.95	0.85	0.72	0.72	0.62
Soil 5	0.96	0.95	0.89	0.89	0.71
Soil 6	0.94	0.93	0.89	0.89	0.68
Soil 7	0.97	0.90	0.81	0.81	0.76

B) Null model 2 for regional domain

Dataset	species	links	links_per_sp	indegree	cr_ratio
Bristol	0.96	0.97	0.95	0.95	0.00
Chaco	0.97	0.98	0.96	0.96	0.00
Garraf HP	0.95	0.95	0.96	0.24	0.14
Garraf PP	0.95	0.96	0.98	0.16	0.06
Garraf PP2	0.97	0.95	0.95	0.20	0.07
Gottin HP	0.99	0.99	0.97	0.31	0.18
Gottin PP	0.95	0.95	0.97	0.17	0.12
Montseny	0.96	0.96	0.97	0.19	0.13
Nahuel	0.99	0.99	0.96	0.17	0.05
Olot	0.97	0.96	0.96	0.18	0.11
Quercus	0.94	0.95	0.97	0.18	0.09
Sanak	0.95	0.96	0.95	0.00	0.00
Soil 1	0.96	0.96	0.96	0.96	0.00
Soil 2	0.96	0.97	0.96	0.96	0.00
Soil 3	0.96	0.97	0.95	0.95	0.00
Soil 4	0.95	0.95	0.96	0.96	0.00
Soil 5	0.96	0.95	0.98	0.98	0.00
Soil 6	0.94	0.95	0.96	0.96	0.00
Soil 7	0.97	0.96	0.97	0.97	0.00

Supplementary Table 6. Proportion of values that fell within the 95% confidence interval of the original data for each null model for biogeographical datasets. The 95% confidence interval of the original data was calculated for each network property at each spatial extent. Then we calculated the proportion of values of each null model that fell within this confidence interval. **A) Null model 1 for biogeographical datasets. B) Null model 2 for biogeographical datasets.** Notice that for null model 1 almost all values of species richness (proportion close to 1) were within the confidence interval since the number of species was explicitly set to be the same as in the original data. The proportion of number of links, links per species, indegree and consumer:resource ratio was much more variable across datasets and smaller. Similarly, for null model 2, the proportion of values of species, links and links of species that fell within the confidence interval was close to 1, while for indegree and consumer:resource ratio was much smaller (specially for bipartite networks).

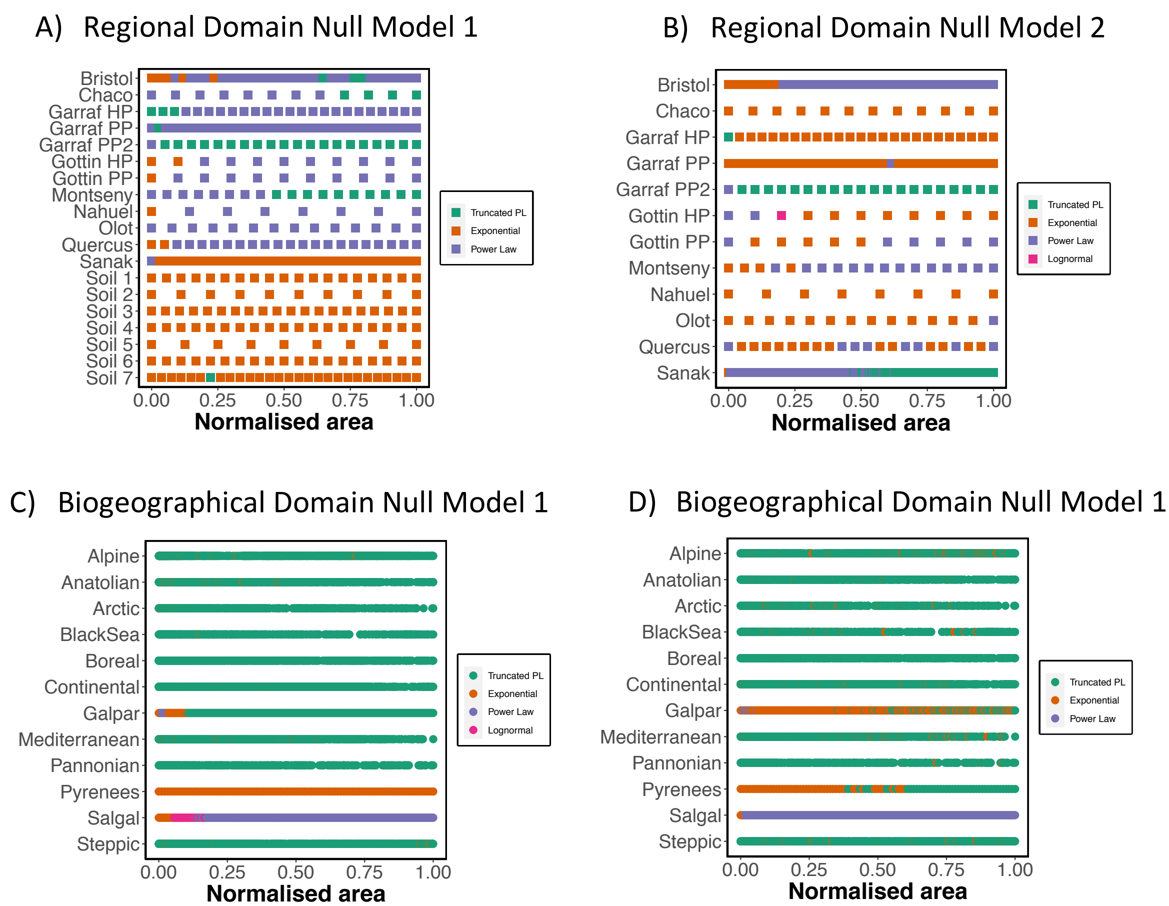
A) Null model 1 for biogeographical domain

Dataset	species	links	links_per_sp	indegree	cr_ratio
Alpine	0.98	0.95	0.80	0.72	0.65
Anatolian	0.94	0.94	0.80	0.91	0.38
Arctic	0.99	1.00	0.99	0.83	0.92
Atlantic	0.95	0.99	0.97	0.97	0.81
BlackSea	0.91	0.90	0.69	0.68	0.77
Boreal	1.00	0.83	0.48	0.52	0.86
Continental	0.97	0.76	0.52	0.72	0.66
Mediterranean	0.95	0.94	0.91	0.88	0.55
Pannonian	0.98	0.98	0.95	0.96	0.77
Steppic	0.97	0.96	0.84	0.85	0.19
galpar	0.97	0.86	0.73	0.38	0.34
pyrenees	0.97	0.90	0.76	0.62	0.66
salgal	0.92	0.69	0.34	0.48	0.01

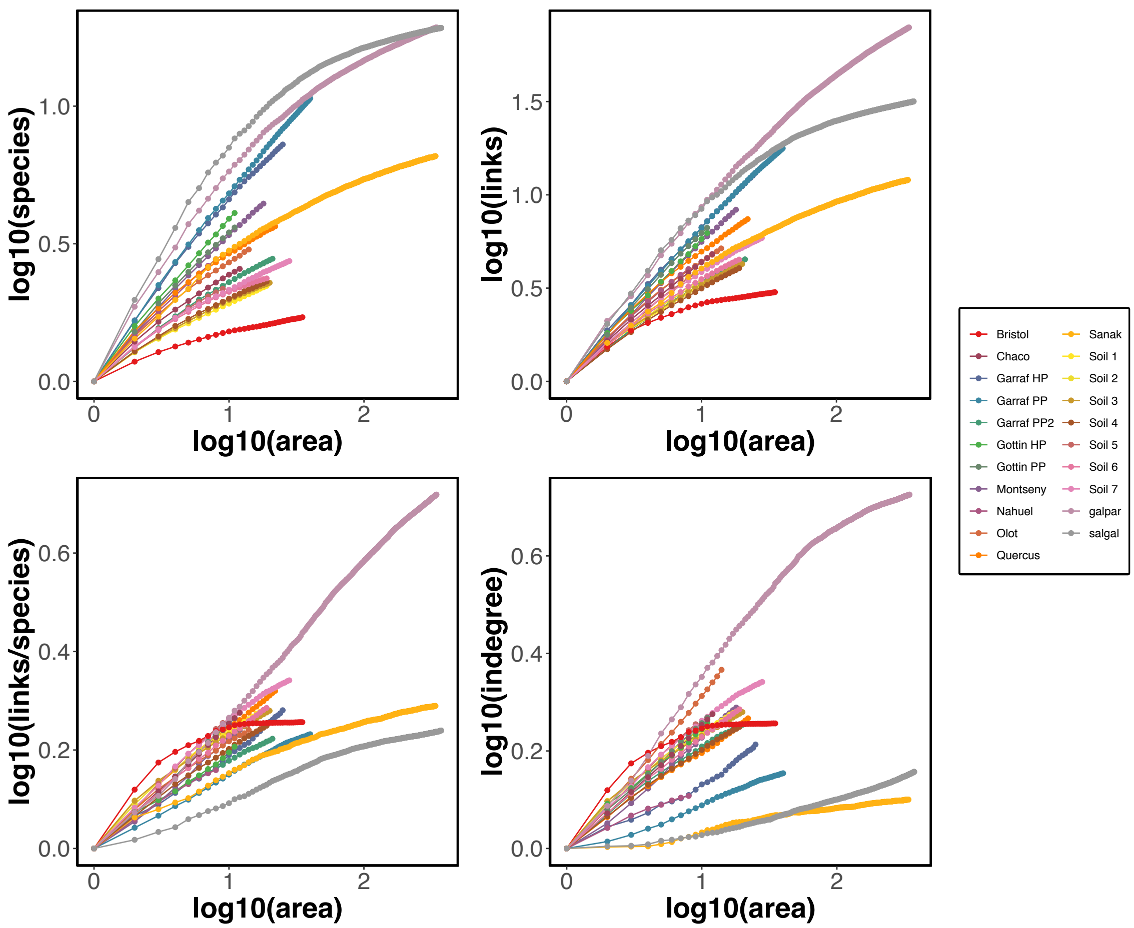
B) Null model 2 for biogeographical domain

Dataset	species	links	links_per_sp	indegree	cr_ratio
Alpine	0.99	1.00	1.00	0.00	0.00
Anatolian	0.97	0.97	0.96	0.00	0.00
Arctic	0.99	0.99	1.00	0.57	0.00
Atlantic	0.94	0.98	0.97	0.00	0.00
BlackSea	0.92	0.94	0.99	0.00	0.00
Boreal	1.00	1.00	1.00	0.00	0.00
Continental	0.94	0.94	0.96	0.00	0.00
Mediterranean	0.89	0.89	0.93	0.00	0.00
Pannonian	0.98	0.98	0.97	0.00	0.00
Steppic	0.99	0.96	0.96	0.00	0.00
galpar	0.97	0.98	0.98	0.20	0.12
pyrenees	0.96	0.96	0.95	0.00	0.00
salgal	0.92	0.95	0.99	0.13	0.08

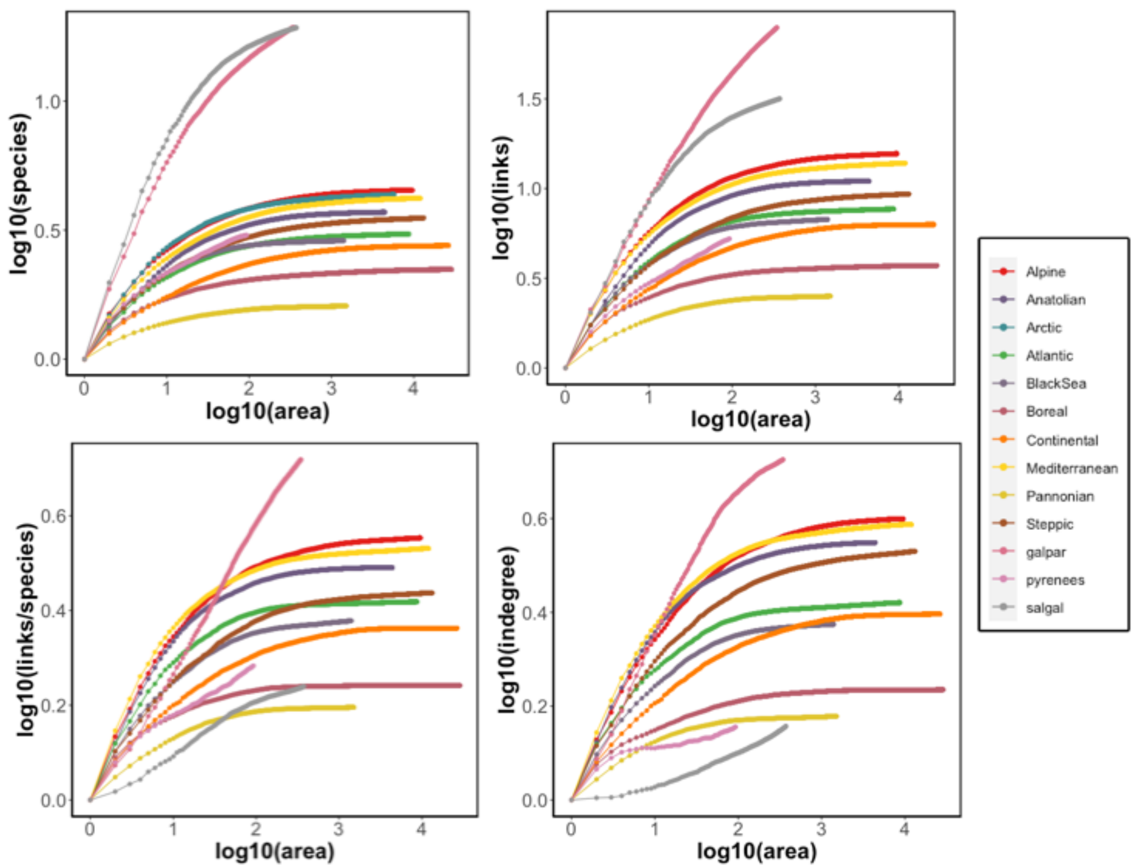
Supplementary Figure 6. Null model comparison of the spatial scaling of degree distributions. The top-ranked model describing the degree distribution of each ecological network across the area range using the null model 1 and the null model 2. Area values were re-scaled between 0 and 1. In **A** and **B**, we show the comparison for the regional datasets of null models 1 and 2, respectively. In **C** and **D**, we show the comparison for the biogeographical datasets of null models 1 and 2, respectively. For regional datasets, the spatial scaling of degree distributions of the networks built with null model 1 resembled the patterns observed in the original networks, suggesting that important structural patterns such as the degree distribution might be inhereted from the metaweb. In contrast, networks built with null model 2 showed very different scaling patterns for network degree distributions. The degree distributions of many of the datasets were best represented by an exponential function, which corresponds with the random distribution of links used in null model 2. Soil food webs are not presented in the plot below for null model 2 because none of the models tested fitted their degree distributions. For biogeographical datasets we did not observe such big differences between the patterns observe for null model 1 and null model 2. Most differences were observed with the empirically sampled network galpar that showed similar patterns as the ones described for the regional networks.



Supplementary Figure 7. Spatial scaling of species, links, links/species and indegree for all datasets where networks were build based on empirical sampling of species and interactions. This corresponds to all regional networks plus the biogeographical networks ‘Salgal’ and ‘Galpar’(Kopelke et al. Ecology 2017). We do this analysis to test the potential effect of the data type on the patterns observed given that while for the regional datasets, all networks were built from empirical sampling of both species and the interactions, most datasets in the biogeographical category were based on inferred interactions using different methodologies. For all datasets analysed here (including the two biogeographical datasets) we used the random aggregation of spatial units. For each dataset, each point represents the mean value of the analysed network property across the total amount of replicates in the aggregation procedure, for a given area. All network properties have been re-scaled for all datasets to start at 0. We observe that when analysing empirically-sampled datasets alone, even those expanding large spatial extents show similar scaling patterns. However, obtaining empirically sampled data of ecological interactions for domains encompassing full continents is truly challenging.



Supplementary Figure 8. Spatial scaling of species, links, links/species and indegree for biogeographical networks using the random aggregation of spatial units.
Another potential driver of the differences observed across spatial domains could be the aggregation procedure used in each case. While the spatial units of the regional datasets were aggregated randomly, for the biogeographical datasets we employed an aggregation method based on neighbouring cells (see Methods). Due to the large spatial extent covered by these datasets, an aggregation procedure where each aggregated sampling unit is randomly selected in space will generate a much faster increase of network properties with area due to the large heterogeneity encapsulated in the spatial units. For each dataset, each point represents the mean value of the analysed network property across the total amount of replicates in the aggregation procedure, for a given area. All network properties have been re-scaled for all datasets to start at 0. Notice that with the random aggregation procedure the spatial scaling of network properties do not follow a function of the power law family (see Supplementary Table 5).



Supplementary Table 7. Fit of the best functions for the relationship of species with area size for each dataset of the biogeographical category when using random aggregation of spatial units. We only illustrate the relationship between species and area due to space constraints, but the rest of the network properties analysed behave similarly. We used nonlinear least squares (NLS) with the 'nls' function in R. The scaling functions described in Table S4 were fitted to each dataset. In the *Model* column the best ranked model based on AIC comparison is shown. For all models selected $R^2 > 0.95$.

Dataset	Property	Model	Rank	AIC	Param	Estimate	Std. Error	t value
Alpine	species	Cumulative Weibull 4 par.	1	-17889.82	d	826.56	0.02	38975.45
Alpine	species	Cumulative Weibull 4 par.	1	-17889.82	c	5.01	0.01	260.89
Alpine	species	Cumulative Weibull 4 par.	1	-17889.82	z	0.07	0.00	337.61
Alpine	species	Cumulative Weibull 4 par.	1	-17889.82	f	218.87	4.35	50.22
Alpine	species	MMF	2	-10071.86	d	830.28	0.01	46426.45
Alpine	species	MMF	2	-10071.86	c	2.98	0.00	1114.89
Alpine	species	MMF	2	-10071.86	z	0.59	0.00	2827.22
Alpine	species	Heleg(Logistic)	3	-10071.6	c	278.21	0.25	1096.30
Alpine	species	Heleg(Logistic)	3	-10071.6	f	0.33	0.00	1114.86
Alpine	species	Heleg(Logistic)	3	-10071.6	z	0.59	0.00	2827.66
Anatolian	species	Cumulative Weibull 4 par.	1	-11766.87	d	535.41	0.01	47963.87
Anatolian	species	Cumulative Weibull 4 par.	1	-11766.87	c	2.42	0.00	273.81
Anatolian	species	Cumulative Weibull 4 par.	1	-11766.87	z	0.15	0.00	427.98
Anatolian	species	Cumulative Weibull 4 par.	1	-11766.87	f	14.47	0.14	100.53
Anatolian	species	Beta-P cumulative	2	-9405.35	d	536.83	0.01	28027.67
Anatolian	species	Beta-P cumulative	2	-9405.35	c	16.86	0.17	98.42
Anatolian	species	Beta-P cumulative	2	-9405.35	z	0.55	0.00	625.71
Anatolian	species	Beta-P cumulative	2	-9405.35	f	1.70	0.00	248.97
Anatolian	species	MMF	3	-1798.3	d	539.43	0.02	18678.55
Anatolian	species	MMF	3	-1798.3	c	3.20	0.00	417.77
Anatolian	species	MMF	3	-1798.3	z	0.70	0.00	1068.48
Arctic	species	Beta-P cumulative	1	-16131.4	d	280.34	0.01	14492.93
Arctic	species	Beta-P cumulative	1	-16131.4	c	1.49	0.00	198.62
Arctic	species	Beta-P cumulative	1	-16131.4	z	1.14	0.00	144.80
Arctic	species	Beta-P cumulative	1	-16131.4	f	0.41	0.00	124.77
Arctic	species	Extended Power model 2	2	-13720.79	c	252.68	0.04	5255.03
Arctic	species	Extended Power model 2	2	-13720.79	z	0.01	0.00	429.28
Arctic	species	Extended Power model 2	2	-13720.79	d	1.86	0.00	1030.43
Atlantic	species	Beta-P cumulative	1	-17671.55	d	516.08	0.02	25688.16
Atlantic	species	Beta-P cumulative	1	-17671.55	c	1.30	0.00	196.12

Atlantic	species	Beta-P cumulative	1	-17671.55	z	0.81	0.00	319.82
Atlantic	species	Beta-P cumulative	1	-17671.55	f	0.61	0.00	243.12
Atlantic	species	MMF	2	-13130.03	d	513.96	0.01	36914.94
Atlantic	species	MMF	2	-13130.03	c	1.85	0.00	758.64
Atlantic	species	MMF	2	-13130.03	z	0.58	0.00	1746.25
Atlantic	species	Heleg(Logistic)	3	-13129.66	c	276.91	0.37	748.45
Atlantic	species	Heleg(Logistic)	3	-13129.66	f	0.53	0.00	758.68
Atlantic	species	Heleg(Logistic)	3	-13129.66	z	0.58	0.00	1746.33
BlackSea	species	Beta-P cumulative	1	-1903.32	d	492.85	0.04	11302.18
BlackSea	species	Beta-P cumulative	1	-1903.32	c	5.44	0.11	46.06
BlackSea	species	Beta-P cumulative	1	-1903.32	z	0.64	0.00	229.84
BlackSea	species	Beta-P cumulative	1	-1903.32	f	1.51	0.01	99.25
BlackSea	species	Cumulative Weibull 4 par.	2	-1680.52	d	491.68	0.03	12986.87
BlackSea	species	Cumulative Weibull 4 par.	2	-1680.52	c	3.23	0.04	73.25
BlackSea	species	Cumulative Weibull 4 par.	2	-1680.52	z	0.14	0.00	102.12
BlackSea	species	Cumulative Weibull 4 par.	2	-1680.52	f	26.44	1.23	21.35
BlackSea	species	MMF	3	-695.78	d	494.60	0.04	11524.25
BlackSea	species	MMF	3	-695.78	c	2.02	0.00	300.16
BlackSea	species	MMF	3	-695.78	z	0.78	0.00	630.22
Boreal	species	PowerR	1	-76028.13	f	424.10	0.00	57195.60
Boreal	species	PowerR	1	-76028.13	c	-232.26	0.13	-1750.88
Boreal	species	PowerR	1	-76028.13	z	-0.35	0.00	-2506.27
Boreal	species	Cumulative Weibull 4 par.	2	-57454.9	d	422.62	0.00	112324.68
Boreal	species	Cumulative Weibull 4 par.	2	-57454.9	c	25.96	0.00	4953.07
Boreal	species	Cumulative Weibull 4 par.	2	-57454.9	z	0.01	0.00	172.51
Boreal	species	Cumulative Weibull 4 par.	2	-57454.9	f	124.10	5003	2491.99
Boreal	species	Beta-P cumulative	3	-51806.74	d	422.81	0.02	20666.43
Boreal	species	Beta-P cumulative	3	-51806.74	c	0.50	0.00	60.23
Boreal	species	Beta-P cumulative	3	-51806.74	z	0.47	0.00	174.15
Boreal	species	Beta-P cumulative	3	-51806.74	f	0.86	0.00	126.81
Continental	species	Cumulative Weibull 3 par.	1	-14761.12	d	618.51	0.00	83870.50
Continental	species	Cumulative Weibull 3 par.	1	-14761.12	c	0.60	0.00	1534.97
Continental	species	Cumulative Weibull 3 par.	1	-14761.12	z	0.24	0.00	2167.98
Continental	species	MMF	2	-1472.28	d	624.72	0.01	35925.43
Continental	species	MMF	2	-1472.28	c	2.28	0.00	574.32
Continental	species	MMF	2	-1472.28	z	0.54	0.00	1511.54
Continental	species	Heleg(Logistic)	3	-1472.17	c	273.62	0.48	567.94

Continental	species	Heleg(Logistic)	3	-1472.17	f	0.43	0.00	574.30
Continental	species	Heleg(Logistic)	3	-1472.17	z	0.54	0.00	1511.63
Galpar	species	Beta-P cumulative	1	-474.79	d	547.92	17.1	31.99
Galpar	species	Beta-P cumulative	1	-474.79	c	5.69	0.23	23.93
Galpar	species	Beta-P cumulative	1	-474.79	z	0.96	0.01	73.61
Galpar	species	Beta-P cumulative	1	-474.79	f	0.12	0.00	15.98
Galpar	species	Cumulative Weibull 4 par.	2	-226.13	d	326.4	6.16	52.92
Galpar	species	Cumulative Weibull 4 par.	2	-226.13	c	4.65	0.76	6.07
Galpar	species	Cumulative Weibull 4 par.	2	-226.13	z	0.06	0.01	6.72
Galpar	species	Cumulative Weibull 4 par.	2	-226.13	f	351.37	275	1.27
Galpar	species	Extended Power model 1	3	-105.94	c	12.81	0.15	81.75
Galpar	species	Extended Power model 1	3	-105.94	z	0.93	0.00	140.04
Galpar	species	Extended Power model 1	3	-105.94	d	0.11	0.00	215.22
Mediterranean	species	Beta-P cumulative	1	-12912.53	d	784.07	0.03	23174.61
Mediterranean	species	Beta-P cumulative	1	-12912.53	c	4.28	0.02	161.73
Mediterranean	species	Beta-P cumulative	1	-12912.53	z	0.62	0.00	501.1
Mediterranean	species	Beta-P cumulative	1	-12912.53	f	0.85	0.00	310.73
Mediterranean	species	Cumulative Weibull 4 par.	2	-10977.86	d	780.84	0.03	20286.92
Mediterranean	species	Cumulative Weibull 4 par.	2	-10977.86	c	7.44	0.06	120.91
Mediterranean	species	Cumulative Weibull 4 par.	2	-10977.86	z	0.05	0.00	145.34
Mediterranean	species	Cumulative Weibull 4 par.	2	-10977.86	f	2505.18	156	15.96
Mediterranean	species	MMF	3	-10701.06	d	782.66	0.01	42529.49
Mediterranean	species	MMF	3	-10701.06	c	2.75	0.00	1021.47
Mediterranean	species	MMF	3	-10701.06	z	0.57	0.00	2552.00
Pannonian	species	Beta-P cumulative	1	-2318.94	d	364.90	0.07	5018.65
Pannonian	species	Beta-P cumulative	1	-2318.94	c	0.50	0.02	18.18
Pannonian	species	Beta-P cumulative	1	-2318.94	z	0.57	0.01	57.86
Pannonian	species	Beta-P cumulative	1	-2318.94	f	1.03	0.02	36.68
Pannonian	species	MMF	2	-2265.52	d	364.92	0.03	10260.57
Pannonian	species	MMF	2	-2265.52	c	0.64	0.00	312.60
Pannonian	species	MMF	2	-2265.52	z	0.58	0.00	444.75
Pannonian	species	Heleg(Logistic)	3	-2265.51	c	563.34	1.83	307.46
Pannonian	species	Heleg(Logistic)	3	-2265.51	f	1.54	0.00	312.62
Pannonian	species	Heleg(Logistic)	3	-2265.51	z	0.58	0.00	444.77
Pyrenees	species	Persistence function 2	1	-32.25	c	111.54	0.47	235.00
Pyrenees	species	Persistence function 2	1	-32.25	z	0.13	0.00	130.83
Pyrenees	species	Persistence function 2	1	-32.25	d	0.52	0.01	41.73

Pyrenees	species	PowerR	2	1.23	f	440.59	16.5	26.66
Pyrenees	species	PowerR	2	1.23	c	-372.68	15.9	-23.35
Pyrenees	species	PowerR	2	1.23	z	-0.09	0.00	-17.14
Pyrenees	species	Cumulative Weibull 4 par.	3	44.04	d	292.19	25.6	11.40
Pyrenees	species	Cumulative Weibull 4 par.	3	44.04	c	11.52	18.4	0.62
Pyrenees	species	Cumulative Weibull 4 par.	3	44.04	z	0.02	0.03	0.61
Pyrenees	species	Cumulative Weibull 4 par.	3	44.04	f	139.21	257	0.05
Salgal	species	Beta-P cumulative	1	-769.91	d	177.76	0.56	313.12
Salgal	species	Beta-P cumulative	1	-769.91	c	6.20	0.13	46.42
Salgal	species	Beta-P cumulative	1	-769.91	z	1.19	0.01	96.99
Salgal	species	Beta-P cumulative	1	-769.91	f	0.36	0.00	43.69
Salgal	species	Cumulative Weibull 4 par.	2	-530.02	d	166.44	0.70	237.30
Salgal	species	Cumulative Weibull 4 par.	2	-530.02	c	7.91	0.96	8.20
Salgal	species	Cumulative Weibull 4 par.	2	-530.02	z	0.06	0.00	9.28
Salgal	species	Cumulative Weibull 4 par.	2	-530.02	f	9749.94	9526	1.02
Salgal	species	MMF	3	-114.87	d	160.23	0.26	599.38
Salgal	species	MMF	3	-114.87	c	13.16	0.16	78.18
Salgal	species	MMF	3	-114.87	z	0.84	0.00	184.90
Steppic	species	Beta-P cumulative	1	-26858.14	d	647.97	0.02	24596.41
Steppic	species	Beta-P cumulative	1	-26858.14	c	2.17	0.01	207.38
Steppic	species	Beta-P cumulative	1	-26858.14	z	0.62	0.00	531.67
Steppic	species	Beta-P cumulative	1	-26858.14	f	0.70	0.00	362.06
Steppic	species	Cumulative Weibull 4 par.	2	-21146.5	d	644.80	0.03	20130.21
Steppic	species	Cumulative Weibull 4 par.	2	-21146.5	c	11.71	0.10	112.37
Steppic	species	Cumulative Weibull 4 par.	2	-21146.5	z	0.03	0.00	125.58
Steppic	species	Cumulative Weibull 4 par.	2	-21146.5	f	157.84	165	9.53
Steppic	species	MMF	3	-16337.23	d	645.12	0.01	35217.75
Steppic	species	MMF	3	-16337.23	c	2.12	0.00	1044.98
Steppic	species	MMF	3	-16337.23	z	0.50	0.00	2324.45