SUPPLEMENTARY INFORMATION

Supplementary Application 1 | https://sdray.shinyapps.io/globalspectr/

The hypervolume occupied by vascular plants in six-dimensional trait space. This application allows to obtain three-dimensional interactive representations of the hypervolume occupied by vascular plants in six-dimensional trait-space. Select three traits at a time to represent the observed data set. Trait values are $\log_{10}$- and z-transformed.

Supplementary Application 2 | https://sdray.shinyapps.io/globalspectrPC Interactive three-dimensional representations of the space occupied by vascular plants (blue symbols) in the six-dimensional trait space defined by different Principal Components (PC). PC 1 and PC 2 correspond to those reported in Fig. 2 and the first two columns of Extended Data Table 1.

Supplementary Table 1 | The world's vascular plant species are concentrated in six-trait space as compared to expectations under theoretical null models. Minimum number of cells within six-trait multivariate space (divided in $10^{\wedge 6}$ cells) needed to cover 10% (N10) or 50% (N50) of species in the observed hypervolume (Hv_{obs}) and in four different null-model simulated hypervolumes ($Hv_{nm1\text{-}4}$). For details see Methods.

Hypervolume	**N_{10}**	**N_{50}**
Hv_{obs}	11	141
hv_{nm1}	198	1084
hv_{nm2}	46	524
hv_{nm3}	43	458
hv_{nm4}	21	257

Supplementary Table 2. Taxonomic composition of functional hotspots. Representation (expressed as percentage) of different plant orders and families as a proportion of all species located in the functional hotspots (defined as the regions with ≥0.50 occurrence probability of species within the trait space defined by Principal Components 1 and 2 of Fig. 2a). Families according to The Plant List (https:www.theplantlist.org/; accessed 2015). Attribution of families to order according to APG III (2009) (http://www.mobot.org/MOBOT/research/APweb/)

Herbaceous hotspot				**Woody hotspot**			
Orders	%	Families	%	Orders	%	Families	%
Asterales	22,40	Compositae	20,69	Malpighiales	15,19	Leguminosae	11,60
Poales	20,55	Poaceae	14,10	Sapindales	13,08	Malvaceae	5,91
Geraniales	10,54	Leguminosae	5,53	Rosales	12,45	Fagaceae	5,49
Fabales	8,17	Cyperaceae	4,87	Fabales	12,03	Moraceae	5,06
Caryophyllales	5,40	Lamiaceae	4,22	Fagales	7,81	Sapindaceae	4,43
Rosales	4,35	Rosaceae	4,22	Malvales	7,38	Salicaceae	3,80
Malpighiales	4,08	Plantaginaceae	3,82	Magnoliales	5,91	Meliaceae	3,59
Ranunculales	3,43	Ranunculaceae	3,43	Gentianales	4,85	Rubiaceae	3,38
Gentianales	3,16	Caryophyllaceae	3,29	Myrtales	4,85	Annonaceae	3,38
Apiales	3,03	Apiaceae	3,03	Ericales	3,59	Euphorbiaceae	3,38
Ericales	2,24	Polygonaceae	2,24	Lamiales	3,38	Lauraceae	2,95
Brassicales	2,11	Brassicaceae	1,98	Laurales	3,16	Rosaceae	2,95
Asparagales	1,71	Orobanchaceae	1,98	Boraginales	1,48	Myrtaceae	2,32
Boraginales	1,58	Amaranthaceae	1,71	Apiales	0,63	Myristicaceae	2,11
Geraniales	1,45	Primulaceae	1,71	Cornales	0,63	Anacardiaceae	2,11
Myrtales	1,45	Boraginaceae	1,58	Brassicales	0,42	Bignoniaceae	1,90
Dipsacales	1,32	Rubiaceae	1,58	Oxalidales	0,42	Betulaceae	1,69
Liliales	0,53	Violaceae	1,58	Saxifragales	0,42	Boraginaceae	1,48
Saxifragales	0,53	Campanulaceae	1,45	Other (11 orders)	2,32	Sapotaceae	1,48
Malvales	0,40	Geraniaceae	1,45			Chrysobalanaceae	1,48
Solanales	0,26	Euphorbiaceae	1,45			Ulmaceae	1,48
Zygophyllales	0,26	Caprifoliaceae	1,32			Rutaceae	1,48
Other (8 orders)	1,05	Onagraceae	1,32			Lecythidaceae	1,27
		Juncaceae	1,32			Clusiaceae	1,27
		Gentianaceae	0,92			Dipterocarpaceae	1,27
		Amaryllidaceae	0,79			Combretaceae	1,27
		Asparagaceae	0,79			Burseraceae	1,27
		Apocynaceae	0,66			Apocynaceae	1,05
		Hypericaceae	0,53			Oleaceae	1,05
		Linaceae	0,53			Cannabaceae	1,05
		Polygalaceae	0,40			Olacaceae	0,84
		Liliaceae	0,40			Phyllanthaceae	0,84
		Menyanthaceae	0,26			Rhamnaceae	0,84
		Polemoniaceae	0,26			Urticaceae	0,84
		Scrophulariaceae	0,26			Araliaceae	0,63
		Verbenaceae	0,26			Cornaceae	0,63
		Malvaceae	0,26			Primulaceae	0,63
		Typhaceae	0,26			Juglandaceae	0,63
		Crassulaceae	0,26			Violaceae	0,63
		Saxifragaceae	0,26			Melastomataceae	0,63
		Convolvulaceae	0,26			Capparaceae	0,42
		Zygophyllaceae	0,26			Polygonaceae	0,42
		Other (19 families)	2,50			Loganiaceae	0,42
						Magnoliaceae	0,42
						Hypericaceae	0,42
						Rhizophoraceae	0,42
						Vochysiaceae	0,42
						Elaeocarpaceae	0,42
						Altingiaceae	0,42

Aquifoliaceae	0,21
Nyctaginaceae	0,21
Celastraceae	0,21
Staphyleaceae	0,21
Dilleniaceae	0,21
Adoxaceae	0,21
Ebenaceae	0,21
Ginkgoaceae	0,21
Welwitschiaceae	0,21
Lamiaceae	0,21
Verbenaceae	0,21
Monimiaceae	0,21
Achariaceae	0,21
Calophyllaceae	0,21
Centroplacaceae	0,21
Dichapetalaceae	0,21
Erythroxylaceae	0,21
Goupiaceae	0,21
Lacistemataceae	0,21
Malpighiaceae	0,21
Ochnaceae	0,21
Putranjivaceae	0,21
Bixaceae	0,21
Lythraceae	0,21
Picramniaceae	0,21
Platanaceae	0,21
Elaeagnaceae	0,21
Simaroubaceae	0,21
Solanaceae	0,21
Other (29 families)	6,12