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Global hotspots of plant phylodiversity

SUPPLEMENTARY

Melanie Tietje[1], Alexandre Antonelli[2,3,4], Félix Forest[2], Rafaël Govaerts[2], Stephen A. Smith[5], Miao Sun[6], William J. Baker[2,8,] Wolf L. Eiserhardt[1,2,7,8]

[1] Department of Biology, Aarhus University, Denmark
[2] Royal Botanic Gardens, Kew, Richmond, Surrey, UK
[3] Department of Plant Sciences, University of Oxford, UK
[4] Gothenburg Global Biodiversity Centre, University of Gothenburg, Sweden
[5] Department of Ecology & Evolutionary Biology, University of Michigan, Ann Arbor, USA
[6] Huazhong Agriculture University, China
[7] Aarhus Institute of Advanced Studies, Aarhus University, Denmark
[8] shared senior authors

Data

Table S1: Data sources

	Data	Description and source
Phylogeny	Phylogenetic tree for vascular plants	GBMB phylogenetic tree (Smith and Brown 2018), completed with missing species using TACT (Chang et al. 2020). Missing species were collected from the World Checklist of Vascular Plants (Govaerts et al. 2021)
Distribution	Presence-absence checklist for vascular plant species in TDWG level 3 units ("botanical countries")	World Checklist of Vascular Plants (Govaerts et al. 2021)
Region traits	Area	Size of unit, km^2
	Diversification rates	Mean root distance per botanical country from Tietje et al. (Tietje et al. 2022)
	Biome type coverage (14 vars)	Olson *et al.*, 2001 biome type coverage proportions
Threats	Human Footprint	Human Footprint Index (HFP) 2018 (Mu *et al.*, 2022). Human footprint summarises human pressure, measured using eight variables including built-up environments, population density, electric power infrastructure, crop lands, pasture lands, roads, railways, and navigable waterways.
	Deforestation	Forest loss during the period 2000–2021, defined as a stand-replacement disturbance, or a change from a forest to non-forest state. Botanical countries were cropped to forested areas using tree cover prior to extracting proportion of deforestation. https://data.globalforestwatch.org/documents/tree-cover-loss/explore
	Future temperature change	Change of annual mean temperature from today to the period 2071-2100 (CMIP6 SSP3-7.0) (Karger et al. 2017)
	Future precipitation change	Change of annual precipitation from today to the period 2071-2100 (CMIP6 SSP3-7.0) (Karger et al. 2017)

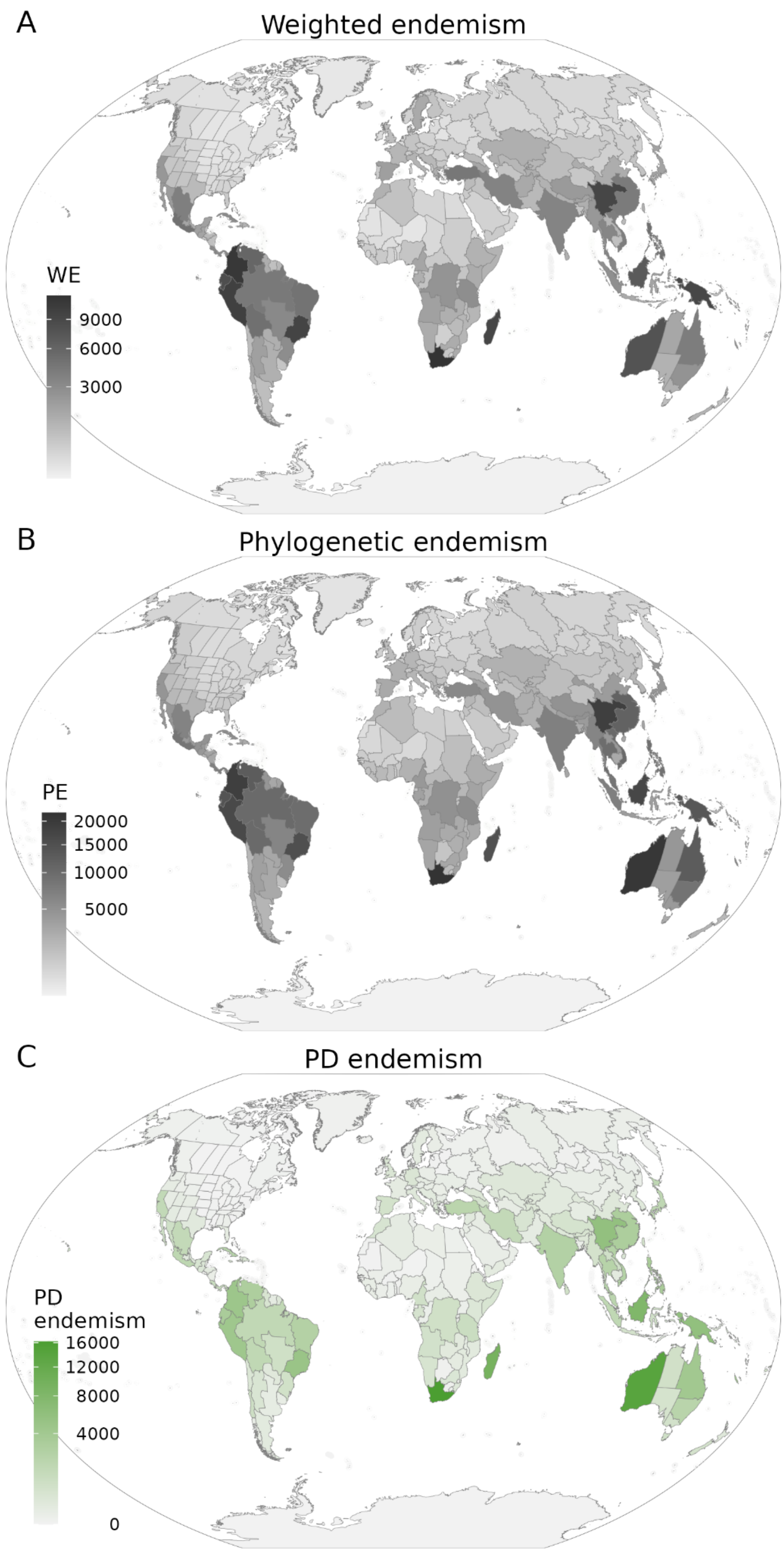

Fig S1. Weighted endemism, Phylogenetic endemism [(Rosauer et al. 2009)]() and PD endemism.

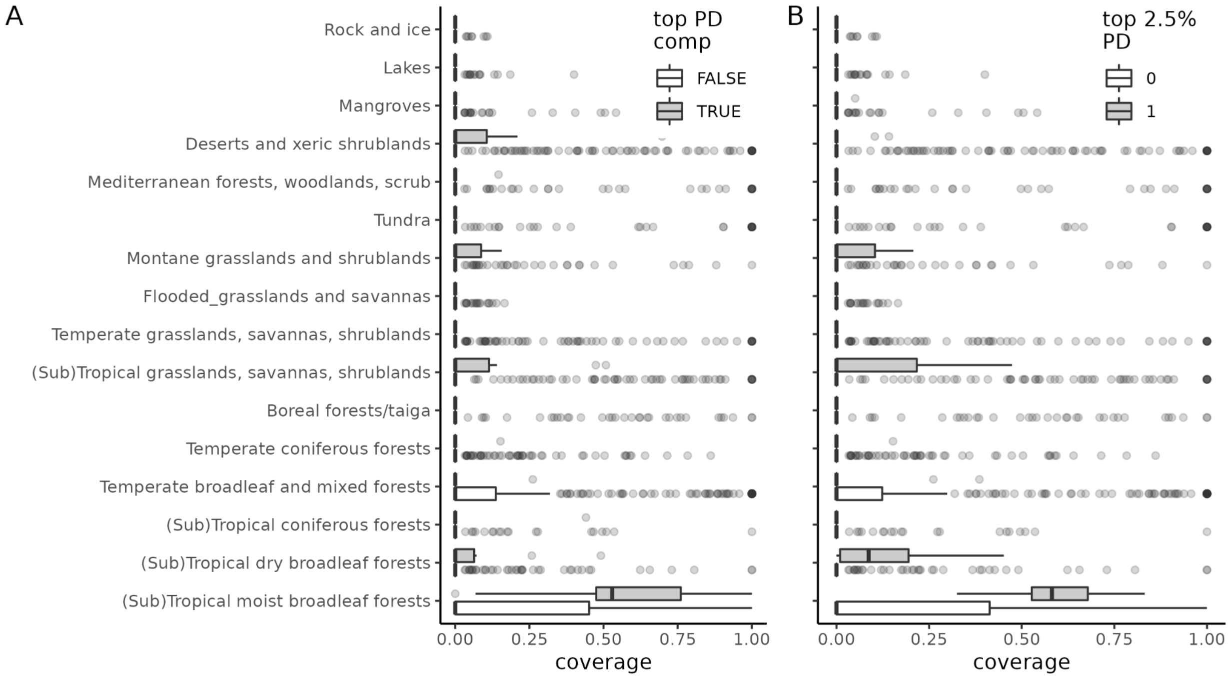

Fig S2. Proportion coverage with biome types [(Olson et al. 2001)](#) for (A) top 10 PD complementarity hotspots and (B) top 2.5% PD countries compared to the remaining countries.

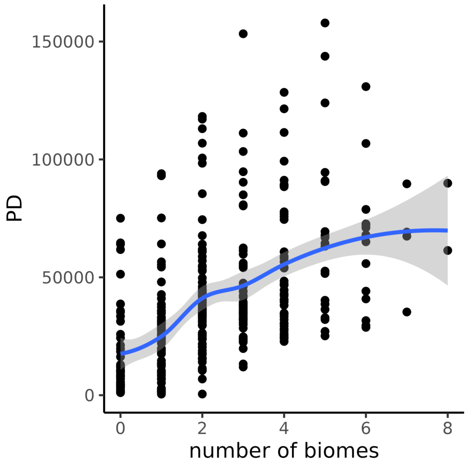

Fig S3. Number of biomes (Olson et al. 2001) and PD per botanical country.

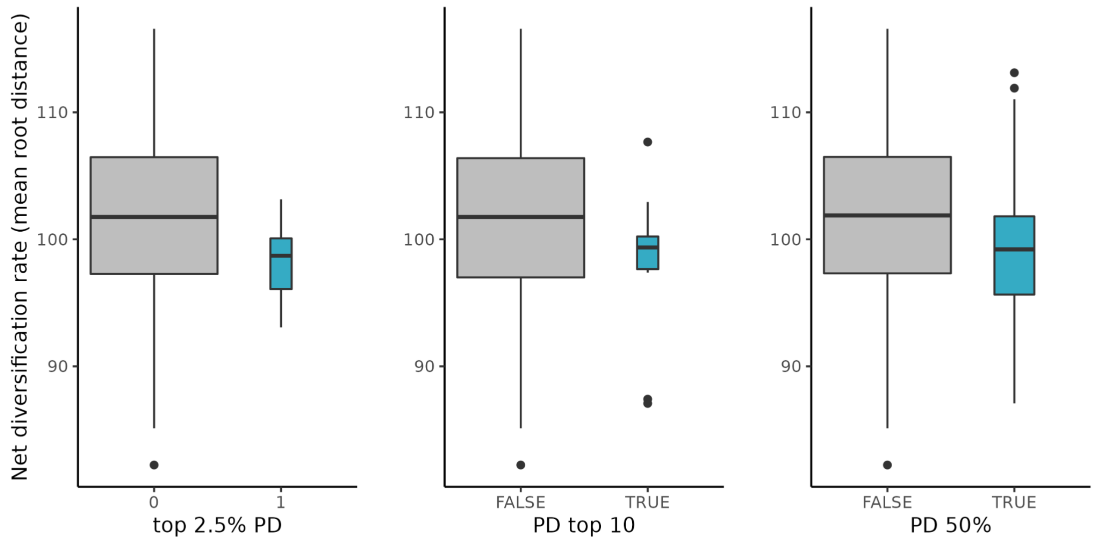

Fig S4. Diversification rates (mean root distance) for top 2.5% PD countries, top 10 PD complementarity hotspots, 50% PD including countries and the respective other botanical countries.

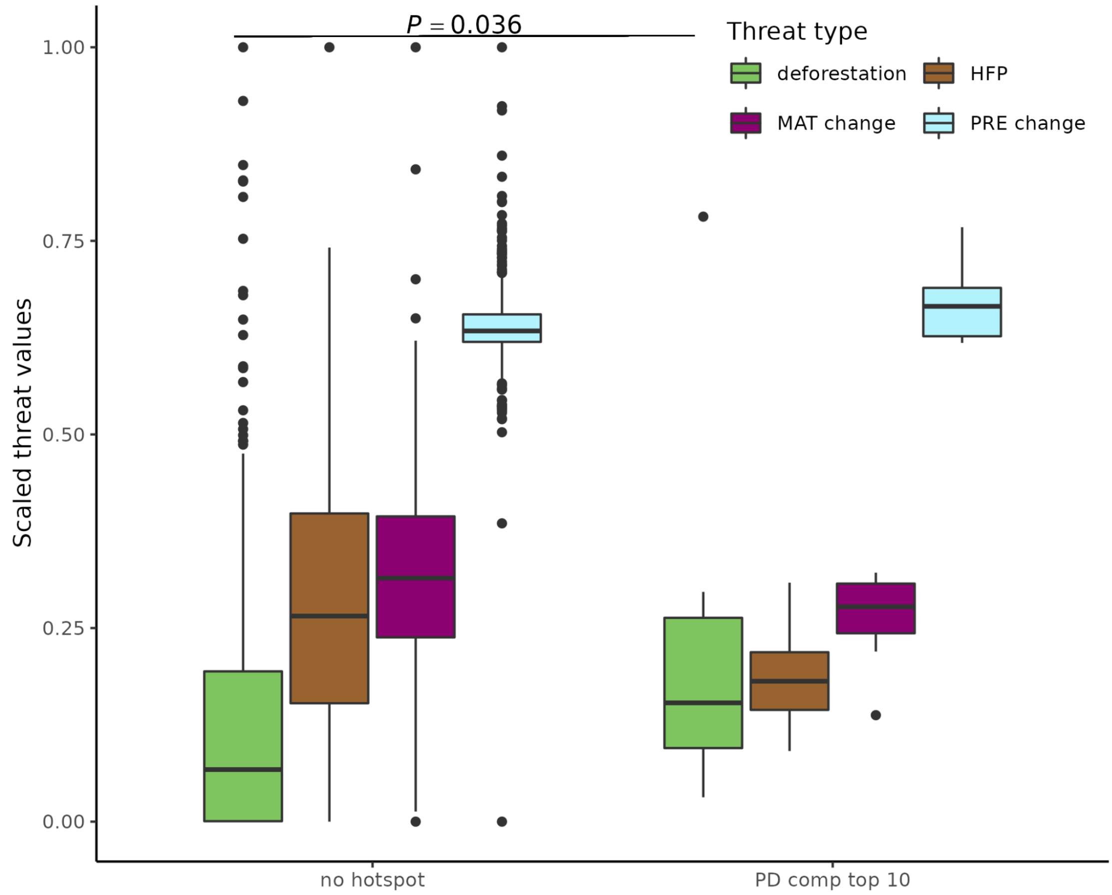

Fig S5. Threat estimates for top 10 PD complementarity hotspots and the other botanical countries. Threats were scaled for plotting.

Political countries

PD complementarity hotspots had on average a larger area than other countries (Kruskal-Wallis chi-squared = 15.67, df = 1, P < 0.001 for top 10 complementarity countries (pd_comp_top10) and chi-squared = 41.48, df = 1, P < 0.001 for those countries providing 50% of PD (pd_comp_50), Fig. S3). This trend is mostly driven by relatively small islands (compared to continental units), however naturally also a result of the PD area curve (Helmus and Ives 2012) caused by larger spatial units simply holding more species.

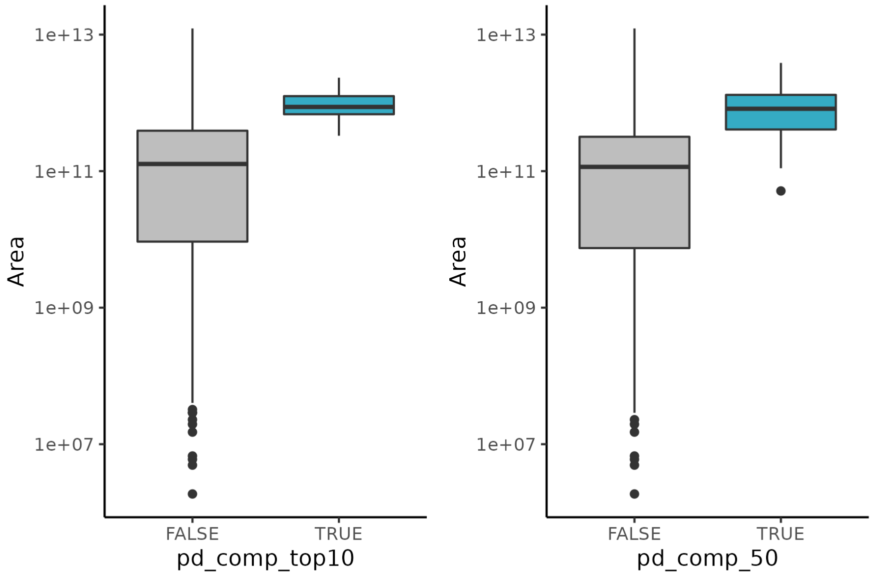

Fig S6. Area for countries either part or not (TRUE or FALSE) of the top 10 complementarity countries (left) and botanical countries holding 50% of global phylogenetic diversity (right).

We repeated our analysis on the basis of political countries to test if larger political countries who have been split into smaller botanical country units simply were not included because of their subdivision. Countries were merged as in Table S2. Results showed that the top 2.5% PD complementary hotspots (now only seven countries due to the reduction in total number of countries) included only one political country which did not contain a PD hotspot on botanical country level (Australia, Fig S7, S8). The remaining merged countries like e.g. Argentina, United States of America and Russia were still not selected as complementarity hotspots despite their substantial increase in area. Scaling patterns as shown in Fig. 4 remained the same for political countries (Fig. S9).

Table S2. Botanical countries merged into political units.

Political country	Botanical countries included (LEVEL 3 CODE)
Canada	ABT, BRC, LAB, MAN, NBR, NFL, NSC, NUN, NWT, ONT, PEI, QUE, SAS, YUK
USA	ALA, ARI, ARK, ASK, CAL, CNT, COL, DEL, FLA, GEO, IDA, ILL, INI, IOW, KAN, KTY, LOU, MAI, MAS, MIC, MIN, MNT, MRY, MSI, MSO, NCA, NDA, NEB, NEV, NWH, NWJ, NWM, NWY, OHI, OKL, ORE, PEN, RHO, SCA, SDA, TEN, TEX, UTA, VER, VRG, WAS, WDC, WIS, WVA, WYO
Mexico	MXC, MXE, MXG, MXN, MXS, MXT
Brazil	BZC, BZE, BZL, BZN, BZS
Argentina	AGE, AGS, AGW
Chile	CLC, CLN, CLS
South Africa	CPP, LES, NAT, OFS, TVL
Russia	ALT, AMU, BRY, CTA, IRK, KAM, KHA, KRA, KUR, MAG, PRM, RUC, RUE, RUN, RUS, RUW, SAK, TVA, WSB, YAK
Australia	NSW, NTA, QLD, SOA, VIC, WAU
China	CHC, CHI, CHM, CHN, CHQ, CHS, CHT, CHX
Morocco	MOR, WSA

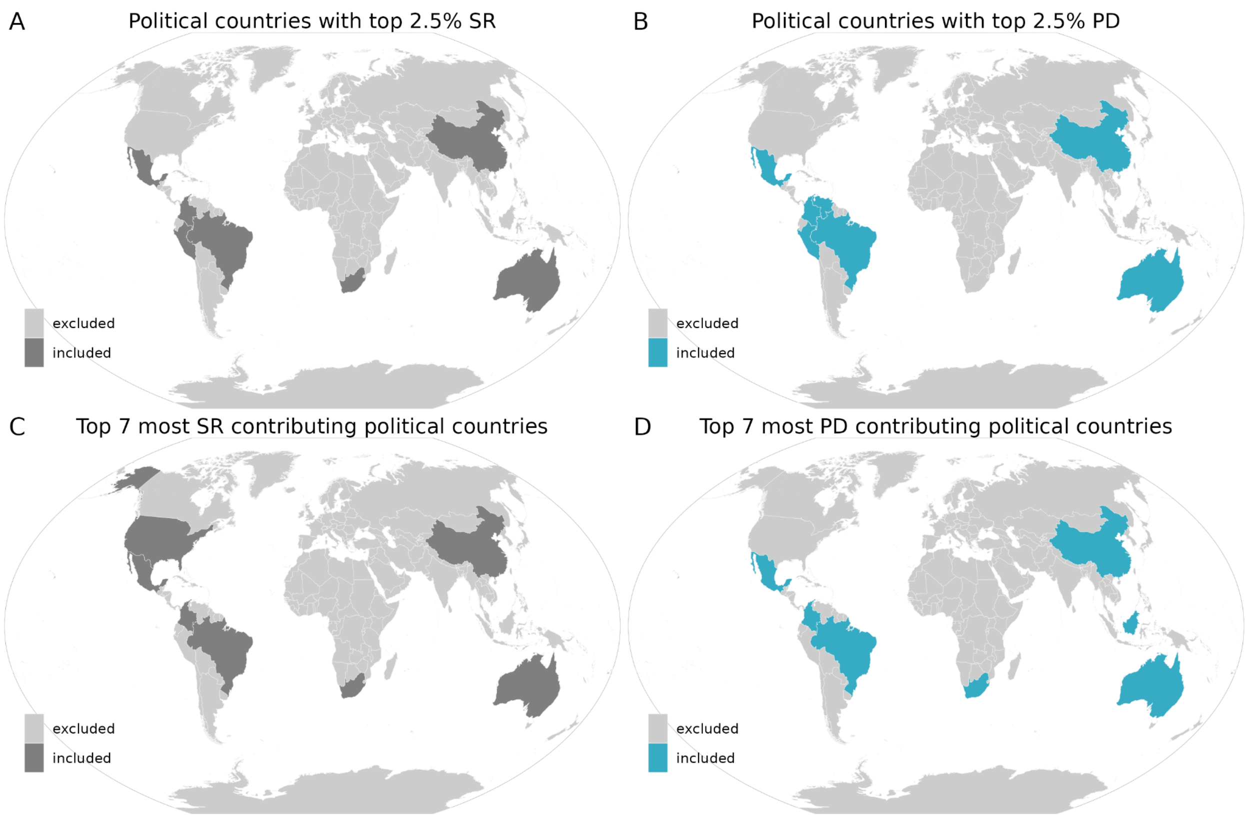

Fig S7. Equivalent to Fig 2 , political countries with the top 2.5% total species richness (A) or phylogenetic diversity (B), and the top 7 botanical countries with the highest contribution (complementarity) to global species richness (C) or phylogenetic diversity (D). The number of countries here is 7 instead of 10 due to merging of botanical countries. Complementarity was assessed using a greedy algorithm that identifies the minimum number of countries containing the maximum number of species richness or phylogenetic diversity. The algorithm starts with the highest SR and PD value and subsequently adds countries with the next highest remaining contribution to SR and PD to the set. C and D show the top ten contributing countries according to this selection procedure. Selected political countries in A and B contain 45% and 24% of total SR and PD, selected countries in C and D hold 54% and 32% of total SR and PD.

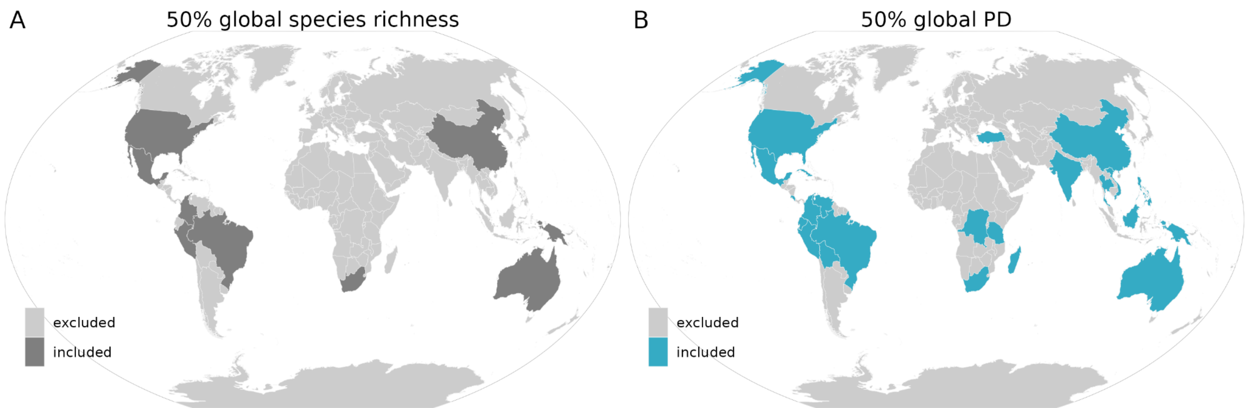

Fig S8. Map shows the minimum number of political countries needed to capture 50% of global species richness (A, 9 political countries) and phylogenetic diversity (B, 23 political countries). Political countries were identified using a greedy algorithm that starts with the highest SR and PD values and subsequently adds countries with the next highest remaining contribution to SR and PD to the set.

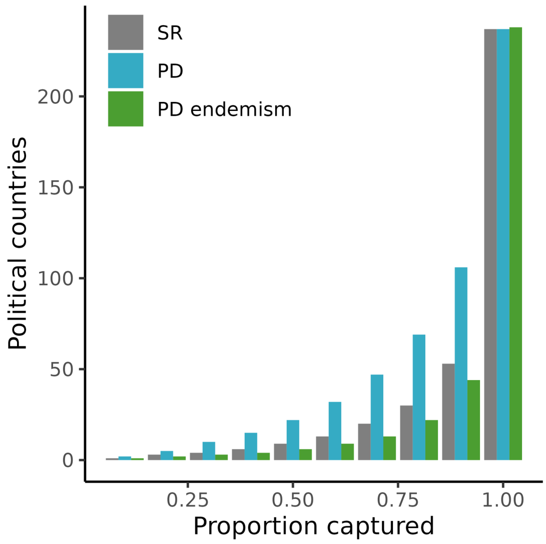

Fig S9. The number of political countries required to capture different percentages of species richness, phylogenetic diversity and endemic phylogenetic diversity. Half (50%) of plant species richness, phylogenetic diversity or PD endemism can be captured in either 9, 22 or 6 political countries, respectively.