

Supplementary Information for

Plant height and hydraulic vulnerability to drought and cold

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Figs. S1 to S5
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Other supplementary materials for this manuscript include the following:

Dataset S1

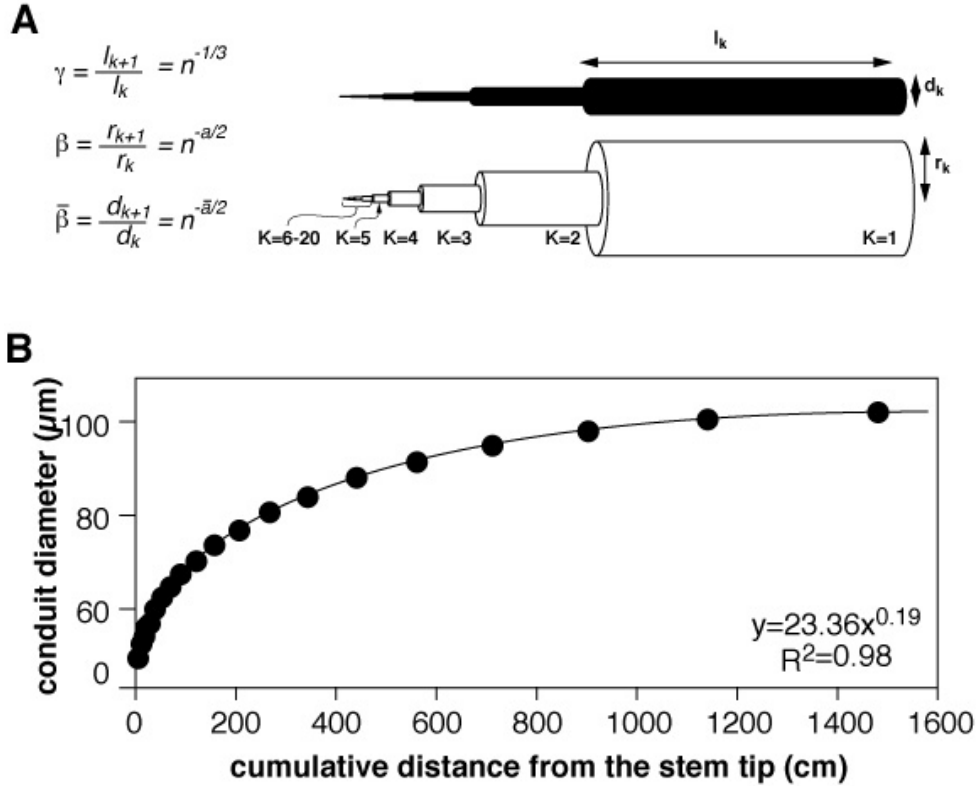


Fig. S1. Conduit diameter-stem length scaling and the WBE model. (A) The model of West, Brown and Enquist (1999) (1) depicts plants as made up of cylindrical segments. The rules at left specify the dimensions of stem segments (white cylinders), which contain conduits (black cylinders, shown outside the stem for clarity). γ specifies the length l of a segment k relative to the length of the segment subtending it, $k+1$. n is the number of branches at each branching node (for simplicity and to highlight the stem tip-to-base length of the conductive path, in the drawing at right we only show a single branch at each node). r_k is the branch segment radius, and d_k the conduit radius. In a way analogous to γ , β specifies the relative diameters of the stem segments, and $\bar{\beta}$ specifies conduit diameter. a and \bar{a} relate branch and conduit transectional area between segments. (B) In the idealized WBE plant, $a=1$, implying area-preserving branching, $\bar{a}=1/6$, minimizing the accumulation of hydraulic resistance with increasing total plant height (1), and $n = 2$, implying bifurcation at each node (again, we show only one branch at each node because branching does not affect the longest base-to-tip conductive distance). Given these values, assuming a tree with a terminal twig diameter of 5.5 mm and 20 branching generations results in a range of conduit diameters very similar to those observed in nature. Plotting these conduit diameters against the accumulated distance to the stem tip (i.e. summing l_k from the stem tip) results in a power-law like function with a scaling exponent of approximately 0.2. Poiseuille's law shows that conduit diameter-stem length exponents of 0.25 or slightly above should minimize the accumulation of hydraulic resistance with height growth while minimizing embolism risk and conduit construction costs (1–10). Our empirical results across angiosperm climates, habits, and lineages fall strikingly within this range.

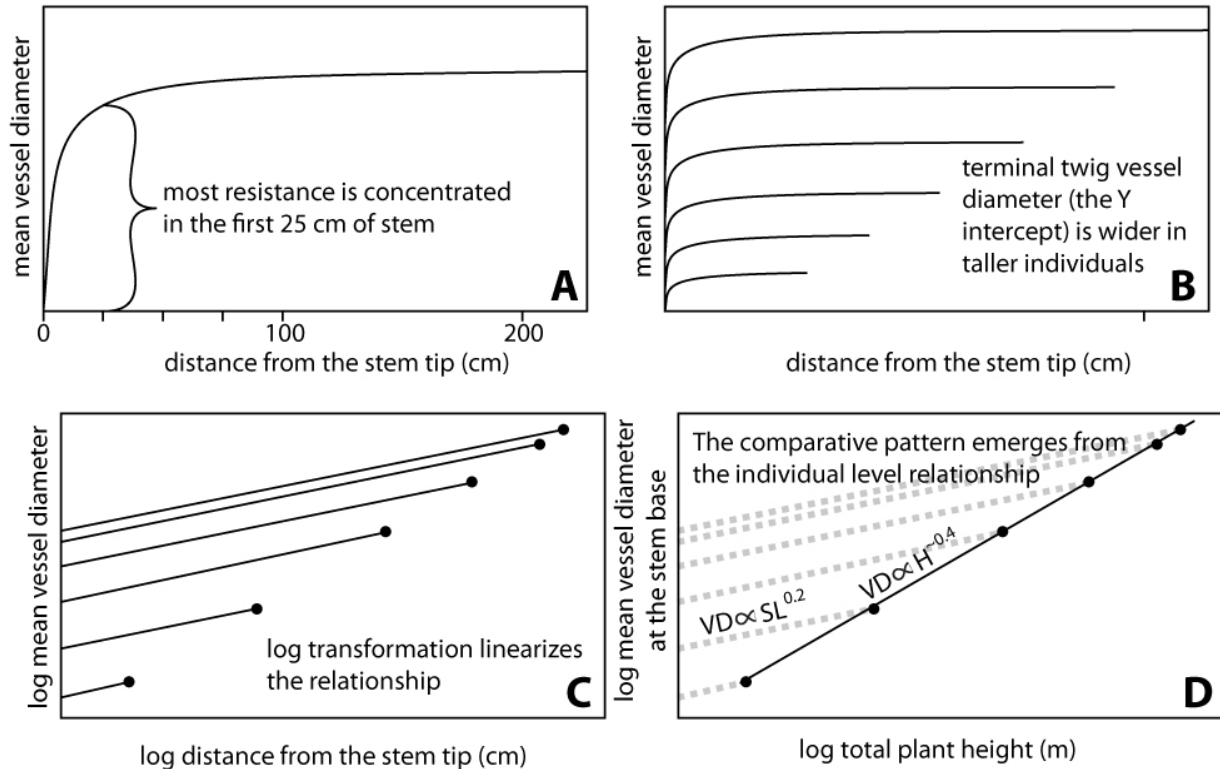


Fig. S2. Schematics illustrating the relationship between within-individual patterns of longitudinal vessel widening from the stem tip to the base, and across-species studies of vessel diameter at the stem base. (A) The relationship between vessel diameter and distance from the stem tip within a single individual approximates a power law of the form $VD \propto SL^a$, where a is usually about 0.2-0.26 (10). Most of the change in vessel diameter occurs within the first 25 cm or so of twig. This means that most of the resistance in the stem is concentrated in the terminal portions of branches, and that vessel diameter increase is relatively slow in large branches and along the bole. It also means that vessel diameter, and functional properties that depend on it such as embolism vulnerability, change more rapidly in small plants than in large plants for a given unit of height increase. (B) Our data indicate that in angiosperms terminal twig vessel diameter increases with height growth (Fig. 2). This implies that, if the tip-to-base vessel diameter profile were traced for the same individual as it grows in height, the Y-intercept would increase as its maximum height increases (the right end of each curve indicates the total height of the plant). (C) Because the vessel diameter-distance from the stem tip relationship approximates a power law, log transformation linearizes it effectively. The black dots represent the vessel diameter found at the stem base, to show how the within-individual slope is related to the across-species slope. (D) Plotting mean vessel diameter at the stem base against plant height, which we did here (Fig. 2), results in a relationship of similar form as the within-individual relationship (which usually has a slope of 0.2 or slightly above, log transformed shown here), but of steeper slope (usually of about 0.4 or slightly above, as recovered in the present study). We standardized by tip vessel diameter, and the resulting interspecific slope fell within the usual intra-individual range. In this way, the cross species patterns we studied here (D) are related straightforwardly to the intraspecific ontogenetic pattern described by each individual (A-C).

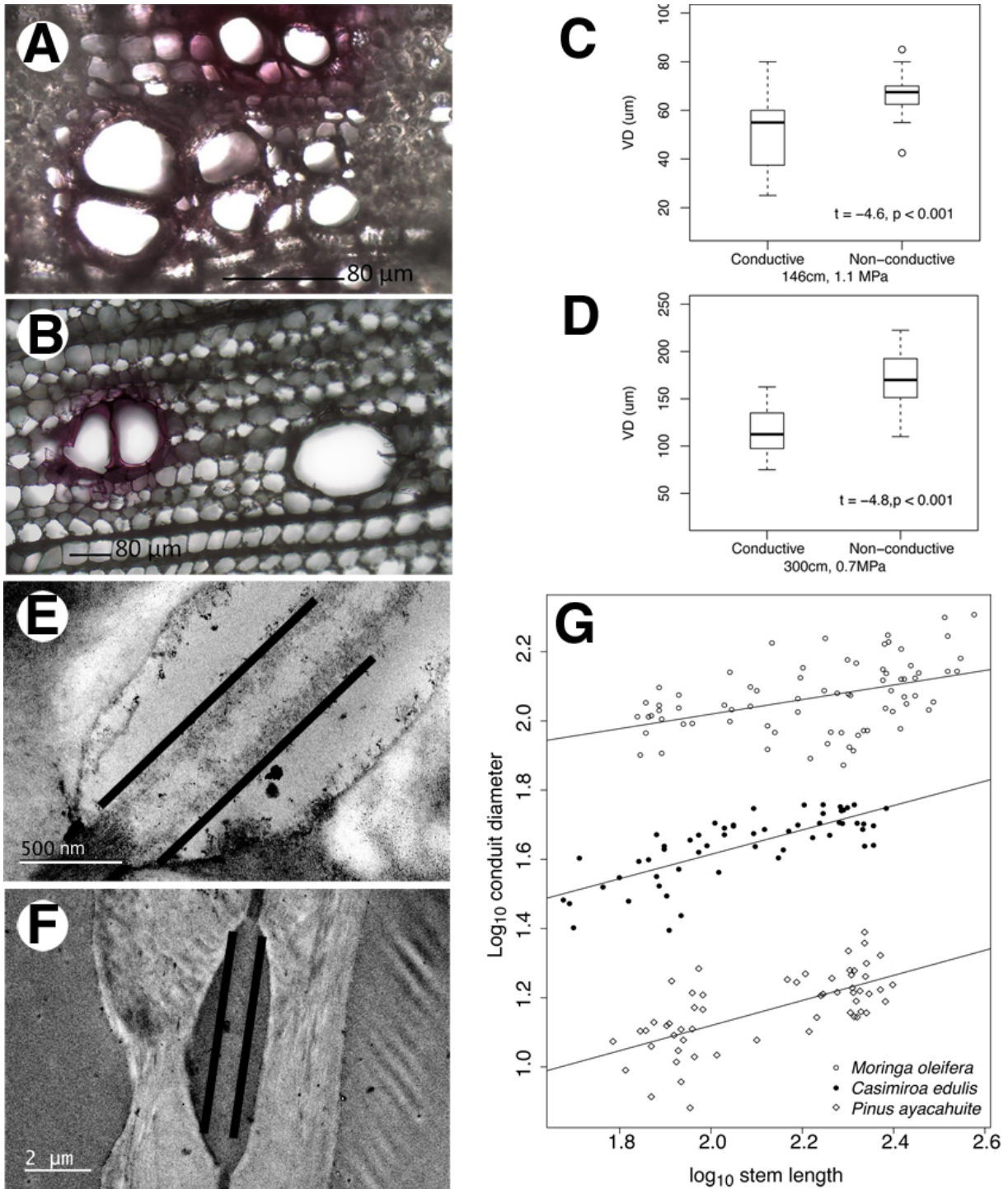


Fig. S3. Vessel diameter-stem length relations in *Moringa oleifera*, *Casimiroa edulis*, and *Pinus ayacahuite*, perfusion experiments, and intervessel pit membrane thickness. (A,B) Xylem transections following perfusion experiments showing that wider vessels on average embolize before narrow ones. We exposed different stems to different xylem tensions, provoking differing levels of embolism, and then perfused stem segments with acid fuchsin. Stain surrounding vessels indicates that they were conductive, unstained

embolized ones. Taller plants have wider vessels, and are thus more vulnerable than shorter conspecifics, and wider vessels within size classes embolize first. (A) *Casimiroa edulis*, functional vessels at top, (B) *Moringa oleifera*, functional vessels at left. (C, D) Graphs showing that after exposing stems to a given tension, embolized vessels are significantly wider than the functional vessels. (C) *Casimiroa edulis*, (D) *Moringa oleifera*. (E, F) Transmission electron micrographs of intervessel pit membranes in xylem transverse sections, showing that *Casimiroa edulis* (E), which for a given height is more resistant to embolism than *Moringa oleifera* (F), has thicker intervessel pit membranes. (G) While conduit diameter scaled broadly similarly across the three species in our plantation experiment, *Moringa oleifera*, with its very low wood density, had the widest vessels for a given height, and *Casimiroa edulis*, with its higher wood density, had narrower vessels for a given height. *Pinus ayacahuite* conducts water in tracheids, rather than vessels, and tracheids are much narrower for a given height than vessels.

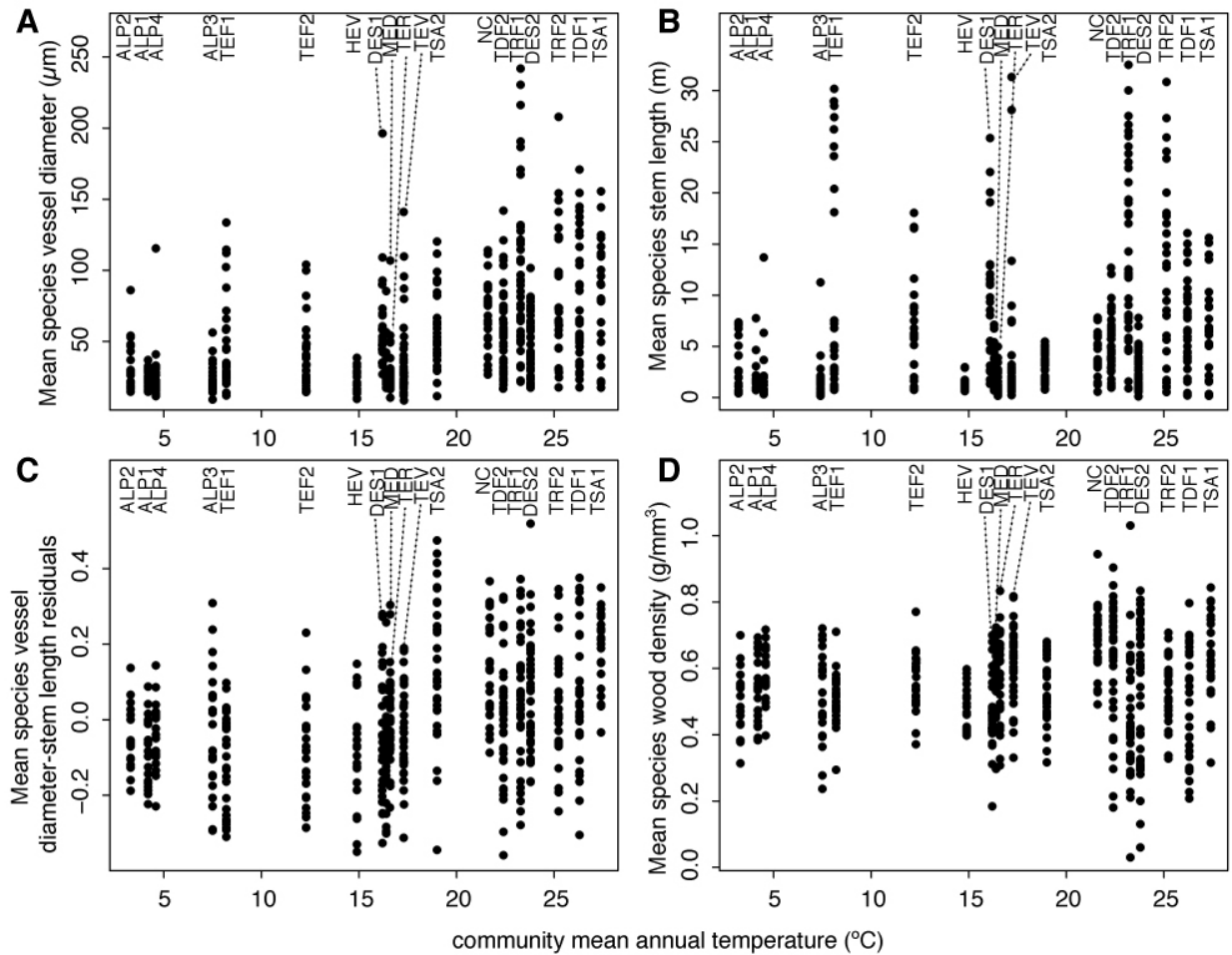


Fig. S4. Variance in vessel diameter, plant size, and wood density with temperature across communities. (A,B) The distribution of raw vessel diameter across communities closely paralleled that of plant height. (C) Correcting for stem size reveals that the relatively narrowest vessels are found not in cold but in warmer communities, where the relatively widest vessels were also found. A very slight tendency for wider vessel diameter in warmer climates can be seen. (D) Warmer communities not only had wider ranges of size-corrected vessel diameter but also of wood density. Because species with lower density have wider vessels, the patterns in wood density variance and size-corrected vessel diameter parallel one another. Community codes are from Extended Data Table 1.

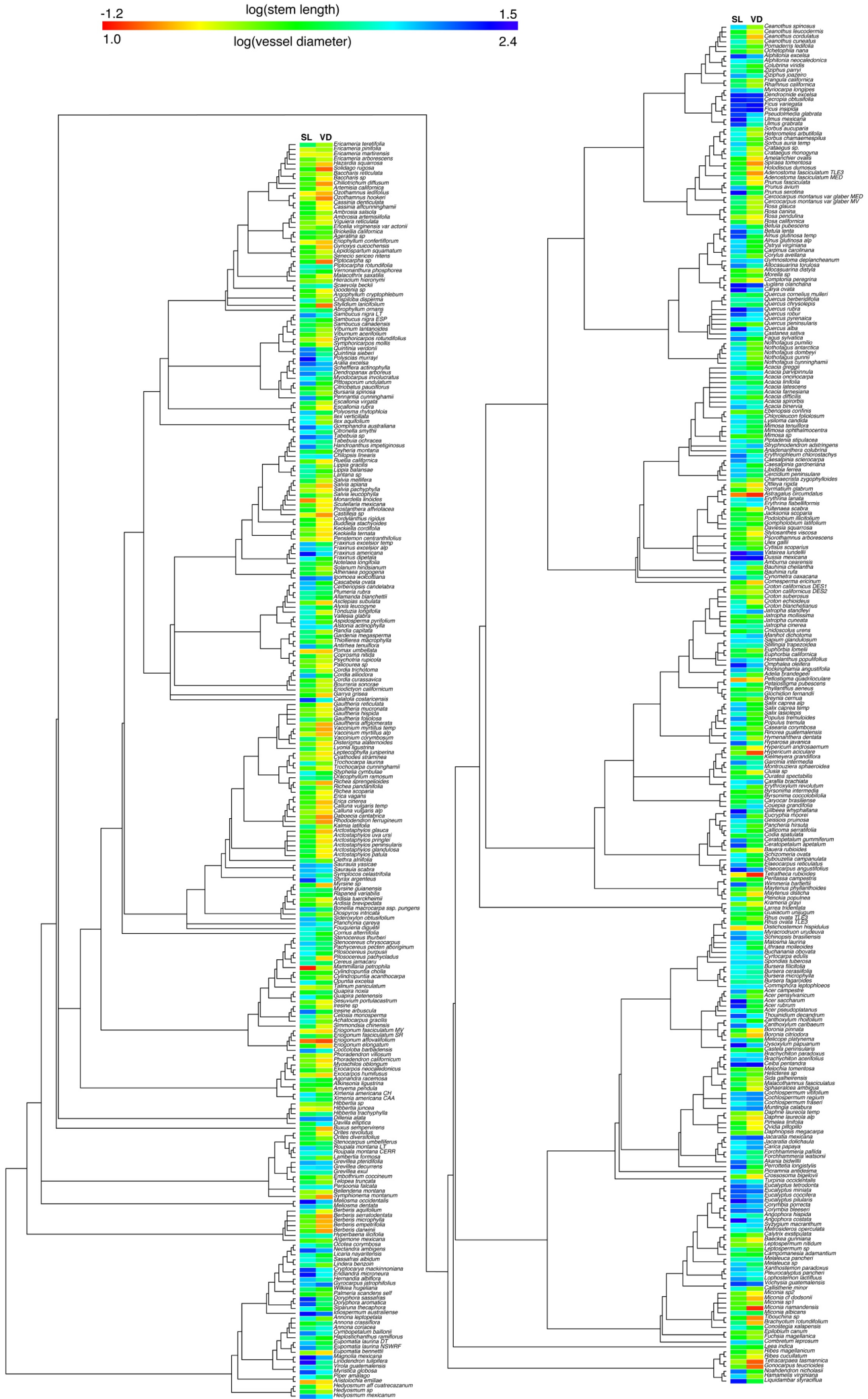


Fig. S5. Phylogenetic relationships of the studied species and phylogenetic distribution of vessel diameter and stem length. Colors represent the values of \log_{10} vessel diameter (VD) and plant height (SL), to show that colors usually covary independently of the values of the phylogenetic neighbors of a given species.

Table S1. Communities studied, ordered from low to high mean annual precipitation (MAP), with coordinates, mean annual temperature (MAT), mean basal vessel diameter (VD_{base}), and mean stem length (SL), with ranges in parentheses

Code	Vegetation	Locality	Lat	Lon	MAT (°C)	MAP (mm)	VD (μm)	SL (m)
DES2	Desert	Baja California Cape, Mexico	23.081	-109.662	23.7	230.0	49.8 (20.0, 104.2)	2.8 (0.1, 7.7)
DES1	Desert	Mojave Desert, California, USA	34.083	-116.582	16.3	324.0	32.4 (13.1, 109.5)	1.5 (0.1, 4.9)
MED	Mediterranean shrubland	Santa Monica Mountains, California, USA	34.093	-118.656	16.3	516.0	32.1 (19.8, 88.0)	2.7 (0.6, 7.1)
TDF2	Tropical dry forest	Fazenda Almas caatinga, Paraiba, Brazil	-7.471	-36.898	22.3	580.0	59.8 (19.5, 144.5)	5.4 (0.9, 12.6)
TLE3	Cold temperate treeline ecotone	Sierra San Pedro Mártir, Baja California, Mexico	31.044	-115.464	7.4	763.0	27.0 (11.7, 58.9)	1.7 (0.1, 11.2)
TDF1	Tropical dry forest	Chamela dry forest, Jalisco, Mexico	19.495	-105.039	26.2	794.0	81.1 (20.3, 173.5)	7.6 (0.2, 16.1)
TLE1	Cold temperate treeline ecotone	Coyhaique, Patagonia, Chile	-45.518	-72.042	4.1	944.0	26.1 (17.1, 39.6)	1.7 (0.7, 7.7)
HEV	Highland evergreen forest	Loja, Ecuador	-3.992	-79.159	14.8	1083.0	23.6 (12.1, 41.1)	1.2 (0.6, 2.9)
TEV	South temperate evergreen forest	Sydney, New South Wales, Australia	-33.756	151.104	17.2	1169.0	43.3 (11.1, 143.6)	4.3 (0.2, 31.3)
TEF1	Temperate deciduous forest	Yale Forest, Connecticut, USA	41.953	-72.122	8.1	1238.0	51.2 (14.5, 136.1)	10.1 (0.7, 30.1)
TLE2	Cold temperate treeline ecotone	Pyrenees highlands, Spain	42.761	-0.249	3.2	1263.0	36.5 (17.3, 88.6)	3.0 (0.4, 7.3)
TEF2	Temperate deciduous forest	Pyrenees foothills, Spain	43.167	-1.6	12.2	1279.0	44.4 (16.9, 106.5)	6.1 (0.7, 18.0)
TSA2	Tropical savannah	Botucatu cerrado, São Paulo, Brazil	-22.914	-48.503	18.9	1331.0	62.0 (14.1, 122.8)	3.0 (0.8, 7.3)
TER	Temperate rainforest	New South Wales temperate rainforests, Australia	-33.54	151.223	16.3	1419.5	64.5 (29.6, 198.7)	9.6 (1.3, 25.3)
TLE4	Cold temperate treeline ecotone	Mount Field, Tasmania, Australia	-42.684	146.589	4.5	1515.0	29.4 (14.1, 118.0)	1.8 (0.3, 13.7)
TSA1	Tropical savannah	Howard Springs, Northern Territory, Australia	-12.452	131.032	27.3	1570.0	86.9 (20.1, 158.1)	6.7 (0.1, 15.6)
TRF2	Tropical rainforest	Daintree rainforest, Queensland, Australia	-16.109	145.443	25.1	2081.2	85.4 (20.2, 210.3)	12.1 (0.5, 30.8)
NC	Tropical shrubland on ultramafic soil	Barrage de Yaté, New Caledonia	-22.160	166.780	21.6	2112.0	68.6 (28.0-115.4)	4.0 (0.7-8.0)
TRF1	Tropical rainforest	Los Tuxtlas rainforest, Veracruz, Mexico	18.55	-95.09	23.2	3271.3	103.2 (24.1, 244.3)	14.2 (0.8, 32.5)

Table S2. 119 models fit predicting vessel diameter based on stem length, temperature variables, precipitation variables, and wood density, ranked by fit.

Stem length	Temperature variables	Precipitation variables	Wood density	adjusted R ²	df †	AICc‡	delta AIC§	wi¶	acc.wi#	Relative importance stem length	Relative importance temperature	Relative importance precipitation	Relative importance Dens	Intercept	Beta stem length	Beta temperature	Beta precipitation	Beta density
SL	Annual mean T	Ppt warmest quarter	Dens	0.73	519	-2031.9	0	0.56	0.56	0.446 (0.385, 0.502)	0.055 (0.035, 0.079)	0.008 (0.001, 0.02)	0.029 (0.015, 0.045)	1.468 (0.029)***	0.369 (0.014)***	0.009 (0.001)***	0.00009 (0.00003)***	-0.326 (0.044)***
SL	Mean T coldest quarter	Ppt warmest quarter	Dens	0.728	519	-2029	2.9	0.13	0.69	0.464 (0.406, 0.528)	0.052 (0.033, 0.073)	0.007 (0.001, 0.02)	0.028 (0.014, 0.044)	1.528 (0.027)***	0.376 (0.014)***	0.007 (0.001)***	0.00008 (0.00003)**	-0.323 (0.044)***
SL	Annual mean T	Annual ppt	Dens	0.727	519	-2027.4	4.42	0.06	0.75	0.448 (0.387, 0.507)	0.067 (0.046, 0.092)	0.004 (0, 0.014)	0.029 (0.015, 0.046)	1.456 (0.03)***	0.37 (0.014)***	0.01 (0.001)***	0.00002 (0.00001)**	-0.328 (0.045)***
SL	Mean T wettest quarter	Ppt wettest month	Dens	0.727	519	-2027	4.89	0.05	0.8	0.448 (0.388, 0.508)	0.054 (0.034, 0.081)	0.006 (0, 0.017)	0.027 (0.014, 0.044)	1.505 (0.028)***	0.369 (0.014)***	0.007 (0.001)***	0.00015 (0.00005)**	-0.317 (0.045)***
SL	Annual mean T	Ppt wettest month	Dens	0.727	519	-2026.8	5.1	0.04	0.85	0.452 (0.392, 0.511)	0.055 (0.034, 0.08)	0.005 (0, 0.016)	0.029 (0.015, 0.046)	1.471 (0.029)***	0.371 (0.014)***	0.009 (0.001)***	0.00014 (0.00005)*	-0.327 (0.045)***
SL	Mean T wettest quarter	Ppt warmest quarter	Dens	0.727	519	-2026.5	5.33	0.04	0.88	0.454 (0.397, 0.513)	0.054 (0.034, 0.078)	0.006 (0.001, 0.017)	0.027 (0.014, 0.045)	1.51 (0.028)***	0.372 (0.014)***	0.007 (0.001)***	0.00007 (0.00003)**	-0.319 (0.045)***
SL	Annual mean T	Ppt wettest quarter	Dens	0.727	519	-2026.4	5.43	0.04	0.92	0.453 (0.395, 0.509)	0.057 (0.036, 0.081)	0.005 (0, 0.014)	0.029 (0.015, 0.046)	1.47 (0.029)***	0.371 (0.014)***	0.009 (0.001)***	0.00005 (0.00002)*	-0.328 (0.045)***
SL	Mean T wettest quarter	Ppt wettest quarter	Dens	0.727	519	-2026.3	5.59	0.03	0.96	0.449 (0.386, 0.509)	0.056 (0.036, 0.084)	0.005 (0.001, 0.015)	0.027 (0.013, 0.045)	1.506 (0.028)***	0.37 (0.014)***	0.007 (0.001)***	0.00005 (0.00002)**	-0.319 (0.045)***
SL	Mean T wettest quarter	Annual ppt	Dens	0.725	519	-2024.1	7.79	0.01	0.97	0.453 (0.392, 0.519)	0.066 (0.043, 0.092)	0.003 (0, 0.011)	0.028 (0.016, 0.046)	1.501 (0.029)***	0.372 (0.014)***	0.007 (0.001)***	0.00002 (0.00001)*	-0.321 (0.045)***
SL	Mean T coldest quarter	Annual ppt	Dens	0.725	519	-2023.6	8.25	0.01	0.98	0.472 (0.414, 0.532)	0.064 (0.044, 0.089)	0.003 (0, 0.01)	0.029 (0.015, 0.046)	1.525 (0.029)***	0.379 (0.014)***	0.008 (0.001)***	0.00002 (0.00001)*	-0.327 (0.045)***
SL	Mean T coldest quarter	Ppt wettest month	Dens	0.725	519	-2023	8.87	0.01	0.98	0.474 (0.415, 0.536)	0.054 (0.034, 0.08)	0.003 (0, 0.013)	0.029 (0.015, 0.046)	1.533 (0.028)***	0.38 (0.014)***	0.007 (0.001)***	0.00011 (0.00006)*	-0.326 (0.045)***
SL	Mean T coldest quarter	Ppt wettest quarter	Dens	0.725	519	-2022.7	9.17	0.01	0.99	0.475 (0.412, 0.533)	0.055 (0.036, 0.079)	0.003 (0, 0.012)	0.029 (0.016, 0.046)	1.533 (0.028)***	0.38 (0.014)***	0.007 (0.001)***	0.00004 (0.00002)ns	-0.327 (0.045)***
SL	Annual mean T	-	Dens	0.724	520	-2022.3	9.58	0	0.99	0.479 (0.426, 0.54)	0.069 (0.048, 0.092)	-	0.031 (0.017, 0.05)	1.484 (0.029)***	0.382 (0.029)***	0.01 (0.029)***	-	-0.342 (0.029)***
SL	Mean T wettest quarter	-	Dens	0.723	520	-2021.2	10.71	0	1	0.478 (0.421, 0.535)	0.069 (0.046, 0.093)	-	0.03 (0.016, 0.048)	1.524 (0.027)***	0.382 (0.027)***	0.007 (0.027)***	-	-0.332 (0.027)***
SL	Mean T coldest quarter	-	Dens	0.723	520	-2020.9	10.98	0	1	0.497 (0.439, 0.551)	0.066 (0.044, 0.093)	-	0.031 (0.017, 0.05)	1.548 (0.027)***	0.389 (0.027)***	0.008 (0.027)***	-	-0.338 (0.027)***
SL	Min T coldest month	Ppt warmest quarter	Dens	0.723	519	-2020.1	11.75	0	1	0.469 (0.41, 0.534)	0.049 (0.029, 0.073)	0.006 (0, 0.017)	0.029 (0.015, 0.048)	1.573 (0.028)***	0.378 (0.014)***	0.007 (0.001)***	0.00007 (0.00003)**	-0.33 (0.045)***
SL	Mean T warmest quarter	Ppt warmest quarter	Dens	0.722	519	-2016.7	15.2	0	1	0.445 (0.387, 0.505)	0.041 (0.026, 0.058)	0.015 (0.005, 0.032)	0.027 (0.012, 0.043)	1.403 (0.033)***	0.368 (0.014)***	0.009 (0.001)***	0.00012 (0.00003)***	-0.316 (0.045)***

SL	Min T coldest month	Ppt wettest month	Dens	0.721	519	-	16.95	0	1	0.479 (0.418, 0.537)	0.052 (0.03, 0.079)	0.002 (0, 0.01)	0.03 (0.015, 0.05)	1.58 (0.028)***	0.382 (0.014)***	0.007 (0.001)***	0.00009 (0.00006)ns	-0.334 (0.045)***
SL	Min T coldest month	-	Dens	0.72	520	-	17.3	0	1	0.496 (0.442, 0.553)	0.063 (0.041, 0.085)	-	0.032 (0.017, 0.051)	1.597 (0.027)***	0.389 (0.027)***	0.008 (0.027)***	-	-0.345 (0.027)***
SL	Min T coldest month	Ppt wettest quarter	Dens	0.72	519	-	17.34	0	1	0.481 (0.42, 0.54)	0.054 (0.032, 0.079)	0.002 (0, 0.009)	0.03 (0.015, 0.049)	1.582 (0.028)***	0.383 (0.014)***	0.007 (0.001)***	0.00003 (0.00002)ns	-0.335 (0.045)***
SL	Min T coldest month	Annual ppt	Dens	0.72	519	-	17.64	0	1	0.482 (0.424, 0.538)	0.06 (0.041, 0.086)	0.001 (0, 0.007)	0.031 (0.016, 0.05)	1.582 (0.029)***	0.383 (0.014)***	0.008 (0.001)***	0.00001 (0.00001)ns	-0.337 (0.045)***
SL	Mean T warmest quarter	Ppt wettest month	Dens	0.72	519	-	18.3	0	1	0.443 (0.383, 0.503)	0.04 (0.027, 0.058)	0.014 (0.005, 0.027)	0.027 (0.014, 0.044)	1.401 (0.034)***	0.367 (0.015)***	0.009 (0.001)***	0.00023 (0.00005)***	-0.314 (0.045)***
SL	Mean T warmest quarter	Ppt wettest quarter	Dens	0.719	519	-	19.45	0	1	0.444 (0.385, 0.5)	0.043 (0.028, 0.061)	0.013 (0.004, 0.027)	0.027 (0.014, 0.044)	1.399 (0.034)***	0.368 (0.015)***	0.01 (0.001)***	0.00008 (0.00002)***	-0.316 (0.045)***
SL	Mean T warmest quarter	Annual ppt	Dens	0.717	519	-	23.48	0	1	0.448 (0.393, 0.507)	0.056 (0.038, 0.075)	0.009 (0.002, 0.02)	0.027 (0.014, 0.044)	1.374 (0.036)***	0.369 (0.015)***	0.011 (0.001)***	0.00003 (0.00001)***	-0.318 (0.045)***
SL	Mean T warmest quarter	-	Dens	0.71	520	-	35.28	0	1	0.497 (0.444, 0.546)	0.053 (0.036, 0.075)	-	0.03 (0.016, 0.048)	1.421 (0.034)***	0.389 (0.034)***	0.011 (0.034)***	-	-0.335 (0.034)***
SL	Annual mean T	Ppt warmest quarter	-	0.702	520	-	49.71	0	1	0.465 (0.406, 0.522)	0.044 (0.026, 0.065)	0.012 (0.003, 0.028)	-	1.295 (0.017)***	0.376 (0.017)***	0.008 (0.017)***	0.00011 (0.017)***	-
SL	Mean T coldest quarter	Ppt warmest quarter	-	0.701	520	-	51.62	0	1	0.481 (0.42, 0.536)	0.042 (0.025, 0.067)	0.011 (0.003, 0.027)	-	1.349 (0.013)***	0.383 (0.013)***	0.006 (0.013)***	0.0001 (0.013)***	-
SL	Mean T wettest quarter	Ppt wettest month	-	0.701	520	-	51.71	0	1	0.462 (0.403, 0.516)	0.045 (0.024, 0.07)	0.01 (0.002, 0.025)	-	1.33 (0.014)***	0.375 (0.014)***	0.006 (0.014)***	0.0002 (0.014)***	-
SL	Mean T wettest quarter	Ppt warmest quarter	-	0.7	520	-	52.78	0	1	0.471 (0.416, 0.534)	0.045 (0.025, 0.07)	0.009 (0.002, 0.023)	-	1.335 (0.014)***	0.379 (0.014)***	0.006 (0.014)***	0.00009 (0.014)***	-
SL	Mean T wettest quarter	Ppt wettest quarter	-	0.7	520	-	52.91	0	1	0.464 (0.403, 0.523)	0.047 (0.029, 0.072)	0.009 (0.002, 0.023)	-	1.33 (0.014)***	0.376 (0.014)***	0.006 (0.014)***	0.00007 (0.014)***	-
SL	Annual mean T	Ppt wettest month	-	0.699	520	-	54.41	0	1	0.467 (0.412, 0.523)	0.043 (0.026, 0.067)	0.01 (0.002, 0.025)	-	1.296 (0.017)***	0.377 (0.017)***	0.008 (0.017)***	0.00019 (0.017)***	-
SL	Annual mean T	Annual ppt	-	0.699	520	-	54.5	0	1	0.465 (0.403, 0.521)	0.059 (0.04, 0.083)	0.008 (0.001, 0.02)	-	1.276 (0.019)***	0.376 (0.019)***	0.009 (0.019)***	0.00003 (0.019)***	-
SL	Annual mean T	Ppt wettest quarter	-	0.699	520	-	55.27	0	1	0.469 (0.406, 0.523)	0.046 (0.027, 0.068)	0.009 (0.001, 0.023)	-	1.294 (0.017)***	0.378 (0.017)***	0.008 (0.017)***	0.00007 (0.017)***	-
SL	Mean T wettest quarter	Annual ppt	-	0.699	520	-	55.46	0	1	0.468 (0.411, 0.525)	0.059 (0.038, 0.084)	0.006 (0.001, 0.017)	-	1.321 (0.016)***	0.378 (0.016)***	0.007 (0.016)***	0.00003 (0.016)***	-
SL	Mean T coldest quarter	Ppt wettest month	-	0.698	520	-	57.52	0	1	0.487 (0.428, 0.54)	0.042 (0.023, 0.067)	0.008 (0.001, 0.023)	-	1.351 (0.013)***	0.385 (0.013)***	0.006 (0.013)***	0.00017 (0.013)***	-
SL	Mean T coldest quarter	Annual ppt	-	0.698	520	-	57.54	0	1	0.487 (0.43, 0.545)	0.055 (0.035, 0.079)	0.006 (0.001, 0.015)	-	1.341 (0.015)***	0.385 (0.015)***	0.007 (0.015)***	0.00003 (0.015)***	-
SL	Mean T coldest quarter	Ppt wettest quarter	-	0.697	520	-	58.31	0	1	0.489 (0.425, 0.547)	0.044 (0.025, 0.069)	0.007 (0, 0.019)	-	1.351 (0.013)***	0.386 (0.013)***	0.007 (0.013)***	0.00006 (0.013)***	-
SL	Mean T warmest quarter	Ppt warmest quarter	-	0.696	520	-	60.7	0	1	0.463 (0.398, 0.518)	0.034 (0.021, 0.053)	0.019 (0.007, 0.039)	-	1.24 (0.025)***	0.375 (0.025)***	0.009 (0.025)***	0.00014 (0.025)***	-

SL	Min T coldest month	Ppt warmest quarter	-	0.695	520	-1970.6	61.26	0	1	0.487 (0.424, 0.546)	0.037 (0.02, 0.059)	0.01 (0.002, 0.025)	-	1.387 (0.012)***	0.385 (0.012)***	0.006 (0.012)***	0.0001 (0.012)***	-
SL	Mean T wettest quarter	-	-	0.694	521	-1969.9	61.97	0	1	0.504 (0.45, 0.555)	0.062 (0.042, 0.089)	-	-	1.344 (0.014)***	0.392 (0.014)***	0.007 (0.014)***	-	-
SL	Mean T warmest quarter	Ppt wettest month	-	0.694	520	-1969	62.84	0	1	0.458 (0.4, 0.516)	0.033 (0.019, 0.05)	0.019 (0.007, 0.038)	-	1.239 (0.025)***	0.374 (0.025)***	0.008 (0.025)***	0.00027 (0.025)***	-
SL	Annual mean T	-	-	0.693	521	-1968.2	63.7	0	1	0.508 (0.455, 0.558)	0.061 (0.043, 0.086)	-	-	1.303 (0.017)***	0.393 (0.017)***	0.009 (0.017)***	-	-
SL	Mean T coldest quarter	-	-	0.693	521	-1967.9	63.94	0	1	0.524 (0.471, 0.576)	0.059 (0.039, 0.083)	-	-	1.365 (0.012)***	0.399 (0.012)***	0.008 (0.012)***	-	-
SL	Mean T warmest quarter	Ppt wettest quarter	-	0.693	520	-1967.3	64.58	0	1	0.46 (0.403, 0.518)	0.035 (0.022, 0.053)	0.017 (0.006, 0.034)	-	1.235 (0.025)***	0.374 (0.025)***	0.009 (0.025)***	0.00009 (0.025)***	-
SL	Min T coldest month	Ppt wettest month	-	0.692	520	-1965.2	66.7	0	1	0.494 (0.437, 0.557)	0.037 (0.019, 0.063)	0.007 (0, 0.021)	-	1.39 (0.012)***	0.388 (0.012)***	0.006 (0.012)***	0.00016 (0.012)**	-
SL	Min T coldest month	Ppt wettest quarter	-	0.692	520	-1964.1	67.72	0	1	0.496 (0.439, 0.553)	0.04 (0.022, 0.065)	0.005 (0, 0.017)	-	1.391 (0.012)***	0.389 (0.012)***	0.006 (0.012)***	0.00005 (0.012)*	-
SL	Min T coldest month	Annual ppt	-	0.691	520	-1963.1	68.78	0	1	0.5 (0.441, 0.555)	0.049 (0.032, 0.074)	0.003 (0, 0.013)	-	1.389 (0.013)***	0.39 (0.013)***	0.007 (0.013)***	0.00002 (0.013)*	-
SL	Mean T warmest quarter	Annual ppt	-	0.691	520	-1963	68.87	0	1	0.463 (0.403, 0.522)	0.049 (0.032, 0.068)	0.013 (0.003, 0.027)	-	1.204 (0.027)***	0.376 (0.027)***	0.01 (0.027)***	0.00004 (0.027)***	-
SL	Min T coldest month	-	-	0.689	521	-1960.4	71.41	0	1	0.525 (0.47, 0.573)	0.054 (0.036, 0.078)	-	-	1.407 (0.01)***	0.4 (0.01)***	0.007 (0.01)***	-	-
SL	-	Ppt warmest quarter	Dens	0.688	520	-1958.1	73.72	0	1	0.522 (0.464, 0.581)	-	0.029 (0.014, 0.049)	0.021 (0.008, 0.038)	1.553 (0.029)***	0.399 (0.029)***	-	0.00017 (0.029)***	-0.277 (0.029)***
SL	-	Ppt wettest month	Dens	0.688	520	-1957.4	74.43	0	1	0.512 (0.455, 0.565)	-	0.029 (0.015, 0.049)	0.02 (0.008, 0.038)	1.545 (0.03)***	0.395 (0.03)***	-	0.00033 (0.03)***	-0.274 (0.03)***
SL	-	Ppt wettest quarter	Dens	0.685	520	-1952.5	79.38	0	1	0.52 (0.46, 0.579)	-	0.026 (0.011, 0.045)	0.021 (0.008, 0.038)	1.549 (0.03)***	0.398 (0.03)***	-	0.00012 (0.03)***	-0.276 (0.03)***
SL	Mean T warmest quarter	-	-	0.681	521	-1946.9	84.91	0	1	0.525 (0.471, 0.573)	0.046 (0.03, 0.065)	-	-	1.248 (0.026)***	0.4 (0.026)***	0.01 (0.026)***	-	-
SL	-	Annual ppt	Dens	0.669	520	-1927.6	104.23	0	1	0.577 (0.522, 0.638)	-	0.006 (0.001, 0.017)	0.022 (0.009, 0.041)	1.572 (0.031)***	0.419 (0.031)***	-	0.00003 (0.031)**	-0.283 (0.031)***
SL	-	Ppt wettest month	-	0.668	521	-1926.8	105.03	0	1	0.52 (0.463, 0.579)	-	0.034 (0.017, 0.057)	-	1.388 (0.013)***	0.398 (0.013)***	-	0.00036 (0.013)***	-
SL	-	Ppt warmest quarter	-	0.668	521	-1926.6	105.25	0	1	0.533 (0.478, 0.59)	-	0.033 (0.015, 0.056)	-	1.395 (0.012)***	0.403 (0.012)***	-	0.00018 (0.012)***	-
SL	-	Ppt wettest quarter	-	0.665	521	-1921.6	110.28	0	1	0.529 (0.475, 0.585)	-	0.03 (0.015, 0.053)	-	1.392 (0.013)***	0.401 (0.013)***	-	0.00012 (0.013)***	-
SL	-	-	Dens	0.664	521	-1920.9	110.95	0	1	0.622 (0.575, 0.668)	-	-	0.024 (0.011, 0.041)	1.608 (0.029)***	0.435 (0.029)***	-	-	-0.299 (0.029)***
SL	-	Annual ppt	-	0.649	521	-1896.9	134.97	0	1	0.585 (0.533, 0.635)	-	0.009 (0.002, 0.022)	-	1.409 (0.014)***	0.422 (0.014)***	-	0.00003 (0.014)***	-
SL	-	-	-	0.641	522	-1886.8	145.08	0	1	-	-	-	-	1.442 (0.01)***	0.442 (0.014)***	-	-	-
-	Annual mean T	Annual ppt	Dens	0.381	520	-1598.8	433.05	0	1	-	0.218 (0.159, 0.277)	0.075 (0.043, 0.113)	0.044 (0.02, 0.078)	1.45 (0.046)***	-	0.018 (0.046)***	0.0001 (0.046)***	-0.402 (0.046)***
-	Mean T warmest quarter	Ppt wettest month	Dens	0.38	520	-1598.5	433.32	0	1	-	0.127 (0.085, 0.177)	0.119 (0.071, 0.174)	0.04 (0.016, 0.073)	1.373 (0.05)***	-	0.016 (0.05)***	0.00067 (0.05)***	-0.384 (0.05)***

-	Mean T warmest quarter	Annual ppt	Dens	0.379	520	-1597.6	434.27	0	1	-	0.211 (0.162, 0.263)	0.102 (0.062, 0.149)	0.04 (0.019, 0.077)	1.272 (0.053)***	-	0.021 (0.053)***	0.00011 (0.053)***	-0.387 (0.053)***
-	Mean T warmest quarter	Ppt wettest quarter	Dens	0.379	520	-1597.3	434.54	0	1	-	0.137 (0.095, 0.186)	0.114 (0.072, 0.168)	0.041 (0.017, 0.073)	1.365 (0.05)***	-	0.017 (0.05)***	0.00024 (0.05)***	-0.389 (0.05)***
-	Mean T wettest quarter	Ppt wettest month	Dens	0.378	520	-1596.6	435.27	0	1	-	0.14 (0.092, 0.198)	0.088 (0.048, 0.137)	0.04 (0.017, 0.071)	1.565 (0.042)***	-	0.011 (0.042)***	0.00058 (0.042)***	-0.384 (0.042)***
-	Mean T wettest quarter	Ppt wettest quarter	Dens	0.376	520	-1595.2	436.69	0	1	-	0.15 (0.101, 0.207)	0.083 (0.043, 0.134)	0.041 (0.017, 0.071)	1.566 (0.042)***	-	0.011 (0.042)***	0.00021 (0.042)***	-0.389 (0.042)***
-	Annual mean T	Ppt warmest quarter	Dens	0.373	520	-1592.7	439.18	0	1	-	0.156 (0.105, 0.212)	0.079 (0.042, 0.129)	0.045 (0.021, 0.081)	1.52 (0.044)***	-	0.015 (0.044)***	0.00028 (0.044)***	-0.41 (0.044)***
-	Mean T wettest quarter	Annual ppt	Dens	0.373	520	-1592.4	439.47	0	1	-	0.214 (0.162, 0.278)	0.066 (0.035, 0.105)	0.041 (0.016, 0.071)	1.533 (0.044)***	-	0.013 (0.044)***	0.00009 (0.044)***	-0.389 (0.044)***
-	Annual mean T	Ppt wettest month	Dens	0.373	520	-1592.2	439.7	0	1	-	0.136 (0.09, 0.193)	0.086 (0.045, 0.14)	0.043 (0.018, 0.076)	1.514 (0.044)***	-	0.014 (0.044)***	0.00057 (0.044)***	-0.398 (0.044)***
-	Annual mean T	Ppt wettest quarter	Dens	0.372	520	-1591.6	440.28	0	1	-	0.147 (0.098, 0.202)	0.081 (0.044, 0.13)	0.044 (0.021, 0.075)	1.511 (0.044)***	-	0.015 (0.044)***	0.00021 (0.044)***	-0.403 (0.044)***
-	Mean T warmest quarter	Ppt warmest quarter	Dens	0.372	520	-1591.4	440.5	0	1	-	0.142 (0.096, 0.189)	0.105 (0.061, 0.157)	0.043 (0.02, 0.077)	1.383 (0.05)***	-	0.017 (0.05)***	0.00032 (0.05)***	-0.398 (0.05)***
-	Mean T wettest quarter	Ppt warmest quarter	Dens	0.362	520	-1583.5	448.35	0	1	-	0.153 (0.099, 0.212)	0.068 (0.033, 0.114)	0.043 (0.017, 0.078)	1.592 (0.042)***	-	0.011 (0.042)***	0.00025 (0.042)***	-0.399 (0.042)***
-	Mean T coldest quarter	Ppt warmest quarter	Dens	0.349	520	-1572.6	459.29	0	1	-	0.128 (0.077, 0.188)	0.087 (0.046, 0.139)	0.044 (0.019, 0.078)	1.628 (0.042)***	-	0.011 (0.042)***	0.00029 (0.042)***	-0.402 (0.042)***
-	Mean T coldest quarter	Annual ppt	Dens	0.347	520	-1571.3	460.58	0	1	-	0.186 (0.133, 0.245)	0.072 (0.04, 0.114)	0.043 (0.018, 0.075)	1.585 (0.044)***	-	0.013 (0.044)***	0.00009 (0.044)***	-0.398 (0.044)***
-	Mean T coldest quarter	Ppt wettest month	Dens	0.346	520	-1570	461.91	0	1	-	0.105 (0.057, 0.164)	0.094 (0.05, 0.152)	0.041 (0.017, 0.078)	1.617 (0.043)***	-	0.01 (0.043)***	0.0006 (0.043)***	-0.389 (0.043)***
-	Mean T coldest quarter	Ppt wettest quarter	Dens	0.344	520	-1568.6	463.29	0	1	-	0.115 (0.069, 0.171)	0.087 (0.045, 0.137)	0.042 (0.019, 0.075)	1.619 (0.043)***	-	0.011 (0.043)***	0.00021 (0.043)***	-0.395 (0.043)***
-	Mean T warmest quarter	Ppt wettest month	-	0.343	521	-1568.6	463.31	0	1	-	0.112 (0.074, 0.16)	0.14 (0.087, 0.2)	-	1.173 (0.037)***	-	0.015 (0.037)***	0.00073 (0.037)***	-
-	Mean T warmest quarter	Annual ppt	-	0.341	521	-1567	464.86	0	1	-	0.2 (0.15, 0.254)	0.12 (0.077, 0.176)	-	1.061 (0.039)***	-	0.021 (0.039)***	0.00012 (0.039)***	-
-	Mean T wettest quarter	Ppt wettest month	-	0.34	521	-1566.7	465.19	0	1	-	0.123 (0.078, 0.177)	0.109 (0.06, 0.167)	-	1.354 (0.021)***	-	0.01 (0.021)***	0.00064 (0.021)***	-
-	Mean T warmest quarter	Ppt wettest quarter	-	0.34	521	-1566.5	465.36	0	1	-	0.123 (0.083, 0.169)	0.134 (0.083, 0.194)	-	1.162 (0.037)***	-	0.016 (0.037)***	0.00026 (0.037)***	-
-	Annual mean T	Annual ppt	-	0.339	521	-1565.8	466.07	0	1	-	0.203 (0.147, 0.266)	0.092 (0.053, 0.136)	-	1.228 (0.028)***	-	0.017 (0.028)***	0.00011 (0.028)***	-
-	Min T coldest month	Ppt warmest quarter	Dens	0.339	520	-1565	466.9	0	1	-	0.123 (0.076, 0.181)	0.079 (0.042, 0.133)	0.046 (0.02, 0.078)	1.701 (0.042)***	-	0.011 (0.042)***	0.00027 (0.042)***	-0.414 (0.042)***

-	Mean T wettest quarter	Ppt wettest quarter	-	0.338	521	-	467.35	0	1	-	0.133 (0.084, 0.187)	0.102 (0.056, 0.156)	-	1.351 (0.021)***	-	0.01 (0.021)***	0.00023 (0.021)***	-
-	Min T coldest month	Ppt wettest month	Dens	0.336	520	-	469.81	0	1	-	0.099 (0.05, 0.156)	0.086 (0.044, 0.145)	0.043 (0.019, 0.08)	1.684 (0.044)***	-	0.01 (0.044)***	0.00057 (0.044)***	-0.399 (0.044)***
-	Mean T wettest quarter	Annual ppt	-	0.334	521	-	470.01	0	1	-	0.201 (0.143, 0.265)	0.081 (0.045, 0.132)	-	1.315 (0.024)***	-	0.013 (0.024)***	0.0001 (0.024)***	-
-	Annual mean T	Ppt wettest month	-	0.332	521	-	471.4	0	1	-	0.115 (0.068, 0.17)	0.109 (0.059, 0.168)	-	1.301 (0.026)***	-	0.013 (0.026)***	0.00064 (0.026)***	-
-	Min T coldest month	Ppt wettest quarter	Dens	0.333	520	-1560	471.81	0	1	-	0.11 (0.061, 0.171)	0.078 (0.038, 0.13)	0.045 (0.018, 0.081)	1.69 (0.043)***	-	0.011 (0.043)***	0.0002 (0.043)***	-0.406 (0.043)***
-	Mean T warmest quarter	Ppt warmest quarter	-	0.331	521	-	472.59	0	1	-	0.127 (0.089, 0.177)	0.123 (0.073, 0.179)	-	1.176 (0.037)***	-	0.016 (0.037)***	0.00034 (0.037)***	-
-	Annual mean T	Ppt wettest quarter	-	0.331	521	-1559	472.87	0	1	-	0.126 (0.079, 0.179)	0.102 (0.059, 0.161)	-	1.295 (0.026)***	-	0.014 (0.026)***	0.00023 (0.026)***	-
-	Annual mean T	Ppt warmest quarter	-	0.33	521	-	473.24	0	1	-	0.137 (0.088, 0.195)	0.098 (0.059, 0.151)	-	1.301 (0.026)***	-	0.014 (0.026)***	0.00031 (0.026)***	-
-	Min T coldest month	Annual ppt	Dens	0.33	520	-	473.92	0	1	-	0.176 (0.121, 0.238)	0.056 (0.03, 0.092)	0.047 (0.019, 0.082)	1.684 (0.044)***	-	0.013 (0.044)***	0.00008 (0.044)***	-0.416 (0.044)***
-	Mean T wettest quarter	Ppt warmest quarter	-	0.321	521	-	480.12	0	1	-	0.136 (0.088, 0.194)	0.085 (0.046, 0.133)	-	1.374 (0.021)***	-	0.01 (0.021)***	0.00029 (0.021)***	-
-	Mean T wettest quarter	-	Dens	0.313	521	-	486.72	0	1	-	0.268 (0.211, 0.335)	-	0.056 (0.025, 0.09)	1.655 (0.043)***	-	0.015 (0.043)***	-	-0.457 (0.043)***
-	Annual mean T	-	Dens	0.31	521	-	488.34	0	1	-	0.267 (0.205, 0.328)	-	0.061 (0.03, 0.098)	1.578 (0.045)***	-	0.02 (0.045)***	-	-0.475 (0.045)***
-	Mean T coldest quarter	Ppt warmest quarter	-	0.307	521	-	490.76	0	1	-	0.111 (0.064, 0.166)	0.106 (0.062, 0.163)	-	1.407 (0.019)***	-	0.01 (0.019)***	0.00032 (0.019)***	-
-	Mean T coldest quarter	Ppt wettest month	-	0.307	521	-1541	490.84	0	1	-	0.085 (0.043, 0.141)	0.119 (0.066, 0.177)	-	1.401 (0.02)***	-	0.009 (0.02)***	0.00067 (0.02)***	-
-	Mean T coldest quarter	Annual ppt	-	0.307	521	-	491.19	0	1	-	0.171 (0.116, 0.232)	0.089 (0.053, 0.135)	-	1.361 (0.022)***	-	0.013 (0.022)***	0.0001 (0.022)***	-
-	Mean T coldest quarter	Ppt wettest quarter	-	0.304	521	-	493.16	0	1	-	0.096 (0.052, 0.152)	0.109 (0.061, 0.17)	-	1.4 (0.02)***	-	0.01 (0.02)***	0.00024 (0.02)***	-
-	Min T coldest month	Ppt warmest quarter	-	0.296	521	-	499.57	0	1	-	0.102 (0.054, 0.16)	0.1 (0.053, 0.155)	-	1.469 (0.017)***	-	0.01 (0.017)***	0.00031 (0.017)***	-
-	Min T coldest month	Ppt wettest month	-	0.295	521	-	499.62	0	1	-	0.075 (0.033, 0.126)	0.115 (0.064, 0.18)	-	1.457 (0.018)***	-	0.009 (0.018)***	0.00066 (0.018)***	-
-	Min T coldest month	Ppt wettest quarter	-	0.291	521	-	502.7	0	1	-	0.086 (0.042, 0.145)	0.104 (0.057, 0.162)	-	1.459 (0.018)***	-	0.009 (0.018)***	0.00023 (0.018)***	-
-	Min T coldest month	Annual ppt	-	0.286	521	-	506.44	0	1	-	0.156 (0.104, 0.219)	0.073 (0.039, 0.119)	-	1.447 (0.02)***	-	0.013 (0.02)***	0.0001 (0.02)***	-
-	Min T coldest month	-	Dens	0.281	521	-	510.05	0	1	-	0.238 (0.17, 0.306)	-	0.063 (0.033, 0.103)	1.808 (0.041)***	-	0.016 (0.041)***	-	-0.484 (0.041)***
-	Mean T coldest quarter	-	Dens	0.281	521	-	510.48	0	1	-	0.237 (0.179, 0.304)	-	0.06 (0.031, 0.097)	1.72 (0.042)***	-	0.015 (0.042)***	-	-0.47 (0.042)***

-	Mean T warmest quarter	-	Dens	0.28	521	-1521	510.9	0	1	-	0.236 (0.185, 0.296)	-	0.059 (0.027, 0.1)	1.431 (0.053)***	-	0.022 (0.053)***	-	-0.469 (0.053)***
-	-	Ppt wettest month	Dens	0.272	521	-1515.3	516.61	0	1	-	-	0.23 (0.169, 0.297)	0.027 (0.008, 0.062)	1.639 (0.045)***	-	-	0.001 (0.045)***	-0.319 (0.045)***
-	Mean T wettest quarter	-	-	0.258	522	-1505.9	525.98	0	1	-	-	-	-	1.41 (0.021)***	-	0.014 (0.001)***	-	-
-	-	Ppt wettest quarter	Dens	0.259	521	-1505.9	526.01	0	1	-	-	0.217 (0.16, 0.286)	0.028 (0.008, 0.066)	1.648 (0.045)***	-	-	0 (0.045)***	-0.325 (0.045)***
-	Annual mean T	-	-	0.251	522	-1501.2	530.67	0	1	-	-	-	-	1.327 (0.027)***	-	0.019 (0.001)***	-	-
-	-	Ppt wettest month	-	0.247	522	-1498.1	533.78	0	1	-	-	-	-	1.457 (0.019)***	-	-	0.001 (0)***	-
-	-	Ppt warmest quarter	Dens	0.247	521	-1497.6	534.23	0	1	-	-	0.205 (0.149, 0.265)	0.03 (0.008, 0.068)	1.679 (0.045)***	-	-	0 (0.045)***	-0.336 (0.045)***
-	-	Ppt wettest quarter	-	0.232	522	-1488.3	543.57	0	1	-	-	-	-	1.464 (0.019)***	-	-	0 (0)***	-
-	Mean T coldest quarter	-	-	0.223	522	-1481.7	550.2	0	1	-	-	-	-	1.468 (0.019)***	-	0.015 (0.001)***	-	-
-	Mean T warmest quarter	-	-	0.222	522	-1481.4	550.47	0	1	-	-	-	-	1.188 (0.04)***	-	0.022 (0.002)***	-	-
-	Min T coldest month	-	-	0.22	522	-1479.8	552.06	0	1	-	-	-	-	1.548 (0.014)***	-	0.015 (0.001)***	-	-
-	-	Ppt warmest quarter	-	0.219	522	-1479	552.85	0	1	-	-	-	-	1.489 (0.018)***	-	-	0 (0)***	-
-	-	Annual ppt	Dens	0.17	521	-1446.7	585.18	0	1	-	-	0.128 (0.079, 0.185)	0.029 (0.007, 0.064)	1.683 (0.049)***	-	-	0 (0.049)***	-0.331 (0.049)***
-	-	Annual ppt	-	0.143	522	-1430.6	601.21	0	1	-	-	-	-	1.493 (0.021)***	-	-	0 (0)***	-
-	-	-	Dens	0.046	522	-1374.2	657.66	0	1	-	-	-	-	1.889 (0.046)***	-	-	-	-0.419 (0.082)***

T=temperature; ppt=precipitation; ***P<0.001, **P<0.01, *P<0.05; †degrees of freedom; ‡corrected Akaike information criterion; §the difference between model AICc values and the AICc of the model with the smallest AICc in the model set; ¶Akaike weight; ¤cumulative Akaike weight (the set of best models includes those whose w sum to 0.95)

Table S3. Models predicting vessel diameter at the base (VD_{base}), at the tip (VD_{tip}), and tapering ratio (T) based on stem length (SL)

	$VD_{base} \sim SL$	$VD_{tip} \sim SL$	$T \sim SL$
R^2	0.64	0.28	0.35
Model ANOVA	$F_{(1, 535)} = 951.4^{***}$	$F_{(1, 415)} = 162.2^{***}$	$F_{(1, 415)} = 218.6^{***}$
Intercept	1.446 (1.427, 1.466) ^{***}	1.055 (1.034, 1.076) ^{***}	0.386 (0.366, 0.407) ^{***}
Slope	0.436 (0.408, 0.463) ^{***}	0.197 (0.167, 0.227) ^{***}	0.226 (0.196, 0.256) ^{***}

*** P<0.001

Table S4. Within species, taller plants are more vulnerable to embolism: P_{50} vs. height

Species	Height class (cm)	P_{50} (-MPa)*	95% C.I.
<i>Casimiroa edulis</i>	< 150	1.732	1.573, 1.901
	> 150	1.055	0.918, 1.157
<i>Moringa oleifera</i>	<150	1.301	1.235, 1.386
	150 – 250	0.956	0.885, 1.040
	> 250	0.656	0.487, 0.758
<i>Pinus ayacahuite</i>	< 150	3.544	3.129, 3.939
	> 150	1.938	1.628, 2.298

* the xylem pressure potential at which a stem height class lost half of its conductive ability

Table S5. Correlations between climate, VD_{base} , VD_{tip} , SL , and $Dens$

	VD_{base}	SL	VD_{tip}	$Dens$
N	537	537	417	524
*Annual Mean T	0.45 ^{***}	0.24 ^{***}	0.45 ^{***}	0.06
MeanDiurnalRange	-0.14 ^{***}	-0.16 ^{***}	-0.04	-0.06
Isothermality	0.18 ^{***}	-0.01	0.19 ^{***}	0.00
T Seasonality	-0.26 ^{***}	-0.05	-0.24 ^{***}	-0.03
MaxTWarmest Month	0.34 ^{***}	0.22 ^{***}	0.38 ^{***}	0.04
*Min T Coldest Month	0.43 ^{***}	0.21 ^{***}	0.42 ^{***}	0.07
TAnnualRange	-0.24 ^{***}	-0.07	-0.19 ^{***}	-0.05
*Mean T Wettest Qtr	0.44 ^{***}	0.24 ^{***}	0.44 ^{***}	0.04
Mean T Driest Qtr	0.33 ^{***}	0.10 [*]	0.35 ^{***}	0.07
*Mean T Warmest Qtr	0.41 ^{***}	0.25 ^{***}	0.41 ^{***}	0.05
*Mean T Coldest Qtr	0.43 ^{***}	0.20 ^{***}	0.42 ^{***}	0.05
*Annual Ppt	0.41 ^{***}	0.43 ^{***}	0.49 ^{***}	-0.13 ^{**}
*Ppt Wettest Month	0.52 ^{***}	0.46 ^{***}	0.59 ^{***}	-0.11 [*]
Ppt Driest Month	0.01	0.15 ^{***}	0.03	-0.07
Ppt Season	0.23 ^{***}	0.04	0.18 ^{***}	0.04
*Ppt Wettest Qtr	0.51 ^{***}	0.46 ^{***}	0.58 ^{***}	-0.11 [*]
Ppt Driest Qtr	0.00	0.15 ^{***}	0.03	-0.07
*Ppt Warmest Qtr	0.46 ^{***}	0.40 ^{***}	0.53 ^{***}	-0.10 [*]
Ppt Coldest Qtr	-0.06	0.11 [*]	0.06	-0.11 [*]
VD_{base}	-	0.80 ^{***†}	0.70 ^{***†}	-0.27 ^{***}
VD_{tip}	-	0.53 ^{***†‡}	-	-0.38 ^{***§}

*** P<0.005, **P<0.01, *P<0.05, † variable pair log₁₀ transformed, ‡ n=417, §n=411, *climate variables included in the models in Table S2

Table S6. Maximum conduit and segment lengths

	95% C.I. Maximum conduit length (cm)	Minimum/ maximum segment lengths (cm)
<i>Casimiroa edulis</i>		
< 100	25.400 - 33.499	30/41
100 - 150,	31.841 - 38.258	37/62
>150	43.222 -51.277	43/65
<i>Moringa oleifera</i>		
< 100	42.024 - 48.032	42/68
100 – 150	59.185 - 65.814	54/81
150 -250	65.509 - 75.990	64/95
>250	70.388 - 81.111	60/101
<i>Pinus ayacahuite</i>		
< 150	0.095 - 0.107	13/30
> 150	0.092 - 0.103	18/35

Table S7. Phylogenetic signal in residuals of the *VD~SL* model

	Blomberg's <i>K</i>	P value*
<i>VD-SL</i> residuals	0.16-0.18	0.001-0.017
Residuals of first model in Table 3	0.14-0.17	0.008-0.050

*P-value from a randomization test based on phylogenetically independent contrasts. Ranges based on the 1000 calculations with randomly resolved polytomies in phylogenetic trees.

Dataset S1 (separate file)

Species sampled, authorities, vessel diameters, stem lengths, geographical coordinates, climate data, and place of publication of previously published data

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