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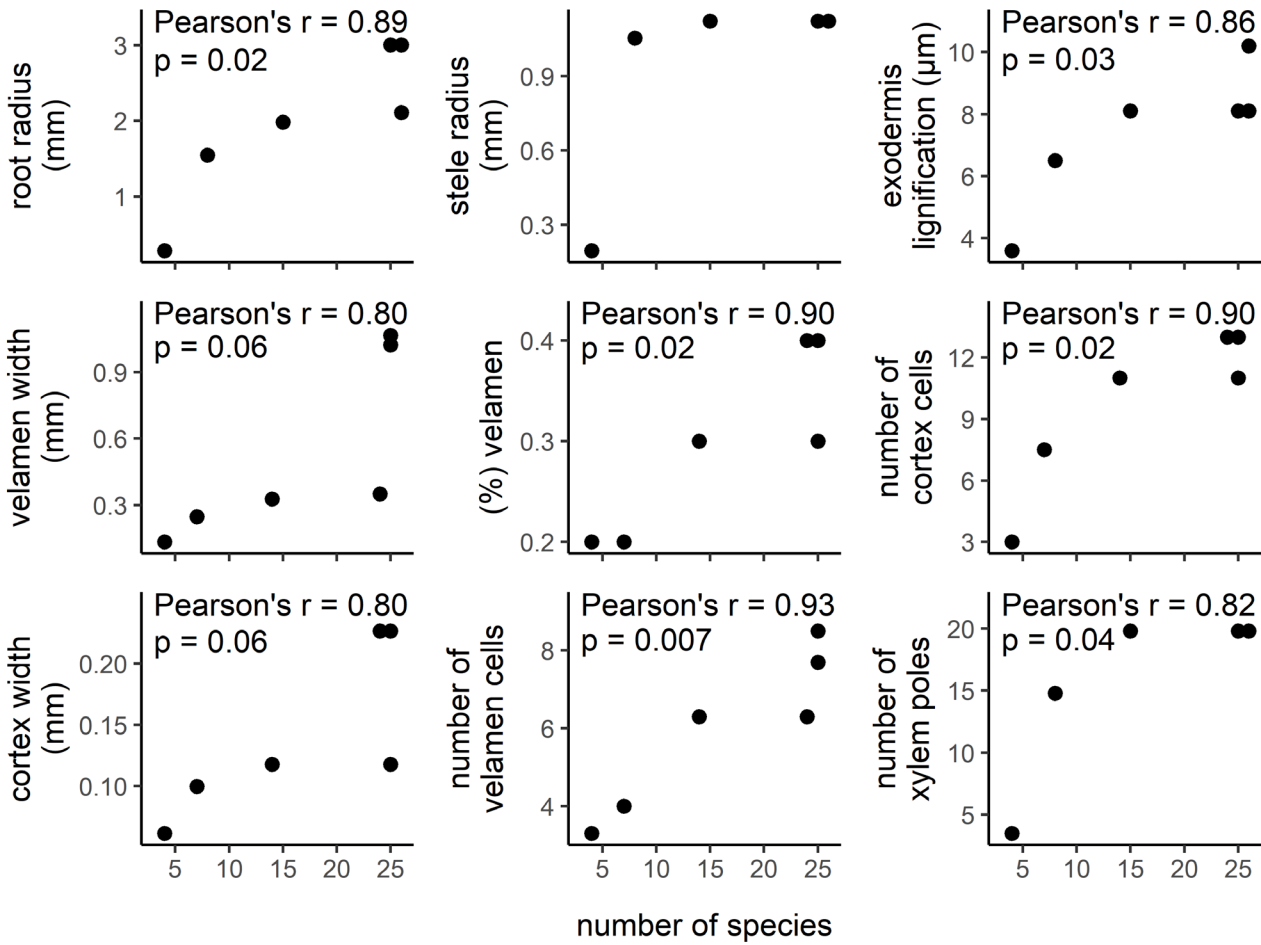


Figure S1. Trait spread within the rainfall classes. With the exception of stele radius all traits correlated positively with species numbers.



Table S1. Root traits of 35 orchid species occurring on pasture trees along a precipitation gradient. Data are means \pm SD for all species with $n \geq 3$, or, respectively, means of two or single values.

Species	n	root radius (mm)	velamen width (mm)	cortex width (mm)	stele radius (mm)	(%) velamen	# cells velamen	exodermis lignification (μ m)	# cells cortex	# xylem poles
<i>Aspasia epidendroides</i> Lindl.	1	0.7	0.2	0.2	0.2	36	6.0	2.0	4.0	11.0
<i>Brassavola nodosa</i> (L.) Lindl.	10	1.1 \pm 0.2	0.2 \pm 0.07	0.5 \pm 0.1	0.2 \pm 0.04	22	4.7 \pm 0.7	8.1 \pm 3.1	8.9 \pm 0.9	8.6 \pm 1.6
<i>Bulbophyllum pachyrachis</i> (A.Rich.) Griseb.	2	0.4	0.1	0.2	0.3	23	2.5	3.7	5.0	8.0
<i>Camaridium ochroleucum</i> Lindl.	3	0.3 \pm 0.1	0.1 \pm 0.04	0.07 \pm 0.01	0.1 \pm 0.04	32	4.3 \pm 0.6	2.6 \pm 0.7	3.0 \pm 0	7.3 \pm 3.2
<i>Catasetum sp maculatum</i>	3	2.4 \pm 0.2	1.1 \pm 0.1	0.8 \pm 0.2	1.0 \pm 0.3	44	7.7 \pm 2.5	0	9.7 \pm 1.5	11.3 \pm 5.0
<i>Catasetum viridiflavum</i> Hook.	2	1.1			0.3			1.6		9.0
<i>Cattleya sp patinii</i>	3	2.3 \pm 0.2	0.4 \pm 0.1	1.2 \pm 0.2	1.2 \pm 0.04	15	4.0 \pm 1.0	3.8 \pm 0.6	14.0 \pm 1.7	23.3 \pm 1.2
<i>Caularthron bilamellatum</i> (Rchb.f.) R.E.Schult.	4	0.9 \pm 0.3	0.2 \pm 0.06	0.4 \pm 0.1	0.2 \pm 0.05	27	5.7 \pm 1.2	4.5 \pm 3.0	8.8 \pm 1.7	12.0 \pm 2.4
<i>Cycnoches chlorochilon</i> Klotzsch	2	2.1	0.9	0.7	0.9	45	10.0	0	10.5	13.0
<i>Dichaea panamensis</i> Lindl.	2	1.7	0.1	1.4	0.3	6	1.5	0	13.0	8.5
<i>Dimerandra emarginata</i> (G.Mey.) Hoehne	7	0.8 \pm 0.2	0.2 \pm 0.04	0.3 \pm 0.1	0.2 \pm 0.04	28	4.7 \pm 0.8	6.7 \pm 4.0	7.1 \pm 1.5	14.6 \pm 1.9
<i>Encyclia cordigera</i> (Kunth) Dressler	10	0.8 \pm 0.2	0.2 \pm 0.09	0.3 \pm 0.07	0.2 \pm 0.05	30	6.3 \pm 1.4	5.8 \pm 3.2	7.0 \pm 0.8	10.9 \pm 2.1
<i>Encyclia stellata</i> (Lindl.) Schltr.	2	1.1	0.4	0.4	0.6	33	7.0	7.5	6.5	12.5
<i>Epidendrum difforme</i> Jacq.	10	0.8 \pm 0.3	0.1 \pm 0.07	0.3 \pm 0.1	0.2 \pm 0.06	20	4.1 \pm 1.1	7.7 \pm 7.4	6.8 \pm 1.2	10.6 \pm 2.9
<i>Epidendrum nocturnum</i> Jacq.	3	1.7 \pm 0.5	0.2 \pm 0.01	1.2 \pm 0.3	0.6 \pm 0.2	12	3.3 \pm 0.6	2.6 \pm 2.3	12.0 \pm 1.0	11.0 \pm 0
<i>Epidendrum schlechterianum</i> Ames	1	0.7	0.1	0.3	0.4	18	3.0	3.6	6.0	8.0
<i>Epidendrum sculptum</i> Rchb.f.	3	0.8 \pm 0.1	0.2 \pm 0.03	0.3 \pm 0.1	0.6 \pm 0.05	22	3.7 \pm 0.6	6.6 \pm 2.5	7.0 \pm 1.0	12.3 \pm 2.3
<i>Epidendrum strobiliferum</i> Rchb.f.	2	0.5	0.04	0.2	0.3	9	2.0	8.1	4.0	9.5
<i>Heterotaxis sessilis</i> (Sw.) F.Barros	2	0.7	0.2	0.2	0.4	30	3.0	7.5	4.0	7.0
<i>Lockhartia micrantha</i> Rchb.f.	2	0.4	0.2	0.1	0.2	41	3.5	2.1	3.0	4.5
<i>Oncidium</i> sp	1	0.4	0.07	0.1	0.4	17	3.0	4.4	4.0	9.0
<i>Oncidium stipitatum</i> Lindl.	2	1.2	0.1	0.6	0.7	11	4.5	0	11.0	8.5
<i>Oncidium teres</i> Ames & C.Schweinf.	1	0.9	0.05	0.5	0.4	6	1.0	0	9.0	8.0
<i>Phloeophila peperomioides</i> (Ames) Garay	2	0.6	0.07	0.3	0.1	12	1.5	7.9	4.0	3.5
<i>Pleurothallis</i> sp3	3	0.5 \pm 0.1	0	0.3 \pm 0.07	0.2 \pm 0.02	0	0	10.2 \pm 3.8	5.3 \pm 0.6	4.0 \pm 0
<i>Polystachya foliosa</i> (Hook.) Rchb.f.	2	1.1	0.1	0.9	0.4	11	3.0	5.4	10.0	8.5
<i>Prosthechea chacaoensis</i> (Rchb.f.) W.E.Higgins	2	0.7	0.2	0.2	0.2 \pm 0.1	32	6.0	3.6	5.5	13.5
<i>Rossioglossum ampliatus</i> (Lindl.) M.W.Chase & N.H.Williams	1	0.9	0.3	0.3	0.2	35	6.0	0	9.0	8.0
<i>Scaphyglottis behrii</i> (Rchb.f.) Benth. & Hook.f. ex Hemsl.	2	0.5	0.1	0.2	0.2	26	3.0	4.6	4.5	7.0
<i>Scaphyglottis bidentata</i> (Lindl.) Dressler	3	0.7 \pm 0.3	0.3 \pm 0.1	0.2 \pm 0.1	0.4 \pm 0.1	37	4.0 \pm 0	6.3 \pm 1.8	5.0 \pm 1.0	9.3 \pm 2.5
<i>Scaphyglottis longicaulis</i> S.Watson	3	0.6 \pm 0.2	0.2 \pm 0.06	0.2 \pm 0.07	0.3 \pm 0.07	35	3.3 \pm 0.6	3.8 \pm 1.5	5.0 \pm 1.0	8.3 \pm 0.6
<i>Sobralia bletiae</i> Rchb.f.	1	3.3	0.1	2.3	0.7	4	3.0	5.9	16.0	12.0
<i>Trichosalpinx ciliaris</i> (Lindl.) Luer	3	0.4 \pm 0.1	0.03 \pm 0.06	0.3 \pm 0.03	0.2 \pm 0.02	7	0.7 \pm 1.2	4.8	4.7 \pm 0.6	3.7 \pm 0.6
<i>Trigonidium egertonianum</i> Bateman ex Lindl.	2	0.9	0.4	0.2	0.5	43	4.5	5.3	5.0	12.5
<i>Trizeuxis falcata</i> Lindl.	1	0.4	0.07	0.2	0.2	19	4.0	0	5.0	3.5



Table S2. Root traits of 18 orchid species with different vertical distributions at the San Lorenzo lowland forest. For each species, the mean, minimum and maximum height (H, in m) in the canopy is given, as well as, the species' abundace, the radius/width of the entire root, velamen (V), cortex and stele (all in mm), the proportional thickness of the velamen (in %), the number of velamen cells, the lignification thickness of the exodermis (in μm) and the number of xylem poles. Data are means of up to six measurements per species.

Species	Hmean	Hmin	Hmax	abund	root radius	V width	cortex width	stele radius	V prop	V cell	Exo lignific	Xpoles
<i>Acianthera verecunda</i>	12.5	5.0	18.0	7	0.29	0.06	0.13	0.09	20	2.0	5.6	5.0
<i>Aspasia principissa</i>	10.9	0.6	31.7	53	0.60	0.22	0.17	0.18	37	6.0	2.7	11.0
<i>Catasetum viridiflavum</i>	24.1	7.5	40.4	70	1.77	0.67	0.65	0.34	38	8.3	2.4	13.0
<i>Caularthron bilamellatum</i>	23.3	23.3	23.3	1	0.55	0.08	0.21	0.08	15	3.0	3.9	8.0
<i>Christensonella uncata</i>	23.2	7.2	36.9	857	0.28	0.09	0.07	0.08	31	2.8	4.1	5.8
<i>Dichaea panamensis</i>	18.0	1.0	29.9	279	0.96	0.06	0.68	0.11	6	1.5	2.3	7.5
<i>Epidendrum difforme</i>	26.1	13.3	33.0	36	0.66	0.11	0.26	0.18	16	3.4	2.4	11.0
<i>Epidendrum nocturnum</i>	17.1	2.5	29.8	38	1.69	0.22	1.05	0.19	13	4.3	8.2	13.0
<i>Masdevallia livingstoneana</i>	14.0	12.0	16.0	45	0.64	0.16	0.25	0.14	25	5.0	n.d.	7.0
<i>Polystachya foliosa</i>	21.5	6.7	36.0	62	1.08	0.14	0.62	0.15	13	3.5	3.2	9.0
<i>Rodriguezia lanceolata</i>	16.5	16.0	17.0	16	0.52	0.10	0.18	0.20	19	4.7	2.2	10.0
<i>Scaphyglottis graminifolia</i>	21.8	5.5	40.4	1514	0.21	0.06	0.07	0.05	27	2.0	6.9	4.0
<i>Scaphyglottis longicaulis</i>	16.7	4.5	40.2	1568	0.53	0.17	0.16	0.12	31	3.8	3.1	8.8
<i>Scaphyglottis prolifera</i>	23.6	0.0	30.9	284	0.48	0.09	0.21	0.10	19	2.6	3.9	7.0
<i>Sobralia fragrans</i>	17.3	4.0	30.5	169	1.48	0.17	0.94	0.29	12	3.2	4.3	13.7
<i>Specklinia brighamii</i>	21.1	3.5	37.3	800	0.29	0.07	0.10	0.08	25	2.0	2.1	5.0
<i>Trichosalpinx orbicularis</i>	16.8	7.0	36.9	390	0.24	0.06	0.21	0.08	23	1.0	1.9	5.5
<i>Trigonidium egertonianum</i>	27.0	15.0	33.1	31	0.58	0.26	0.12	0.15	44	5.5	8.1	10.5

