***New Phytologist* Supporting Information**

Island woodiness underpins accelerated disparification in plant radiations

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Manuscript accepted: 12 March 2019

The following Supporting Information is available for this article:

Table S1 Voucher – *Information on species and sequence references included in the study, and coding of characters (distribution, life history, and growth form).*

Table S2 Comparative diversification rate analysis: *model specification and model fit (BayesRate).*

Table S3 Sampling fractions: *exploratory rate heterogeneity analysis (BAMM).*

Table S4 Plant height: *growth form (phenotypic) evolution analysis detailing model fit (OUwie).*

Figures S1–S4 Secondary woodiness – *time trees incl. tip names and clade assignment detailing life history analysis comparing ML to SCM ancestral state estimations (ace & make.simmap), and island/non-island mappings for* Echium *(Fig. S1),* Hypericum *(Fig. S2),* Lupinus *(Fig. S3), and Silverswords–Tarweeds (Fig. S4)*.

Methods S1 Clade specific tree and trait data – *Phylogenetic reconstruction and age estimation (BEAST), fossils used for calibration, full references for trait data.*

Notes S1 *Hypericum* traits – *details on potential biases using mean plant height in the group.*

Table S1. Voucher – Information on taxa included in the study detailing species names per study group, clade assignment, mean plant height, coding of distribution (i, island; n, non-island) and life history traits (h, herbaceous; w, woody), and ENA/NCBI accession numbers of molecular marker used for phylogenies newly reconstructed in this study.

		Plant	Distri-	Life	Molecular marker				
Clade	**Taxon**	**height**	**bution**	**history**	**ITS**	**D6DES**	**rbcL**	**trnL**	**trnLF**
Echium									
E	*E. acanthocarpum* Svent.	170.0	i	w	EU048853	DQ315582	—	EU433604	EU433619
E	*E. aculeatum* Poiret	130.0	i	w	EU048849	DQ315568	EU599868	EU433600	EU433615
D	*E. albicans* Lag. & Rodr.	56.0	n	h	L43172	—	—	L43170	L43171
C	*E. angustifolium* Mill.	83.0	n	h	—	—	EU599871	EU600047	EU599959
A	*E. arenarium* Guss.	37.5	n	h	EU919584	—	—	—	—
D	*E. asperrimum* Lam.	65.0	n	h	L43176	—	—	L33347	L43175
E	*E. auberianum* Webb & Berthel.	80.0	i	w	L43180	DQ315596	EU599866	EU600042	EU599954
E	*E. bethencourtii* Santos	250.0	i	w	—	DQ315595	—	—	—
E	*E. bonnetii* Coynci	25.0	i	h	L43184	DQ315578	EU599864	EU600040	EU599952
E	*E. brevirame* Spr. & Hutch.	60.0	i	w	L43188	DQ315594	—	L43186	L43187
E	*E. callithyrsum* Webb ex Bolle	72.0	i	w	L43196	DQ315573	—	L43194	L43195
E	*E. candicans* L.f.	162.5	i	w	EU048856	DQ315587	—	EU433607	EU433622
D	*E. creticum* L.	57.5	n	h	FJ763249	—	—	L43206	L43207
E	*E. decaisnei* Webb & Berthel.	135.0	i	w	EU048852	DQ315593	EU599867	EU600043	EU433618
E	*E. gentianoides* Webb ex Coynci	70.0	i	w	—	DQ315575	—	—	—
E	*E. giganteum* L.f.	250.0	i	w	L43224	DQ315567	EU599870	EU600046	EU599958
E	*E. handiense* Svent.	102.5	i	w	L43220	DQ315577	—	L43218	L43219
E	*E. hierrense* Webb ex Bolle	160.0	i	w	EU048848	DQ315581	—	EU433599	EU433614
D	*E. horridum* Batt.	83.0	n	h	L43228	—	—	L43226	L43227
A	*E. humile* Desf.	21.0	n	h	AF284109	—	—	AF284105	AF284099
E	*E. hypertropicum* Webb	100.0	i	w	EU048858	DQ315592	—	EU433609	EU433624
D	*E. italicum* L.	59.5	n	h	L43236	—	EU599874	EU600051	EU599963
E	*E. leucophaeum* Webb ex Spr. & Hutch.	150.0	i	w	L43240	DQ315588	EU599865	EU600041	EU599953
D	*E. lusitanicum* L.	87.0	n	h	EU048847	—	—	EU433598	EU433613
E	*E. nervosum* Dryand.	130.0	i	w	EU048855	DQ315574	—	EU433606	EU433621
E	*E. onosmifolium* Webb & Berthel.	120.0	i	w	L43260	DQ315572	—	L43258	L43259
A	*E. parviflorum* Moench	25.0	n	h	L43264	—	—	L43262	L43263
E	*E. pininana* Webb & Berthel.	78.5	i	w	L43268	DQ315586	—	L43266	L43267
E	*E. pitardii* A. Chev	25.0	i	h	L43322	DQ315569	—	L43320	L43321
D	*E. plantagineum* L.	66.0	n	h	L43272	—	EU599872	EU600049	EU599960
D	*E. pycnanthum* Pomel	21.0	n	h	AF284108	—	—	AF284104	AF284101
D	*E. rosulatum* Lange	78.0	n	h	L43276	—	—	L43274	L43275
B	*E. russicum* J.F. Gmel.	82.5	n	h	L43280	—	—	L33356	L43279

continued

Clade	Taxon	Plant height	Distri-bution	Life history	Molecular marker				
					ITS	D6DES	rbcL	trnL	trnLF
A	*E. sabulicola* Pomel	37.5	n	h	L43288	DQ315570	—	L43286	L43287
E	*E. simplex* DC	215.0	i	w	EU048851	DQ315584	HM849965	EU433602	EU433617
E	*E. stenosiphon* Webb	100.0	i	w	EU048859	DQ315591	—	EU433611	EU433627
E	*E. strictum* L.f.	130.0	i	w	L43292	DQ315590	—	L43290	L43291
E	*E. sventenii* Bramw.	145.0	i	w		DQ315579	—	—	—
A	*E. tenue* Lam.	83.0	n	h	AF284106	DQ315571	—	AF284102	AF284098
E	*E. triste* Svent.	60.0	i	h	L43324	DQ315576	—	—	L43323
D	*E. tuberculatum* Hoffmanns. & Link	95.0	n	h	L43300	—	—	L43298	L43299
A	*E. vilmorinianum* Sauvage & Vindt	83.0	n	h	AF284107	—	—	AF284103	AF284100
E	*E. virescens* Bolle	165.0	i	w	EU048850	DQ315583	EU599869	EU433601	EU433616
E	*E. vulcanorum* A. Chev	150.0	i	w	EU048857	DQ315589	—	EU433608	EU433623
D	*E. vulgare* L.	75.0	n	h	AY092900	—	KF158087	L33362	FJ789880
E	*E. webbii* Coyncii	170.0	i	w	EU048854	DQ315580	—	EU433605	EU433620
E	*E. wildpretii* H.Pearson ex Hook.f.	250.0	i	w	KF287973	DQ315585	EU599863	EU600039	EU599951
B	*Pontechium maculatum* (L.) Böhle & Hilger	82.5	n	h	EU919608	—	—	KF288055	—
Hypericum									
I	*H. aciculare* Kunth	115.0	i	w					
H	*H. acostanum* N.Robson	45.0	i	w					
I	*H. adpressum* W.P.C.Barton	60.0	n	h					
I	*H. andinum* Gleason	30.0	i	w					
B	*H. apocynifolium* Small	55.0	n	w					
H	*H. arbuscula* Stanley & Steyerm.	35.0	i	w					
D	*H. boreale* (Britton) Bickn.	37.5	n	h					
B	*H. brachyphyllum* (Spach) Steud.	75.0	n	w					
C	*H. brasiliense* Choisy	65.0	n	h					
H	*H. brevistylum* Choisy	11.5	i	h					
I	*H. bryoides* Gleason	12.0	i	w					
B	*H. buckleyi* M.A.Curtis	25.0	n	w					
I	*H. callacallanum* N.Robson	35.0	i	w					
C	*H. campestre* Cham. & Schltdl.	125.0	n	h					
D	*H. canadense* L.	31.5	n	h					
I	*H. cardonae* Cuatrec.	60.0	i	w					
I	*H. carinosum* R.Keller	155.0	i	w					
B	*H. chapmanii* W.P.Adams	190.0	n	w					
B	*H. cistifolium* Lam.	90.0	n	w					
C	*H. connatum* Lam.	61.5	n	h					
I	*H. costaricense* N.Robson	55.0	i	w					

continued

Clade	Taxon	Plant height	Distri-bution	Life history	Molecular marker ITS	D6DES	rbcL	trnL	trnLF
B	*H. crux_andreae* (L.) Crantz	55.0	n	w					
I	*H. cuatrecasii* Gleason	160.0	i	w					
I	*H. cymobrathys* N.Robson	75.0	i	w					
I	*H. decandrum* Turcz.	35.0	i	w					
B	*H. densiflorum* Pursh	120.0	n	w					
F	*H. dichotomum* Lam.	13.0	n	h					
B	*H. dolabriforme* Vent.	32.5	n	w					
F	*H. drummondii* (Grev. & Hook.) Torr. & A.Gray	45.0	n	h					
B	*H. fasciculatum* Lam.	150.0	n	w					
B	*H. frondosum* Michx.	153.0	n	w					
B	*H. galioides* Lam.	100.0	n	w					
I	*H. garciae* Pierce	75.0	i	w					
E	*H. gentianoides* (L.) Britton, Sterns & Poggenb.	33.5	n	h					
I	*H. gladiatum* N.Robson	42.5	i	w					
I	*H. gleasonii* N.Robson	82.5	i	w					
D	*H. globuliferum* R.Keller	19.5	n	h					
H	*H. gnidioides* Seem.	79.5	i	w					
I	*H. goyanesii* Cuatrec.	200.0	i	w					
D	*H. gramineum* G.Forst.	61.0	n	h					
I	*H. harlingii* N.Robson	255.0	i	w					
I	*H. hartwegii* Benth.	60.0	i	w					
I	*H. horizontale* N.Robson	50.0	i	w					
I	*H. humboldtianum* Steud.	42.5	i	w					
B	*H. hypericoides* (L.) Crantz	65.0	n	w					
I	*H. irazuense* Kunze ex N.Robson	170.0	i	w					
D	*H. japonicum* Thunb.	26.0	n	h					
I	*H. juniperinum* Kunth	135.0	i	w					
B	*H. kalmianum* L.	40.0	n	w					
D	*H. lalandii* Choisy	29.5	n	h					
I	*H. lancifolium* Gleason	85.0	i	w					
I	*H. lancioides* subsp. *congestiflorum* Cuatrec.	55.0	i	w					
I	*H. laricifolium* Juss.	315.0	i	w					
C	*H. linoides* A.St.-Hil.	65.0	n	h					
B	*H. lissophloeus* W.P.Adams	240.0	n	w					
I	*H. llanganaticum* N.Robson	120.0	i	w					

continued

Clade	Taxon	Plant height	Distri-bution	Life history	Molecular marker ITS	D6DES	rbcL	trnL	trnLF
B	*H. lloydii* (Svenson) W.P.Adams	30.0	n	w					
B	*H. lobocarpum* Gatt.	120.0	n	w					
H	*H. loxense* subsp. *loxense* Benth.	60.0	i	w					
I	*H. lycopodioides* Triana & Planch.	200.0	i	w					
I	*H. magniflorum* Cuatrec.	175.0	i	w					
I	*H. maguirei* N.Robson	65.0	i	w					
D	*H. majus* (A.Gray) Britton	32.5	n	h					
I	*H. marahuacanum* subsp. *marahuacanum* N.Robson	90.0	i	w					
I	*H. mexicanum* L.	82.5	i	w					
B	*H. microsepalum* (Torr. & A.Gray) A.Gray ex S.Watson	42.5	n	w					
D	*H. mutilum* L.	37.5	n	h					
I	*H. myricariifolium* Hieron.	200.0	i	w					
B	*H. myrtifolium* Lam.	65.0	n	w					
B	*H. nitidum* subsp. *exile* Lam.	170.0	n	w					
B	*H. nudiflorum* Michx.	125.0	n	w					
I	*H. parallelum* N.Robson	35.0	i	w					
I	*H. phellos* subsp. *phellos* Gleason	215.0	i	w					
H	*H. philonotis* Schltdl. & Cham.	33.0	i	w					
I	*H. pimeleoides* Planch. & Linden ex Triana & Planch.	95.0	i	w					
C	*H. polyanthemum* Klotzsch ex Reichardt	25.0	n	w					
H	*H. pratense* Schltdl. & Cham.	45.0	i	h					
B	*H. prolificum* L.	112.5	n	w					
I	*H. prostratum* Cuatrec.	20.0	i	w					
H	*H. quitense* R.Keller	65.0	i	w					
C	*H. rigidum* subsp. *rigidum* A.St.-Hil.	125.0	n	w					
I	*H. ruscoides* Cuatrec.	80.0	i	w					
I	*H. sabiniforme* Trevir.	40.0	i	w					
D	*H. scioanum* Chiov.	20.0	n	h					
I	*H. selaginella* N.Robson	15.0	i	w					
H	*H. silenoides* Juss.	35.0	i	h					
B	*H. sphaerocarpum* Michx.	40.0	n	w					

continued

Clade	Taxon	Plant height	Distri-bution	Life history	Molecular marker ITS	D6DES	rbcL	trnL	trnLF
I	*H. sprucei* N.Robson	110.0	i	w					
I	*H. strictum* Kunth	60.0	i	w					
I	*H. struthiolifolium* Juss.	50.0	i	w					
B	*H. suffruticosum* W.P.Adams	10.0	n	w					
B	*H. tenuifolium* Pursh	30.0	n	w					
C	*H. ternum* A.St.-Hil.	45.0	n	w					
G	*H. terrae-firmae* Sprague & Riley	150.0	i	w					
B	*H. tetrapetalum* Lam.	60.0	n	w					
I	*H. tetrastichum* Cuatrec.	52.5	i	w					
H	*H. thesiifolium* Kunth	36.0	i	h					
I	*H. thuyoides* Kunth	200.0	i	w					
I	*H. valleanum* N.Robson	100.0	i	w					
I	*H. woodianum* N.Robson	150.0	i	w					
A	*H. fraseri* (Spach) Gleason	45.0	n	h					
A	*H. fauriei* (Blume) Makino	50.0	n	h					
A	*H. virginicum* Raf.	45.0	n	h					
A	*H. walteri* (J.F.Gmel.) Gleason	60.0	n	h					
Lupinus									
P	*L. albicaulis* Douglas	75.0	i	w					
P	*L. albifrons* Benth.	110.0	i	w					
P	*L. andersonii* S.Watson	57.0	i	w					
P	*L. arboreus* Sims	160.0	i	w					
Q	*L. arcticus* S.Watson	30.0	i	w					
P	*L. argenteus* Pursh	42.0	i	w					
K	*L. arizonicus* (S.Watson) S.Watson	30.0	n	h					
S	*L. arvensis* Benth.	40.0	i	h					
R	*L. aschenbornii* S.Schauer	40.0	i	w					
S	*L. ballianus* C.P.Sm.	160.0	i	w					
S	*L. bangii* Rusby	65.0	i	h					
K	*L. benthamii* A.Heller	45.0	n	h					
O	*L. bicolor* Lindl.	25.0	n	h					
S	*L. bogotensis* Benth.	170.0	i	w					
I	*L. brevicaulis* S.Watson	5.0	n	h					
P	*L. breweri* A.Gray	10.0	i	w					
P	*L. cervinus* Kellogg	20.0	i	w					
S	*L. chachas* C.P.Sm.	65.0	i	w					
P	*L. chamissonis* Eschsch.	125.0	i	w					
S	*L. chrysanthus* Ulbr.	60.0	i	w					
J	*L. citrinus* Kellogg	35.0	n	h					
K	*L. concinnus* J.Agardh	6.5	n	h					
P	*L. duranii* Eastw.	8.5	i	w					

continued

Clade	Taxon	Plant height	Distri-bution	Life history	Molecular marker				
					ITS	D6DES	rbcL	trnL	trnLF
R	*L. elegans* Kunth	200.0	i	w					
S	*L. ellsworthianus* C.P.Sm.	80.0	i	w					
P	*L. excubitus* M.E.Jones	110.0	i	w					
I	*L. flavoculatus* A.Heller	6.0	n	h					
P	*L. formosus* Greene	50.0	i	w					
P	*L. grayi* S.Watson	27.0	i	w					
N	*L. guadalupensis* C.P.Sm.	40.0	n	h					
J	*L. hirsutissimus* Benth.	60.0	n	h					
R	*L. huachucanus* M.E.Jones	65.0	i	w					
S	*L. huaronensis* J.F.Macbr.	80.0	i	w					
S	*L. huigrensis* Rose ex C.P.Sm.	35.0	i	h					
R	*L. jaimehintonianus* B.L. Turner	400.0	i	w					
P	*L. latifolius* J.Agardh	67.0	i	w					
P	*L. lepidus* Lindl.	30.0	i	w					
P	*L. leucophyllus* Lindl.	57.0	i	w					
S	*L. lindleyanus* J.Agardh	18.0	i	h					
P	*L. littoralis* Lindl.	20.0	i	w					
I	*L. luteolus* Kellogg	65.0	n	h					
S	*L. mantaroensis* C.P.Sm.	31.0	i	h					
R	*L. mexicanus* Lag.	55.0	i	w					
I	*L. microcarpus* Sims	18.0	n	h					
S	*L. microphyllus* Desr.	4.0	i	w					
S	*L. misticola* Ulbr.	25.0	i	w					
S	*L. mollendoensis* Ulbr.	15.0	i	h					
R	*L. montanus* Kunth	80.0	i	w					
S	*L. mutabilis* Sweet	150.0	i	h					
O	*L. nanus* Benth.	25.0	n	h					
P	*L. neomexicanus* Greene	70.0	i	w					
P	*L. nevadensis* A.Heller	27.0	i	w					
Q	*L. nootkatensis* Sims	60.0	i	w					
S	*L. nubigenus* Kunth	25.0	i	w					
I	*L. odoratus* A.Heller	22.0	n	h					
O	*L. pachylobus* Greene	27.0	n	h					
Q	*L. perennis* L.	50.0	n	w					
S	*L. piurensis* C.P.Sm.	55.0	i	h					
P	*L. polyphyllus* Lindl.	67.0	i	w					
S	*L. praestabilis* C.P.Sm.	225.0	i	w					
S	*L. prostratus* J.Agardh	12.0	i	w					
S	*L. pubescens* Benth.	100.0	i	w					

continued

Clade	Taxon	Plant height	Distri-bution	Life history	Molecular marker				
					ITS	D6DES	rbcL	trnL	trnLF
S	*L. pulvinaris* Ulbr.	2.0	i	w					
S	*L. purosericeus* C.P.Sm.	75.0	i	w					
S	*L. ramosissimus* Benth.	160.0	i	w					
P	*L. rivularis* Lindl.	65.0	i	w					
S	*L. sarmentosus* Desr.	15.0	i	w					
S	*L. semperflorens* Benth.	550.0	i	w					
P	*L. sericeus* Pursh	90.0	i	w					
I	*L. shockleyi* S.Watson	12.0	n	h					
P	*L. sierrae-blancae* Wooton & Standl.	100.0	i	w					
S	*L. solanagrorum* C.P. Sm.	170.0	i	w					
K	*L. sparsiflorus* Benth.	27.0	n	h					
M	*L. stiversii* Kellogg	30.0	n	h					
S	*L. subacaulis* Griseb.	12.0	i	w					
L	*L. succulentus* K.Koch	45.0	n	h					
P	*L. sulphureus* Hook.	60.0	i	w					
S	*L. tarapacensis* C.P.Sm.	85.0	i	w					
P	*L. tegeticulatus* Eastw.	8.0	i	w					
S	*L. tomentosus* DC.	170.0	i	w					
S	*L. tominensis* Wedd.	80.0	i	w					
K	*L. truncatus* Hook. & Arn.	30.0	n	h					
I	*L. uncialis* S.Watson	1.5	n	h					
S	*L. weberbaueri* Ulbr.	160.0	i	w					
Silverswords—Tarweeds (Madiinae)									
E	*Achyrachaena mollis* Schauer	33.0	n	h	AF229318				
E	*Adenothamnus validus* (Brandegee) D.D.Keck	17.5	n	w	M93787				
O	*Anisocarpus madioides* Nutt.	47.5	n	h	AF061914				
O	*A. scabridus* (Eastw.) B.G.Baldwin	30.0	n	h	M93799				
P	*Argyroxiphium caliginis* C.N.Forbes	84.5	i (2)	w	M93788				
P	*A. grayanum* (Hillebr.) O.Deg.	199.9	i (2)	w	AF061885				
P	*A. kauense* (Rock & Neal) O.Deg. & I.Deg.	160.0	i (2)	w	AF061887				
P	*A. sandwicense* DC.	300.1	i (2)	w	EU341969				
A	*Blepharipappus scaber* Hook.	12.5	n	h	AF229316				
I	*Blepharizonia laxa* Greene	95.0	n	h	AF283548				
I	*B. plumosa* (Kellogg) Greene	95.0	n	h	AF283551				
G	*Calycadenia fremontii* A.Gray	55.0	n	h	U04249				
G	*C. hooveri* G.D.Carr	35.0	n	h	U04251				

continued

Clade	Taxon	Plant height	Distri-bution	Life history	Molecular marker ITS	D6DES	rbcL	trnL	trnLF
G	*C. mollis* A.Gray	39.0	n	h	U04253				
G	*C. multiglandulosa* DC.	40.0	n	h	U04254				
G	*C. oppositifolia* (Greene) Greene	20.0	n	h	U04256				
G	*C. pauciflora* A.Gray	25.0	n	h	U04259				
G	*C. spicata* (Greene) Greene	40.0	n	h	U04260				
G	*C. truncata* DC.	70.0	n	h	U04262				
G	*C. villosa* DC.	27.5	n	h	U04263				
J	*Carlquistia muirii* (A.Gray) B.G.Baldwin	30.5	n	h	M93798				
H	*Centromadia perennis* Greene	87.5	n	h	U04265				
N	*Deinandra arida* (D.D.Keck) B.G.Baldwin	50.0	n	h	EF059610				
N	*D. bacigalupii* B.G.Baldwin	25.0	n	h	EF059701				
N	*D. clementina* (Brandegee) B.G.Baldwin	55.0	i (1)	w	EF059624				
L	*D. conjugens* (D.D.Keck) B.G.Baldwin	30.0	n	h	EF059606				
N	*D. corymbosa* (DC.) B.G.Baldwin	53.0	n	h	EF059691				
L	*D. fasciculata* (DC.) Greene	52.0	n	h	EF059605				
N	*D. floribunda* (A.Gray) Davidson & Moxley	65.0	n	h	EF059608				
N	*D. frutescens* (A.Gray) B.G.Baldwin	40.0	i (1)	w	EF059660				
N	*D. greeneana* (Rose) B.G.Baldwin	75.0	i (1)	w	EF059644				
N	*D. halliana* (D.D.Keck) B.G.Baldwin	67.5	n	h	EF059697				
N	*D. increscens* (H.M.Hall ex D.D.Keck) B.G.Baldwin	52.0	n	h	EF059688				
N	*D. kellogii* Greene	37.5	n	h	EF059692				
N	*D. lobbii* (Greene) Greene	37.5	n	h	EF059700				
N	*D. martirensis* (D.D.Keck) B.G.Baldwin	80.0	n	w	EF059643				
N	*D. minthornii* (Jeps.) B.G.Baldwin	57.5	n	w	EF059612				
N	*D. mohavensis* (D.D.Keck) B.G.Baldwin	55.0	n	h	EF059685				
N	*D. pallida* (D.D.Keck) B.G.Baldwin	54.5	n	h	EF059694				

continued

Clade	Taxon	Plant height	Distri-bution	Life history	Molecular marker ITS	D6DES	rbcL	trnL	trnLF
N	*D. palmeri* (Rose) B.G.Baldwin	10.0	i (1)	w	EF059651				
N	*D. paniculata* (A.Gray) Davidson & Moxley	45.0	n	h	EF059687				
N	*D. pentactis* (D.D.Keck) B.G.Baldwin	39.5	n	h	EF059699				
N	*D. streetsii* (A.Gray) B.G.Baldwin	20.0	i (1)	w	EF059625				
Q	*Dubautia arborea* (A.Gray) D.D.Keck	600.0	i (2)	w	EU341945				
Q	*D. ciliolata* (DC.) D.D.Keck	180.0	i (2)	w	AF061892				
Q	*D. herbstobatae* G.D.Carr	50.0	i (2)	w	AF061901				
R	*D. imbricata* H.St.John & G.D.Carr	249.9	i (2)	w	AF061912				
R	*D. laevigata* A.Gray	249.9	i (2)	w	AF061898				
R	*D. laxa* Hook. & Arn.	500.2	i (2)	w	AF061893				
Q	*D. linearis* (Gaudich.) D.D.Keck	300.1	i (2)	w	AF061910				
Q	*D. menziesii* (A.Gray) D.D.Keck	249.9	i (2)	w	EU341949				
R	*D. microcephala* Skottsb.	399.8	i (2)	w	AF061902				
R	*D. paleata* A.Gray	140.1	i (2)	w	AF061888				
R	*D. pauciflorula* H.St.John & G.D.Carr	300.1	i (2)	w	AF061896				
R	*D. plantaginea* Gaudich.	699.9	i (2)	w	AF061889				
Q	*D. platyphylla* (A.Gray) D.D.Keck	350.0	i (2)	w	AF061908				
R	*D. raillardioides* Hillebr.	300.1	i (2)	w	AF061897				
Q	*D. reticulata* (Sherff) D.D.Keck	800.3	i (2)	w	AF061895				
Q	*D. scabra* (DC.) D.D.Keck	25.0	i (2)	w	AF061906				
Q	*D. sherffiana* Fosberg	199.9	i (2)	w	AF061907				
Q	*D. waianapanapaensis* G.D.Carr	30.0	i (2)	w	EU341967				
F	*Hemizonella minima* (A.Gray) A.Gray	10.5	n	h	AF229317				
F	*H. congesta* DC.	42.5	n	h	AF283544				
M	*Holocarpha heermannii* (Greene) D.D.Keck	65.0	n	h	EF059603				
M	*H. virgata* (A.Gray) D.D.Keck	70.0	n	h	AF229321				
F	*Holozonia filipes* (Hook. & Arn.) Greene	90.0	n	h	AF229312				
F	*Kyhosia bolanderi* (A.Gray) B.G.Baldwin	85.0	n	h	M93794				

continued

Clade	Taxon	Plant height	Distri-bution	Life history	Molecular marker ITS	D6DES	rbcL	trnL	trnLF
B	*Lagophylla glandulosa* A.Gray	55.0	n	h	DQ188073				
B	*L. minor* (D.D.Keck) D.D.Keck	19.0	n	h	AF229311				
B	*L. ramosissima* Nutt.	55.0	n	h	AF229310				
C	*Layia carnosa* (Nutt.) Torr. & A.Gray	10.0	n	h	DQ188045				
C	*L. chrysanthemoides* (DC. ex DC.) A.Gray	28.5	n	h	DQ188077				
C	*L. discoidea* D.D.Keck	11.5	n	h	DQ188068				
C	*L. gaillardioides* (Hook. & Arn.) DC.	33.0	n	h	DQ188044				
C	*L. glandulosa* (Hook.) Hook. & Arn.	31.5	n	h	DQ188063				
C	*L. heterotricha* (DC.) Hook. & Arn.	51.5	n	h	DQ188075				
C	*L. munzii* D.D.Keck	28.0	n	h	AF229314				
C	*L. pentachaeta* A.Gray	52.5	n	h	DQ188046				
C	*L. septentrionalis* D.D.Keck	20.5	n	h	DQ188080				
K	*Madia elegans* D.Don ex Lindl.	128.0	n	h	AF413612				
K	*M. sativa* Molina	67.5	n	h	EU853464				
F	*Osmadenia tenella* Nutt.	22.5	n	h	U04266				
D	*Raillardella argentea* (A.Gray) A.Gray	8.0	n	h	AF229309				
D	*R. pringlei* Greene	37.5	n	h	M93797				
R	*Wilkesia gymnoxiphium* A.Gray	300.1	i (2)	w	M93800				
R	*W. hobdyi* H.St.John	70.0	i (2)	w	AF061882				

Distribution: n, non-island (mainland or lowland); i, island; i (1), California islands; i (2), Hawaiian archipelago;
Life history: w, woody (= perennial in *Lupinus*); h, herbaceous (= annual in *Lupinus*);
Plant height, mean plant height in cm.

Table S2 Comparative diversification rate analysis detailing model specification and model fit used in Bayesian model averaging (BayesRate).

Clade	Model								
	No	Non-island	(Sky-) Island	Island 2	Clades linked	MlnL	BF	*p*	# samples
Echium									
	M1	Yule	Yule	—	No	-27.64	0.00	0.471	990
	M3	Yule	birth-death	—	No	-28.46	1.64	0.208	437
	M5	birth-death	Yule	—	No	-29.03	2.77	0.118	247
	M7	birth-death	birth-death	—	No	-29.50	3.71	0.074	155
	M4	Yule	birth-death	—	Yes	-29.94	4.60	0.047	99
	M8	birth-death	birth-death	—	Yes	-29.97	4.65	0.046	97
	M2	Yule	Yule	—	Yes	-30.27	5.26	0.034	72
	M6	birth-death	Yule	—	Yes	-32.57	9.86	0.003	7
Hypericum									
	M5	birth-death	Yule	—	No	-151.29	0.00	0.823	990
	M7	birth-death	birth-death	—	No	-152.86	3.13	0.172	207
	M1	Yule	Yule	—	No	-156.61	10.63	0.004	5
	M3	Yule	birth-death	—	No	-157.82	13.05	0.001	1
	M8	birth-death	birth-death	—	Yes	-163.39	24.19	0.000	0
	M2	Yule	Yule	—	Yes	-177.50	52.42	0.000	0
	M4	Yule	birth-death	—	Yes	-177.56	52.53	0.000	0
	M6	birth-death	Yule	—	Yes	-179.71	56.82	0.000	0
Lupinus									
	M1	Yule	Yule	—	No	-120.77	0.00	0.523	990
	M3	Yule	birth-death	—	No	-121.30	1.06	0.308	583
	M5	birth-death	Yule	—	No	-122.33	3.11	0.111	209
	M7	birth-death	birth-death	—	No	-122.96	4.37	0.059	112
	M8	birth-death	birth-death	—	Yes	-147.89	54.23	0.000	0
	M4	Yule	birth-death	—	Yes	-155.41	69.27	0.000	0
	M2	Yule	Yule	—	Yes	-155.51	69.48	0.000	0
	M6	birth-death	Yule	—	Yes	-158.57	75.59	0.000	0
Silverswords & Tarweeds (Madiinae)									
	M28	Yule	birth-death	Yule	Hwi. unl.	-181.39	0.00	0.148	990
	M22	Yule	Yule	b-d	Isls. link.	-181.41	0.03	0.146	974
	M17	Yule	birth-death	b-d	No	-181.55	0.33	0.126	841
	M2	Yule	Yule	Yule	Isls. link.	-181.57	0.36	0.124	825
	M14	birth-death	birth-death	b-d	Isls. link.	-181.90	1.02	0.089	595
	M26	Yule	birth-death	Yule	Isls. link.	-181.98	1.17	0.083	551
	M27	Yule	birth-death	Yule	Yes	-182.08	1.38	0.074	496
	M20	Yule	birth-death	b-d	Yes	-182.37	1.96	0.056	372
	M24	Yule	Yule	b-d	Yes	-182.87	2.96	0.034	225
	M5	birth-death	Yule	Yule	No	-182.92	3.07	0.032	213
	M23	Yule	Yule	b-d	Hwi. unl.	-183.08	3.38	0.027	183
	M25	Yule	birth-death	Yule	No	-183.52	4.27	0.018	117
	M8	birth-death	Yule	Yule	Yes	-183.94	5.10	0.012	77
	M1	Yule	Yule	Yule	No	-184.20	5.62	0.009	60
	M11	birth-death	birth-death	Yule	Hwi. unl.	-184.27	5.76	0.008	55
	M16	birth-death	birth-death	b-d	Yes	-184.75	6.73	0.005	34
	M19	Yule	birth-death	b-d	Hwi. unl.	-184.93	7.09	0.004	29
	M13	birth-death	birth-death	b-d	No	-185.44	8.09	0.003	17
	M4	Yule	Yule	Yule	Yes	-185.76	8.74	0.002	13
	M7	birth-death	Yule	Yule	Hwi. unl.	-186.76	10.74	0.001	5
	M10	birth-death	birth-death	Yule	Isls. link.	-187.19	11.61	0.000	3
	M18	Yule	birth-death	b-d	Isls. link.	-188.15	13.53	0.000	1
	M12	birth-death	birth-death	Yule	Yes	-188.26	13.75	0.000	1

continued

Clade	Model					MlnL	BF	*p*	# samples
	No	Non-island	(Sky-) Island	Island 2	Clades linked				
	M15	birth-death	birth-death	b-d	Hwi. unl.	-188.27	13.75	0.000	1
	M3	Yule	Yule	Yule	Hwi. unl.	-188.34	13.90	0.000	1
	M21	Yule	Yule	b-d	No	-188.39	14.00	0.000	1
	M9	birth-death	birth-death	Yule	No	-190.71	18.63	0.000	0
	M6	birth-death	Yule	Yule	Isls. link.	-191.08	19.38	0.000	0

MlnL, natural log marginal likelihood, BF, Bayes factor; *p*, relative probability; # samples, number of samples included in the combined posterior.
Madiinae: Island, Californian Islands; Island 2, Hawaiian Islands.
Yule, pure birth model; b-d, birth-death model; Hwi. unl., Hawaiian silverswords clade not linked, i.e. non-island and Californian islands clade linked; Isls. link., both island clades linked among each other and unlinked with non-island species.

Table S3 Sampling fractions used to account for incomplete species sampling in the exploratory diversification rate heterogeneity analysis (BAMM).

Clade	*Echium*	*Hypericum*	*Lupinus*	Silverswords-Tarweeds
A	1.00	0.67	—	1.00
B	0.60	0.90	—	0.75
C	1.00	0.35	—	0.64
D	0.65	0.36	—	0.67
E	1.00	1.00	—	1.00
F	—	0.33	—	1.00
G	—	0.50	—	0.90
H	—	0.37	—	0.25
I	—	0.63	0.70	1.00
J	—	—	1.00	1.00
K	—	—	0.83	0.20
L	—	—	1.00	1.00
M	—	—	1.00	0.50
N	—	—	1.00	1.00
O	—	—	0.50	1.00
P	—	—	0.41	0.80
Q	—	—	0.60	0.86
R	—	—	0.13	1.00
S	—	—	0.38	—

Lupinus clade names follow Drummond et al. (2012b) with clades A–H pruned in our tree.
For clade assignment see Figs. S1–S4.
See main article Table 1 for sampling fractions used in Bayesian model averaging (BayesRate).

Table S4. Plant height: Continuous trait models of evolution ranked according to model fit per study group (OUwie).

Clade	Model	df	lnL	AICc	ΔAICc	Akaike weight	Eigenvalues negative	Model failure
Echium								
	OUθ	4	-38.301	85.533	0	0.6111	0	0
	OUθσ^2	5	-37.856	87.141	1.609	0.2734	0	0
	OU1	3	-41.737	90.019	4.486	0.0649	0	0
	BMσ^2	4	-40.791	90.512	4.979	0.0507	0	0
	BM1	2	-55.846	115.959	30.426	1.5108e-07	0	0
	OUθα	5	NA	NA	NA	NA	85%	100%
Hypericum								
	OU1	3	-109.096	224.432	0	0.3339	0	0
	OUθ	4	-108.294	224.992	0.56	0.2524	0	0
	OUθσ^2	5	-107.363	225.338	0.906	0.2123	0	0
	OUθα	5	-107.416	225.444	1.011	0.2014	52%	90%
	BMσ^2	4	-128.922	266.248	41.816	2.7768e-10	0	0
	BM1	2	-135.665	275.449	51.017	2.7887e-12	0	0
Lupinus								
	OUθ	4	-118.864	246.234	0	0.5686	0	0
	OUθσ^2	5	-118.663	248.095	1.861	0.2242	0	0
	OUθα	5	-118.759	248.288	2.054	0.2036	75%	99%
	OU1	3	-125.021	256.341	10.107	0.0036	0	0
	BMσ^2	4	-131.172	270.851	24.617	2.5658e-6	0	0
	BM1	2	-143.347	290.842	44.608	1.1704e-10	0	0
Silverswords—Tarweeds (Madiinae)								
	OUθσ^2	7	-89.499	194.415	0	0.7172	24%	0
	OUθ	5	-92.768	196.276	1.861	0.2828	99%	0
	OU1	3	-126.612	259.513	65.098	5.2452e-15	0	0
	BMσ^2	6	-130.446	273.943	79.528	3.8578e-18	0	0
	BM1	2	-176.163	356.469	162.054	4.6349e-36	0	0
	OUθα	7	NA	NA	NA	NA	100%	100%

df, degree of freedom; lnL, natural log likelihood; AICc, sample size corrected Akaike information criterium; ΔAICc, difference in AICc to the best model tested; Eigenvalues negative' and 'Model failure', model performance indices (note that the results of the runs with either negative eigenvalues or failed models were excluded before model averaging).

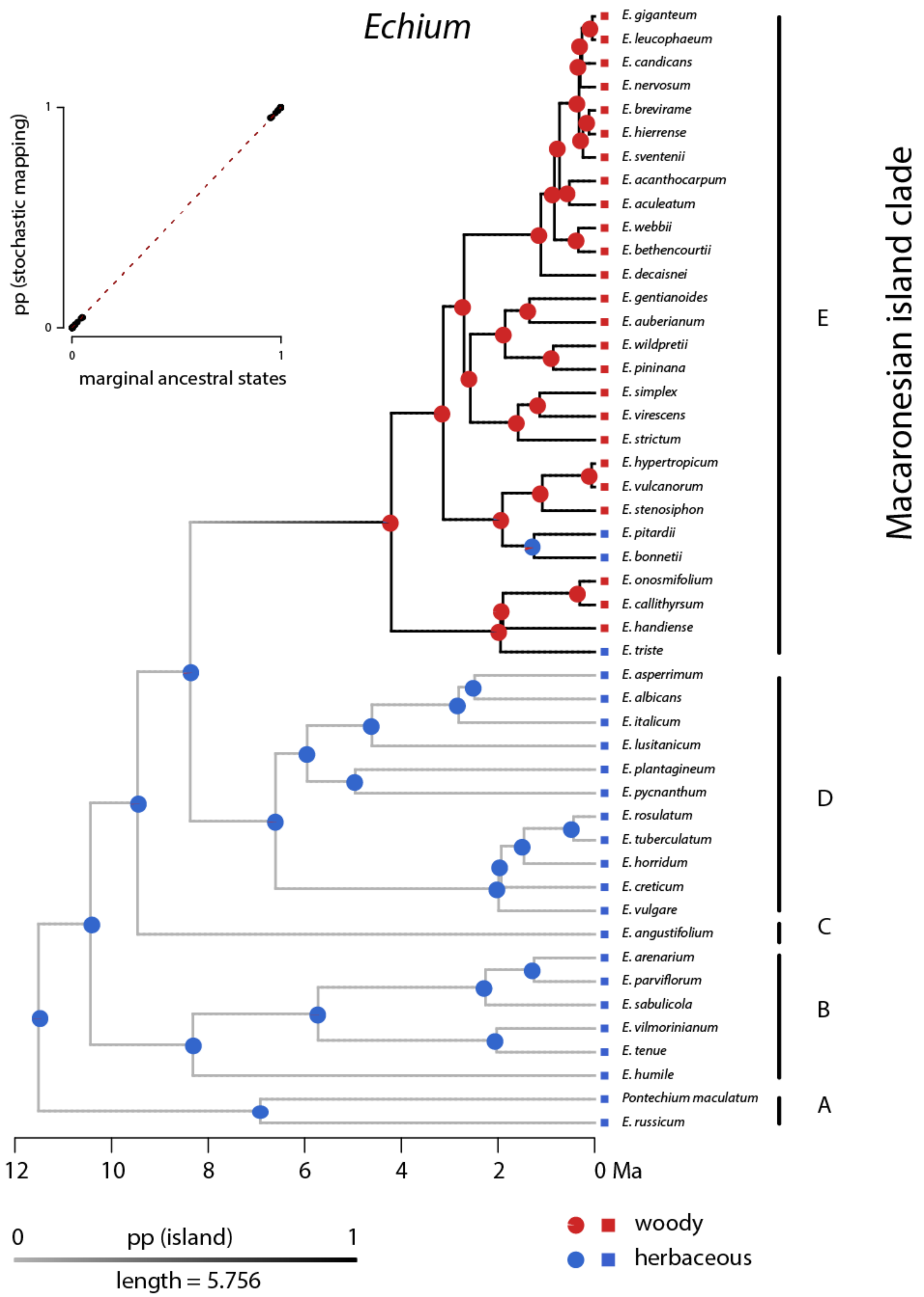

Fig. S1. Ancestral state estimates in *Echium* of life history evolution (tip and node labels, obtained by stochastic character mapping (SCM) of life history strategy) overlaid on a stochastic mapping of occurrence (island / non-island, gradient on branches). The insert top left compares results of SCM (*make.simmap*) to ML (*ace*) estimates of life history. Clade names correspond to tables S1, S4.

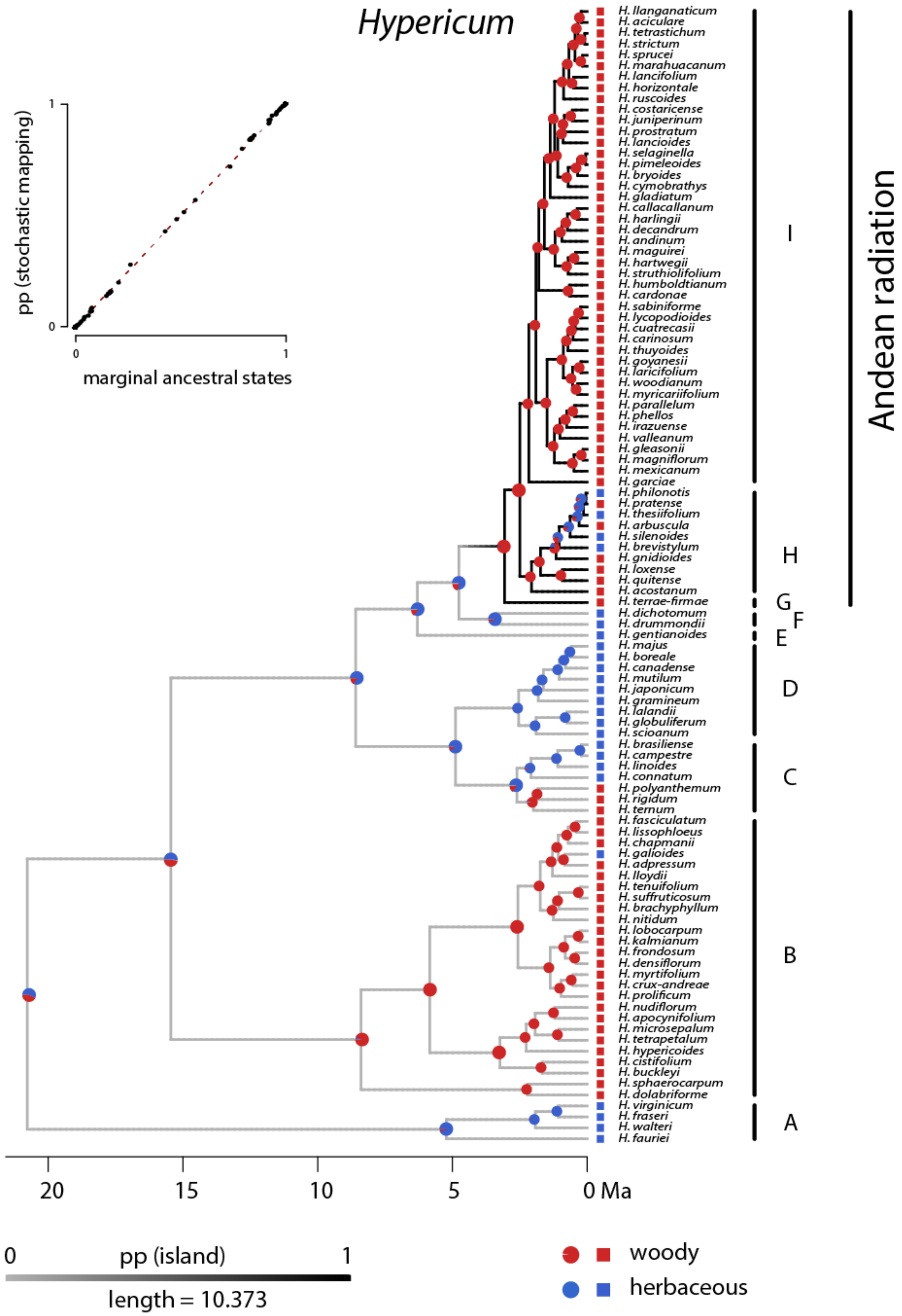

Fig. S2. Ancestral state estimates in *Hypericum* of life history evolution (tip and node labels, obtained by stochastic character mapping (SCM) of life history strategy) overlaid on a stochastic mapping of occurrence (island / non-island, gradient on branches). The insert top left compares results of SCM (*make.simmap*) to ML (*ace*) estimates of life history. Clade names correspond to tables S1, S4.

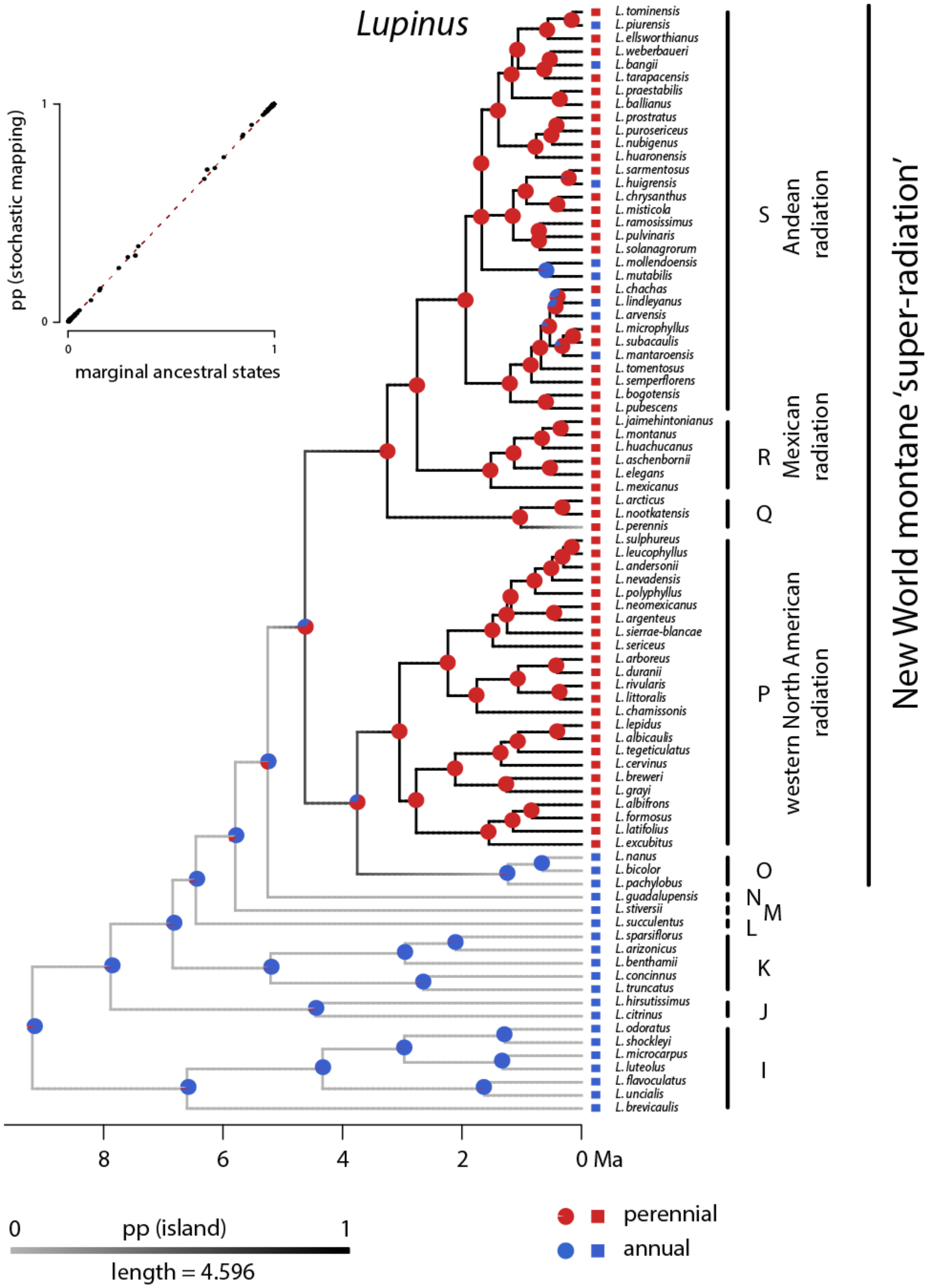

Fig. S3. Ancestral state estimates in *Lupinus* of life history evolution (tip and node labels, obtained by stochastic character mapping (SCM) of life history strategy) overlaid on a stochastic mapping of occurrence (island / non-island, gradient on branches). The insert top left compares results of SCM (*make.simmap*) to ML (*ace*) estimates of life history. Clade names correspond to tables S1, S4.

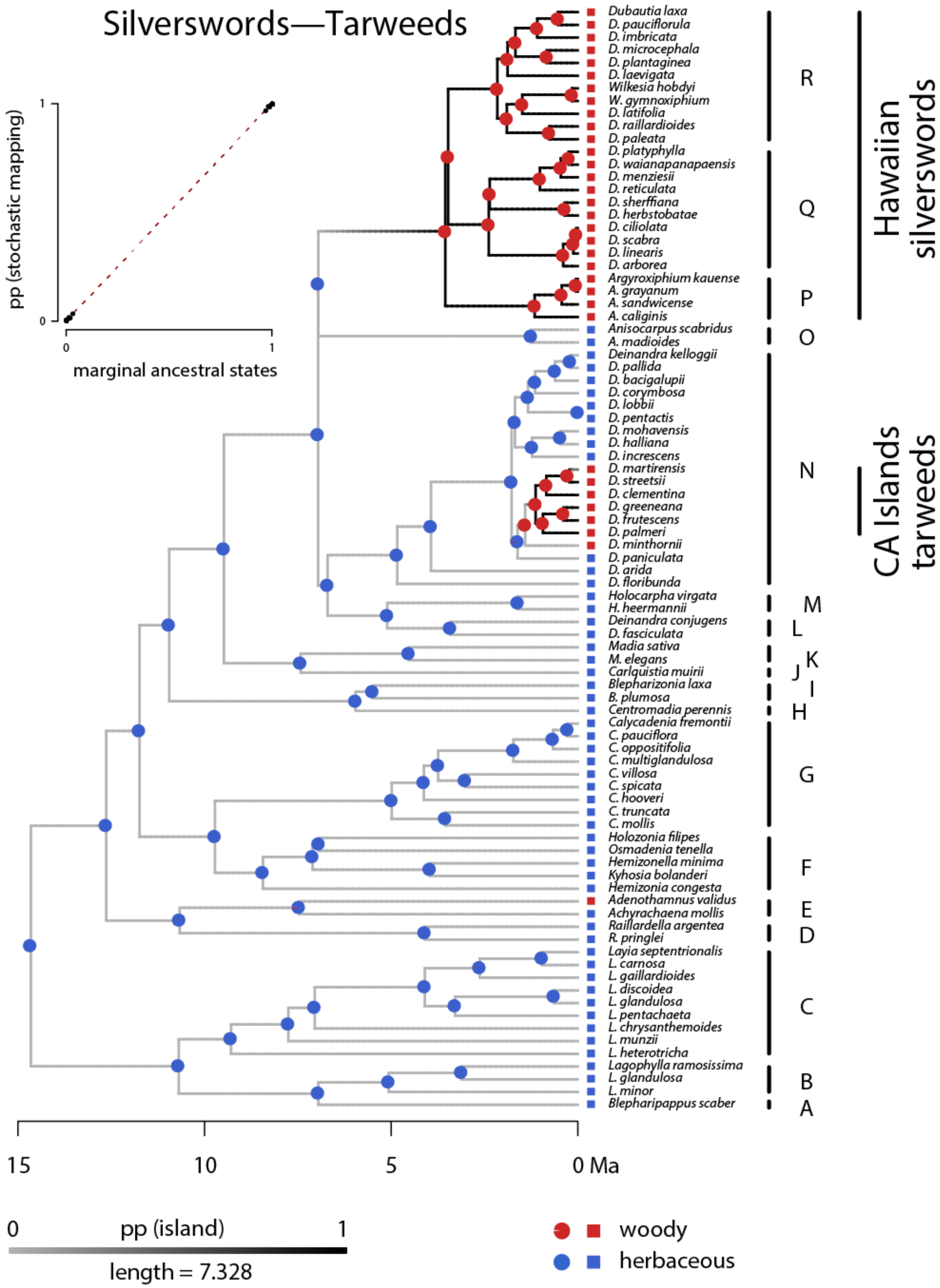

Fig. S4. Ancestral state estimates in the Silverswords—Tarweeds of life history evolution (tip and node labels, obtained by stochastic character mapping (SCM) of life history strategy) overlaid on a stochastic mapping of occurrence (island / non-island, gradient on branches). The insert top left compares results of SCM (*make.simmap*) to ML (*ace*) estimates of life history. Clade names correspond to tables S1, S4.

Methods S1 Clade specific information, phylogenetic reconstructions and trait data

All data used in this study (DNA alignments, xml BEAST input files, phylogenetic trees, trait data tables) are available on Dryad (https://doi.org/10.5061/dryad.rt530k9).

Echium – The genus *Echium* L. comprises ca. 68 species native to North Africa, mainland Europe and the Macaronesian islands. Early phylogenetic work demonstrated the monophyly of the Macaronesian species and characterised this island radiation as a classical example of insular woodiness and disparification of insular growth forms (Böhle *et al.*, 1996). More recently published phylogenies of *Echium* either contain too few non-island taxa (García-Maroto *et al.*, 2009) or lack a timeline (Romeiras *et al.*, 2011). In order to provide a time-calibrated comparative framework encompassing the island and mainland diversity for evolutionary analyses we generated a new time-calibrated phylogenetic tree for all major lineages of Boraginaceae with as complete sampling as possible of the genus *Echium*, using data for two chloroplast markers (rbcL and trnLF) and two nuclear markers (ITS and D6DES) downloaded from GenBank (GenBank accession numbers are provided in table S1). Sequences were aligned using MUSCLE v3.6 (Edgar, 2004) and alignments were visually crosschecked and ambiguous fragments were excluded using Geneious v6.0.5 (Kearse *et al.*, 2011). To test on supported topological conflict between the individual gene trees phylogenies were inferred for each individual marker using RAxML v8 (Stamatakis, 2006) with a GTR + Γ substitution model and rapid bootstrapping with 100 iterations. Since no supported conflicts were present, we concatenated the alignments prior to estimating the topology and divergence times simultaneously using BEAST v1.8.2 (Drummond, AJ *et al.*, 2012) under an uncorrelated lognormal relaxed-clock model, using the general time-reversible (GTR) substitution rate model and Γ-distributed rates among sites with a proportion of invariant sites to describe the rate heterogeneity among sites, with a Yule model as tree prior. We used critically selected fossils for calibration: the genus *Ehretia* P.Browne has a good fossil record from the early Eocene to the Neogene and represents the earliest fossil record of Boraginaceae, therefore we used (1) this set of fossils to set a minimum age of 33.9 Myr (Chandler, 1962; Mai & Walther, 1991; Ozaki, 1991). Other fossils used were: (2) a fossil of *Cryptantha* Lehm. ex G.Don (Darnell & Thomasson, 2007), and (3) a fossil of *Lithospermum* L. (Gabel, 1987), both from the late Miocene Ash Hollow Formation in the Ogallala group from c. 10.3 to c. 13.6 Ma; (4) a fossil nutlet and pollen records of *Tournefortia* L. from the Oligocene (Dorofeev, 1963); and (5) a fossil of *Cordia* L. from the Eocene (Huzioka & Takahasi, 1970). The fossils were assigned to clades on the basis of their morphology and the respective nodes were constrained with uniform priors with the minimum age set by the age of the fossil, and the maximum age of 88 Myr. We ran four independent Markov Chain Monte Carlo (MCMC) runs of 50×10^6 generations and checked for convergence between runs, and effective sample sizes of >200 for all parameters in Tracer 1.5 (Rambaut & Drummond, 2007). We combined the four runs in LogCombiner after discarding the first 10% generations (burnin) in each run and we selected and annotated the Maximum Clade Credibility (MCC) tree using TreeAnnotator. The MCC tree was used in all subsequent comparative analyses after pruning the outgroup taxa.

In our time-calibrated phylogeny of *Echium* all Macaronesian taxa form a monophyletic group, concordant with the topologies of Böhle *et al.* (1996) and García-Maroto *et al.* (2009), with all three Macaronesian clades recovered by the latter also recovered in our own phylogeny (Fig. S1). Our crown age estimate for the Macaronesian clade is slightly younger, ca. 4.2 Ma vs 6.9 Ma, however, the age estimate recovered by García-Maroto *et al.* (2009) falls within our 95% HPD. Our phylogeny also recovers the Cape Verde Islands relationship of *E. stenosiphon* as sister to *E. hypertropicum* + *E. vulcanorum* as presented by Romeiras *et al.* (2011).

Trait measurements were obtained from the *Echium* account from Flora Iberica (Talavera *et al.*, 2012) and Bramwell's (1972) account of Macaronesian *Echium*.

Hypericum – While the main centre of species diversity for *Hypericum* L. with around 330 species is in the Old World (Nürk *et al.*, 2015), ca. 170 species occur in the Americas, thereof 120 in Latin America, of which ca. 70 are Andean páramo endemics (NB ca. 99 species in the 'Andean radiation' [clades G, H, I; Fig. S2] due to 'secondary out-of-páramo' dispersals; Nürk *et al.*, 2018), with the 'sky island' here defined as the high elevation páramo ecosystem above the treeline (Nürk *et al.*, 2018). To ensure as complete sampling as possible for the páramo endemics and related taxa, we used a previously published time-calibrated phylogeny, which has extensive sampling of the New World lineages (Nürk *et al.*, 2018). Previous work has demonstrated a close association between arborescence and tropical montane occurrences in African mountains and the Andes (Nürk *et al.*, 2013a) and elevated species richness associated with the very recent Pliocene / Quaternary radiation in the Andes, a radiation encompassing a disparate array of growth forms typical of tropical alpine sky island plant groups (Nürk *et al.*, 2013b).

Trait measurements were obtained from cladistic studies (Nürk & Blattner, 2010), herbarium specimen data, and the monograph of *Hypericum* (Robson, 1987; Robson, 1990; Robson, 1996; Robson, 2012).

Lupinus – The legume genus *Lupinus* L. comprises ca. 290 species, of which ca. 190 occur across Mexico to South America, thereof ca. 85 across the Andes mountain range (Hughes & Eastwood, 2006; Drummond, CS *et al.*, 2012; Nevado *et al.*, 2016). We used the best currently available time-calibrated phylogeny (Drummond, CS *et al.*, 2012), pruned to the robustly supported large western New World clade containing c. 220 species found in western North and South America (i.e. clades I to S of Drummond et al., 2012). Previous work demonstrated significant associations between shifts from annual to perennial life histories, lowland to montane habitats and accelerated rates of species diversification nested within this clade, with these three coincident shifts subtending a large western New World montane 'super-radiation' within which is nested the Andean radiation (Drummond, CS *et al.*, 2012). Like the Andean radiation of *Hypericum*, Andean *Lupinus* also includes diverse growth forms (Hughes & Eastwood, 2006; Hughes & Atchison, 2015). For *Lupinus* the western New World 'super-radiation' *sensu* Drummond, CS *et al.* (2012) and Hughes and Atchison (2015) is defined as the montane sky island clade and the set of lowland western North American annual species that subtend the montane radiations are the non-island relatives.

Trait measurements were obtained from field observations, herbarium specimen data and literature (Gladstones, 1974; McVaugh & Anderson, 1987; Barneby, 1989; Baldwin *et al.*, 2012).

Silverswords–Tarweeds – The subtribe Madiinae Benth. & Hook.f. (Asteraceae) comprises 123 species distributed across 24 genera (Carlquist *et al.*, 2003). The continental species are commonly referred to as 'tarweeds' with the Hawaiian species known as 'silverswords' alliance. The 33 Hawaiian species form a clade comprising three genera; *Argyroxiphium* DC. (5 spp.), *Dubautia* Gaudich. (26 spp.), and *Wilkesia* A.Gray (2 spp.) (Baldwin *et al.*, 1991; Baldwin & Sanderson, 1998; Baldwin & Wessa, 2000). Like *Echium*, the Hawaiian silversword radiation shows evidence of insular woodiness and disparification of insular growth forms including shrubs, treelets, lianas, acaulescent and candelabra rosettes (Baldwin, 1997) with a smaller radiation with parallel evolution of insular woodiness on the Californian islands in the genus *Deinandra* Greene (Baldwin, 2007), while the vast majority of the continental tarweeds are ephemeral low elevation herbs occupying seasonally dry mainland habitats. Although a suite of phylogenies that sample members of the Madiinae have been published (Baldwin *et al.*, 1991; Baldwin, 1997; Baldwin *et al.*, 1998; Baldwin & Sanderson, 1998; Barrier *et al.*, 1999; Baldwin & Wessa, 2000; Baldwin, 2007) none included the comprehensive sampling of both mainland and island species needed for comparative analysis of species and trait diversification rates (but see: Landis *et al.*, 2018). We generated a time-calibrated phylogenetic tree for the Silverswords–Tarweeds using the ITS marker for as many members of Madiinae with available data in GenBank (GenBank accession numbers are provided in table S1). Sequences were aligned using MUSCLE v3.6 (Edgar, 2004). Alignments were visually crosschecked and ambiguous fragments were excluded using Geneious v.6.0.5. We simultaneously estimated the topology and divergence times using BEAST v1.8 under an uncorrelated lognormal relaxed-clock model, using the general time-reversible (GTR) substitution rate model and Γ-distributed rates among sites with a proportion of invariant sites to describe the rate heterogeneity among sites. In the absence of available fossil calibrations, we used a calibration constraint of 15 Ma for the most recent common ancestor of the silversword alliance and its Californian sister group, as justified by Baldwin and Sanderson (1998) and later used by Baldwin (2007). While this approach may not provide accurate estimates of absolute divergence times (but cf. Landis *et al.*, 2018), this will not affect our downstream rates analyses as our inferences are based on relative divergence times. We ran four independent MCMC runs of 50 × 10^6 generations and checked for convergence between runs, and effective sample sizes of >200 for all parameters in Tracer 1.5. We combined the four runs in LogCombiner after discarding the first 10% generations (burnin) in each run before annotating the MCC tree using TreeAnnotator. The MCC tree was used in all subsequent comparative analyses after pruning all subspecies.

Our time-calibrated phylogeny of the Madiinae is concordant with previous phylogenetic hypotheses in both topology and age estimates, with a crown age estimate for the silverswords of ca. 3.6 Ma and for the tarweeds from CA silands of ca. 1.2 Ma (table 1, Fig. S4). We recovered the Hawaiian silversword taxa as monophyletic matching the phylogenies of Baldwin and Sanderson (1998) and Barrier *et al.* (1999) and also recovered the CA island clade (Fig. S4) presented by Baldwin (2007). Our finding that the two species of *Anisocarpus* Nutt. are sister to the silversword clade is concordant with the phylogeny of Baldwin and Wessa (2000) and Landis *et al.* (2018). We find that within the silversword clade *Wilkesia* is nested within *Dubautia*, which together are sister to *Argyroxiphium*, matching the previously most comprehensively sampled topology for the silverswords of Baldwin and Sanderson (1998), but differs from the groupings recently recovered by Landis *et al.* (2018), in which *Argyroxiphium* is nested within *Dubautia*.

Trait data were obtained from the Monograph of the Hawaiian Madiinae (Carr, 1985), the Jepson manual (Baldwin *et al.*, 2012), the manual of the flowering plants of Hawai'i, (Wagner *et al.*, 1999) and the monograph of tarweeds and silverswords (Carlquist *et al.*, 2003).

Notes S1 *Hypericum* traits: We are relaying on mean plant height as proxy for growth form evolution, which might introduce bias into comparisons of overall disparity between *Hypericum* clades because not all species descriptions contain measures of min and max plant height (Robson, 1987; 1996). For example, the North American non-island species *H. chapmanii* W.P.Adams is descried as "up to 4 m tall" in Robson (1996: p 112), whereas the Andean sky island species *H. laricifolium* Juss. is described as "(0.1–) 0.3–3 (–6) m tall" (Robson, 1987: p 47). For these two species (and *H. densiflorum* Pursh, *H. frondosum* Michx., *H irazuense* Kunze ex N.Robson, *H lycopodioides* Triana & Planch.) we evaluated additional herbarium specimens and calculated as most likely actual mean plant height 190 cm for *H. chapmanii*, and 315 cm for *H. laricifolium* that, as adult plant, generally grows up to 3–4 (–6) m height (NM Nürk, pers. observations). Nevertheless, overall disparity of growth form might be overestimated for the non-island species and potentially underestimated for the sky island species of *Hypericum*.

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