

Supplementary material

Table S1. GenBank accessions numbers for *ndhF*, *matK*, *trnL-F* and ITS.

Genera	Species		<i>ndhF</i>	<i>matK</i>	<i>trnL-trnF</i>	ITS
Hugonoideae						
<i>Hugonia</i>	<i>busseana</i>		FJ160773	HM544087	FJ160857	MK066674
Linoideae						
<i>Anisadenia</i>	<i>pubescens</i> A		FJ160772	HM544078	FJ160856	FJ169513
<i>Anisadenia</i>	<i>pubescens</i> B		MK090350		MK066784	MK066671
<i>Anisadenia</i>	<i>khasyana</i>			HM544077		
<i>Anisadenia</i>	<i>saxatilis</i>			HM544079		
<i>Cliococca</i>	<i>selaginoides</i> A		MK090351	HM544080	MK066785	KT453457
<i>Cliococca</i>	<i>selaginoides</i> B		FJ160774		FJ160858	MK066672
<i>Hesperolinon</i>	<i>adenophyllum</i>			FJ011121	FJ011277	KT453359
<i>Hesperolinon</i>	<i>bicarpellatum</i>			FJ011124	FJ011280	
<i>Hesperolinon</i>	<i>breweri</i>			FJ011131	FJ011287	
<i>Hesperolinon</i>	<i>californicum</i>			FJ011145	FJ011301	KT453387
<i>Hesperolinon</i>	<i>clevelandii</i>			HM544083	FJ011308	KT453392
<i>Hesperolinon</i>	<i>congestum</i>			FJ011158	FJ011314	KT453398
<i>Hesperolinon</i>	<i>didymocarpum</i>			FJ011163	FJ011319	KT453403
<i>Hesperolinon</i>	<i>disjunctum</i>			HM544084	KT453495	KT453413
<i>Hesperolinon</i>	<i>drymarioides</i>			HM544085	FJ011327	KT453419
<i>Hesperolinon</i>	<i>micranthum</i> A *		FJ160775	HM544086	KT453507	KT453440
<i>Hesperolinon</i>	<i>micranthum</i> B *		MK090352	HM544086	MK066786	MK066673
<i>Hesperolinon</i>	<i>sharsmithiae</i>			FJ011184	FJ011339	KT453446
<i>Hesperolinon</i>	<i>sperguLinum</i>			FJ011188	FJ011344	KT453451
<i>Hesperolinon</i>	<i>tehamense</i>			FJ011193	FJ011349	KT453456
<i>Radiola</i>	<i>linoides</i> A		FJ160815	HM544118	FJ160899	MK066777
<i>Radiola</i>	<i>linoides</i> B		MK090456	HM850983	MK066889	FJ169534
<i>Reinwardtia</i>	<i>indica</i> A		MK090457	AB048380	MK066890	MK066778
<i>Reinwardtia</i>	<i>indica</i> B		KX526972	HM544119	FJ160898	FJ169514
<i>Sclerolinon</i>	<i>digynum</i> A		FJ160787	HM544122	FJ160871	FJ169541
<i>Sclerolinon</i>	<i>digynum</i> B		MK090458	AB233792	MK06689	MK066779
<i>Tirpitzia</i>	<i>ovoidea</i>			HM544123		
<i>Tirpitzia</i>	<i>sinensis</i> A		MK090459	HM544124	MK066892	MK066780
<i>Tirpitzia</i>	<i>sinensis</i> B		FJ160816	FJ160855	FJ160900	FJ169515
Sección						
<i>Linum</i>	<i>acuticarpum</i>	<i>Linopsis</i>	MK090354	MK098985	MK066788	MK066675
<i>Linum</i>	<i>adustum</i>	<i>Linopsis</i>	MK090355	MK098986	MK066789	MK066676
<i>Linum</i>	<i>aethiopicum</i>	<i>Linopsis</i>	MK090356	MK098987	MK066790	MK066677

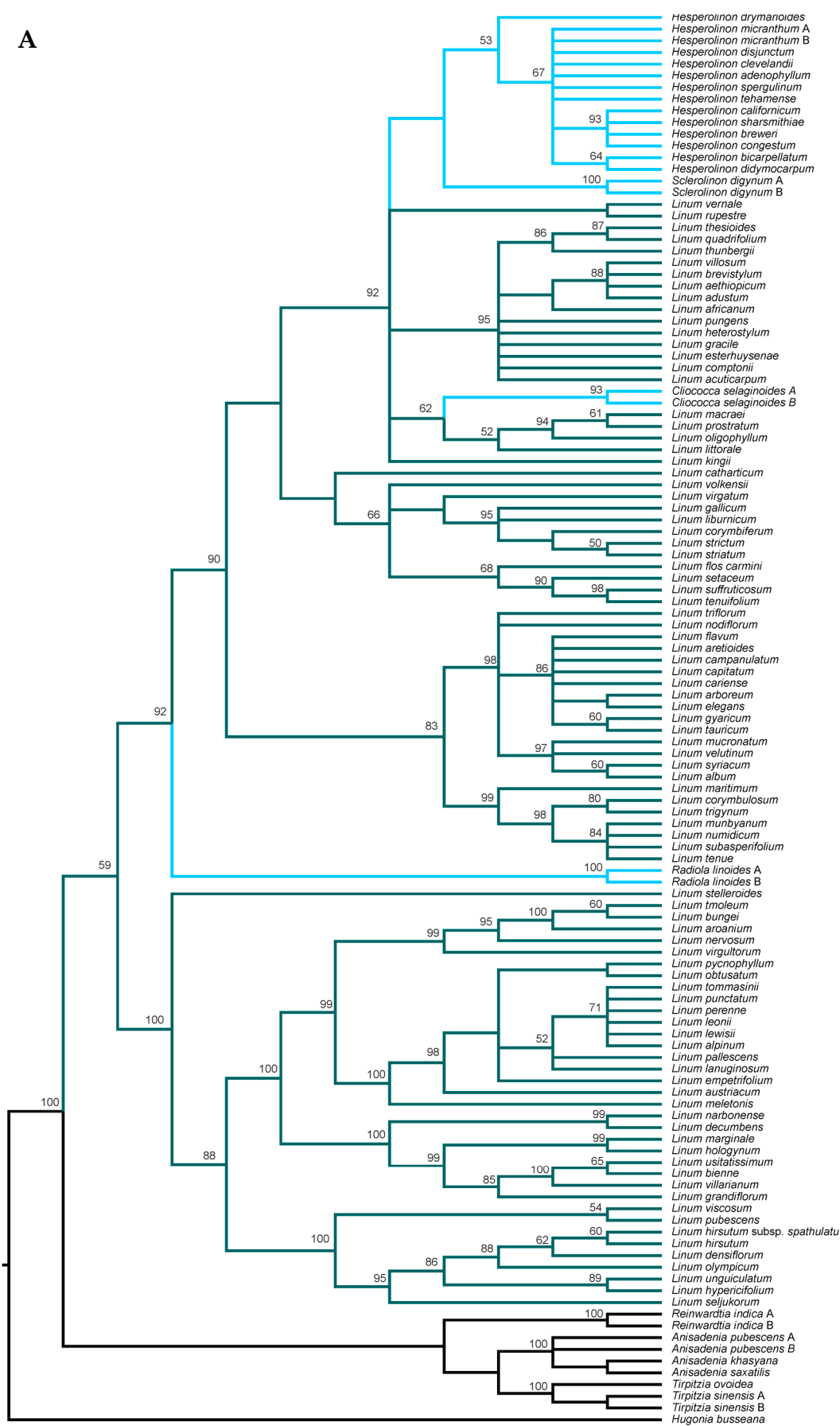
<i>Linum</i>	<i>africanum</i>	<i>Linopsis</i>	FJ160777	MK098988	FJ160861	MK066678
<i>Linum</i>	<i>album</i>	<i>Syllinum</i>	FJ160792	FJ160831	FJ160876	MK066679
<i>Linum</i>	<i>alpinum</i>	<i>Linum</i>	MK090359	MK098989	MK066793	MK066680
<i>Linum</i>	<i>arboreum</i>	<i>Syllinum</i>	FJ160793	HM544100	FJ160877	MK066681
<i>Linum</i>	<i>aretioides</i>	<i>Syllinum</i>	MK090361	MK098991	MK066795	MK066682
<i>Linum</i>	<i>aroanum</i>	<i>Linum</i>	MK098992	MK090362	MK066796	MK066683
<i>Linum</i>	<i>austriacum</i>	<i>Linum</i>	FJ160799	FJ160838	FJ160883	KY661907
<i>Linum</i>	<i>bienne</i>	<i>Linum</i>	FJ160797	HM544102	KT453509	KT453458
<i>Linum</i>	<i>brevistylum</i>	<i>Linopsis</i>	MK090368	MK098997	MK066801	MK066689
<i>Linum</i>	<i>bungei</i>	<i>Linum</i>	MK090369	MK098998	MK066802	MK066690
<i>Linum</i>	<i>campanulatum</i>	<i>Syllinum</i>	MK090370	MK098999	MK066803	MK066691
<i>Linum</i>	<i>capitatum</i>	<i>Syllinum</i>	MK090337	MK099000	MK066804	MK066692
<i>Linum</i>	<i>cariense</i>	<i>Syllinum</i>	MK090372	MK099001	MK066805	MK066693
<i>Linum</i>	<i>catharticum</i>	<i>Cathartolinum</i>	FJ160796	HM544103	FJ160880	MK066694
<i>Linum</i>	<i>comptonii</i>	<i>Linopsis</i>	FJ160778	HM544104	FJ160862	MK066695
<i>Linum</i>	<i>corymbiferum</i>	<i>Linopsis</i>	MK090375	MK099004	MK066808	MK066696
<i>Linum</i>	<i>corymbulosum</i>	<i>Linopsis</i>	MK090376	MK099005	MK066809	MK066697
<i>Linum</i>	<i>decumbens</i>	<i>Linum</i>	MK090377	MK099007	MK066811	MK066699
<i>Linum</i>	<i>densiflorum</i>	<i>Dasylinum</i>	MK090380	MK099009	MK066813	MK066701
<i>Linum</i>	<i>elegans</i>	<i>Syllinum</i>	MK090381	MK099010	MK066814	MK066702
<i>Linum</i>	<i>empetrifolium</i>	<i>Linum</i>	MK099012	MK090382	MK066915	MK066815
<i>Linum</i>	<i>esterhuysenae</i>	<i>Linopsis</i>	FJ160779	MK099013	MK066817	MK066705
<i>Linum</i>	<i>flavum</i>	<i>Syllinum</i>	FJ160794	HM544105	FJ160878	MK066706
<i>Linum</i>	<i>flos-carmini</i>	<i>Linopsis</i>	MK090426	MK099043	MK066819	MK066747
<i>Linum</i>	<i>gallicum</i>	<i>Linopsis</i>	MK090386	MK099015	MK066819	MK066707
<i>Linum</i>	<i>gracile</i>	<i>Linopsis</i>	FJ160776	MK099016	FJ160860	MK066708
<i>Linum</i>	<i>grandiflorum</i>	<i>Linum</i>	FJ160798	KX783704	FJ160882	MK066709
<i>Linum</i>	<i>gyaricum</i>	<i>Syllinum</i>	MK090389	MK099017	MK066822	MK066710
<i>Linum</i>	<i>heterostylum</i>	<i>Linopsis</i>	MK090390	MK099018	MK066823	MK066711
<i>Linum</i>	<i>hirsutum</i>	<i>Dasylinum</i>	FJ160788	HM544106	FJ160872	MK066712
<i>Linum</i>	<i>hirsutum</i> subsp. <i>spathulatum</i>	<i>Dasylinum</i>	MK099044	MK090427	MK066860	MK066748
<i>Linum</i>	<i>hologynum</i>	<i>Linum</i>	MK090392	MK099020	MK066825	MK077713
<i>Linum</i>	<i>hypericifolium</i>	<i>Dasylinum</i>	FJ160789	HM544107	FJ160873	MK066714
<i>Linum</i>	<i>kingii</i>	<i>Linopsis</i>	FJ160780	FJ160823	FJ160864	MK066715
<i>Linum</i>	<i>lanuginosum</i>	<i>Linum</i>	MK090395	MK099022	MK066828	MK066716
<i>Linum</i>	<i>leonii</i>	<i>Linum</i>	MK090396	MK099023	MK066829	MK066717
<i>Linum</i>	<i>lewisii</i> *	<i>Linum</i>	FJ160800	FJ160839	KT453510	KT453459
<i>Linum</i>	<i>liburnicum</i>	<i>Linopsis</i>	MK090398	MK099024	MK066831	MK066719
<i>Linum</i>	<i>littorale</i>	<i>Linopsis</i>	FJ160781		FJ160865	MK066720
<i>Linum</i>	<i>macraei</i>	<i>Linopsis</i>	MK090400		MK066833	MK066721

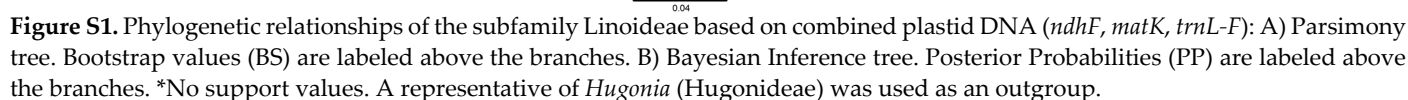
<i>Linum</i>	<i>marginale</i>	<i>Linum</i>	FJ160804	FJ160843	FJ160888	MK066723
<i>Linum</i>	<i>maritimum</i>	<i>Linopsis</i>	FJ160811	FJ160850	MK066835	MK066723
<i>Linum</i>	<i>meletonis</i>	<i>Linum</i>	MK090403	MK099025	MK066836	MK066724
<i>Linum</i>	<i>mucronatum</i>	<i>Syllinum</i>	KJ194521	MK099027	MK066838	MK066726
<i>Linum</i>	<i>mumbyanum</i>	<i>Linopsis</i>	MK090406	MK099028	MK066839	MK066727
<i>Linum</i>	<i>narbonense</i>	<i>Linum</i>	MK090407	HM544109	MK066840	MK066728
<i>Linum</i>	<i>nervosum</i>	<i>Linum</i>	MK090408	HM544110	MK066841	MK066729
<i>Linum</i>	<i>numidicum</i>	<i>Linopsis</i>	MK090410	MK099031	MK066843	MK066731
<i>Linum</i>	<i>nodiflorum</i>	<i>Linopsis</i>	MK090410	FJ160834	MK066843	FJ169539
<i>Linum</i>	<i>obtusatum</i>	<i>Linum</i>	MK090411	MK099032	MK066844	MK066732
<i>Linum</i>	<i>oligophyllum</i>	<i>Linopsis</i>	FJ160783	HM544111	FJ160867	MK066733
<i>Linum</i>	<i>olympicum</i>	<i>Dasylinum</i>	MK099034	MK090413	MK066846	MK066734
<i>Linum</i>	<i>pallens</i>	<i>Linum</i>	FJ160801	FJ160840	FJ160885	MK066735
<i>Linum</i>	<i>perenne</i>	<i>Linum</i>	FJ160802	HQ593346	FJ160886	MK066736
<i>Linum</i>	<i>prostratum</i>	<i>Linopsis</i>		MK090416	MK066849	MK066737
<i>Linum</i>	<i>pubescens</i>	<i>Dasylinum</i>	FJ160790	FJ160829	FJ160874	MK066738
<i>Linum</i>	<i>pungens</i>	<i>Linopsis</i>	MK090420	MK099037	MK066853	MK066741
<i>Linum</i>	<i>punctatum</i>	<i>Linum</i>	MK090418	MK099035	MK066852	MK066740
<i>Linum</i>	<i>pycnophyllum</i>	<i>Linum</i>	MK090421	MK099038	MK066854	MK066742
<i>Linum</i>	<i>quadrifolium</i>	<i>Linopsis</i>	MK090422	MK099039	MK066855	MK066743
<i>Linum</i>	<i>rupestre*</i>	<i>Linopsis</i>	FJ160785	HM544113	FJ160869	KT453460
<i>Linum</i>	<i>seljukorum</i>	<i>Dasylinum</i>	MK090424	MK099041	MK066857	MK066745
<i>Linum</i>	<i>setaceum</i>	<i>Linopsis</i>	MK090425	MK099042	MK066858	MK066746
<i>Linum</i>	<i>stelleroides</i>	<i>Linum</i>	FJ160805	MH660026	FJ160889	MK066749
<i>Linum</i>	<i>striatum</i>	<i>Linopsis</i>	FJ160786	FJ160825	MK066863	MK066750
<i>Linum</i>	<i>strictum</i>	<i>Linopsis</i>	FJ160806	MK099045	FJ160890	MK066751
<i>Linum</i>	<i>subasperifolium</i>	<i>Linopsis</i>	MK090431	MK099046	MK066864	MK066752
<i>Linum</i>	<i>suffruticosum</i>	<i>Linopsis</i>	FJ160807	MK099048	MK066866	MK066753
<i>Linum</i>	<i>syriacum</i>	<i>Syllinum</i>	MK090434	MK099049	MK066867	MK066755
<i>Linum</i>	<i>tauricum</i>	<i>Syllinum</i>	MK090435	MK099050	MK066868	MK066756
<i>Linum</i>	<i>tenue</i>	<i>Linopsis</i>	FJ160808	MK099053	FJ160892	MK066759
<i>Linum</i>	<i>tenuifolium</i>	<i>Linopsis</i>	FJ160809	MK966947	FJ160893	MK066761
<i>Linum</i>	<i>thesioides</i>	<i>Linopsis</i>	MK090441	MK099056	MK066874	MK066762
<i>Linum</i>	<i>thunbergii</i>	<i>Linopsis</i>	MK090442	MK099057	MK066875	MK066763
<i>Linum</i>	<i>tommasinii</i>	<i>Linum</i>	MK090444	MK099059	MK066877	MK066765
<i>Linum</i>	<i>tmoleum</i>	<i>Linum</i>	MK090443	MK099058	MK066876	MK066764
<i>Linum</i>	<i>triflorum</i>	<i>Syllinum</i>	MK090445	MK099060	MK066878	MK066766
<i>Linum</i>	<i>trigynum</i>	<i>Linopsis</i>	FJ160810	FJ160849	FJ160894	MK066767
<i>Linum</i>	<i>ungiculatum</i>	<i>Dasylinum</i>	MK090447	MK099061	MK066880	MK066768
<i>Linum</i>	<i>usitatissimum**</i>	<i>Linum</i>	FJ160803	MK099062	FJ160887	MK066769
<i>Linum</i>	<i>velutinum</i>	<i>Syllinum</i>	MK090449	MK099063	MK066882	MK066770

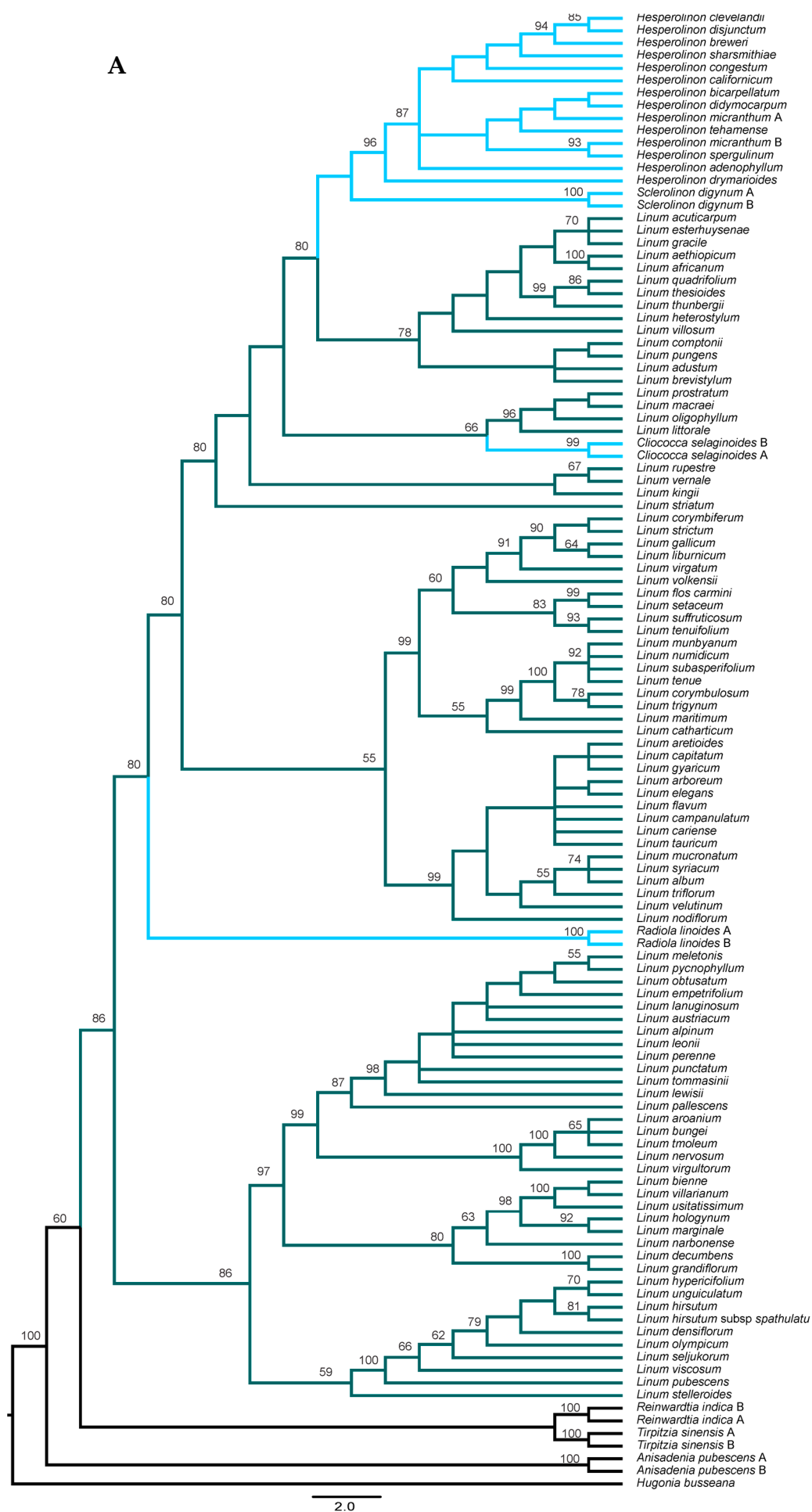
<i>Linum</i>	<i>volkensis</i>	<i>Linopsis</i>	FJ160813	MK099067	FJ160897	MK066776
<i>Linum</i>	<i>villarianum</i>	<i>Linum</i>	MK090451	MK099064	MK066884	MK066772
<i>Linum</i>	<i>villosum</i>	<i>Linopsis</i>	MK090452	MK099065	MK066885	MK066773
<i>Linum</i>	<i>vernale*</i>	<i>Linopsis</i>	FJ160812	FJ160851	FJ160896	MK066771
<i>Linum</i>	<i>virgatum</i>	<i>Linopsis</i>	MK090349	MK098984	MK066783	MK066670
<i>Linum</i>	<i>virgultorum</i>	<i>Linum</i>	MK090453	MK099066	MK066886	MK066774
<i>Linum</i>	<i>viscosum</i>	<i>Dasylinum</i>	FJ160791	FJ160830	FJ160875	MK066775

Table S2. Divergence time estimates from BEAST analysis for key nodes of the subfamily Linoideae based on partitioned data. 95% HPD = 95% highest posterior density, Ma= million years.

	Node	DNAcp		ITS	
		Mean (Ma)	95% HPD	Mean (Ma)	95% HPD
I	Linoideae	41.85	36.35-48.92	44.83	36.15-56.14
II	<i>Anisadenia</i> + <i>Reinwardtia</i> + <i>Tirpitzia</i>	29.52	25.16-35.7	37.17	34.63-42.1
III	<i>Linum</i> s.l.	38.29	35.64-43	40.49	36.50-45.53
IV	Subclade I (sections <i>Dasylinum</i> + <i>Linum</i> + <i>Stellerolinum</i>)	31.82	25.24-38.69	33.04	24.58-42.71
V	Subclade II (sections <i>Linopsis</i> + <i>Syllinum</i> + <i>Cathartolinum</i> + segregated genera)	25.98	15.22-36.07	20.47	12.48-29.53
VI	<i>Hesperolinon</i>	3.21	1.38-5.35	4.23	2.32-6.47
VII	<i>Sclerolinon</i>	1.87	0.42-3.63	0.17	0-0.55
VIII	<i>Cliococca</i>	0.24	0-0.8	0.35	0-0.92
IX	<i>Radiola</i>	5.88	1.32-12.09	0.7	0.08-1.57







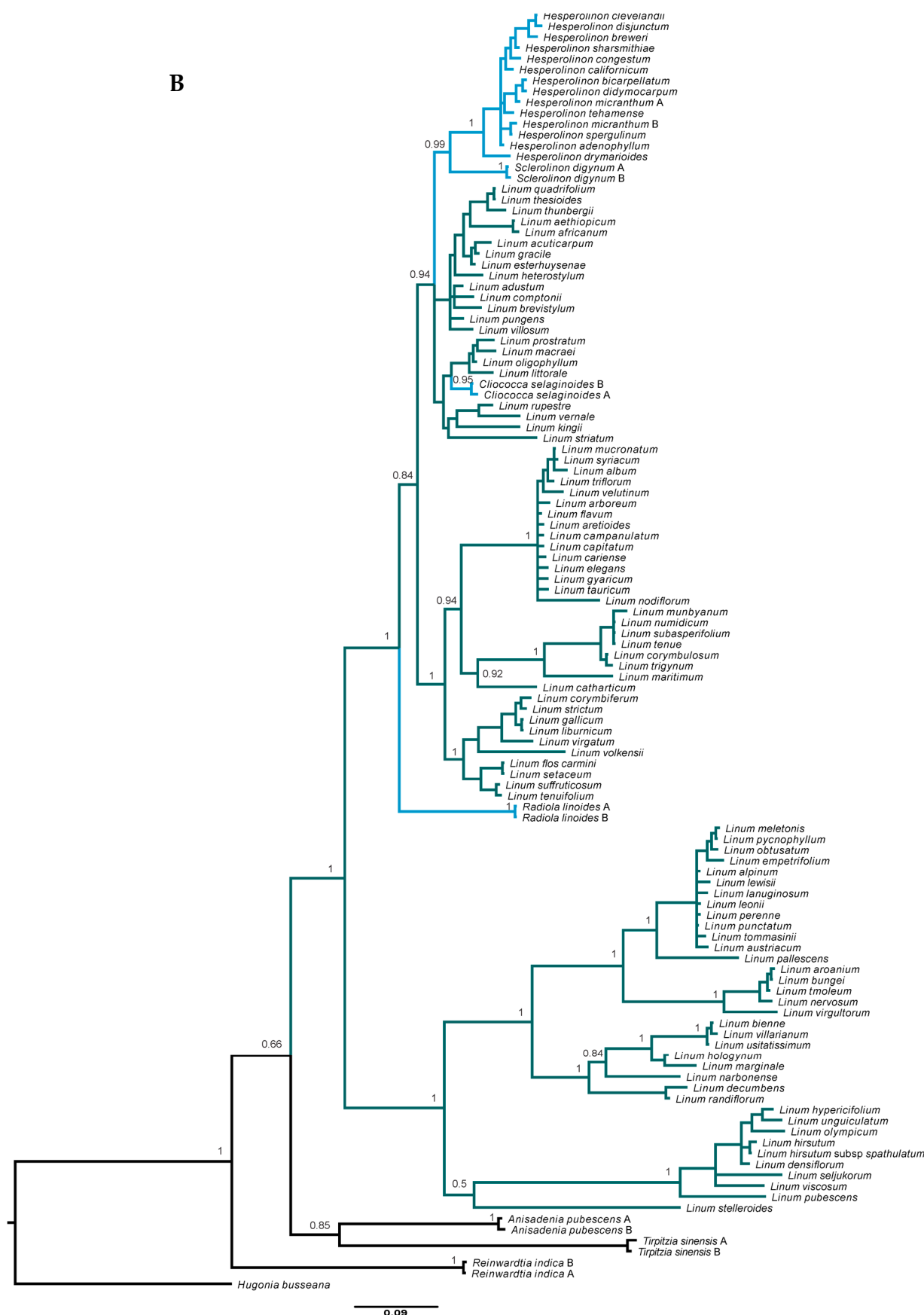


Figure S2. Phylogenetic relationships of the subfamily Linoideae based on ITS: A) Parsimony tree. Bootstrap values (BS) are labeled above the branches. B) Bayesian Inference tree. Posterior Probabilities (PP) are labeled above the branches. *No support values. A representative of *Hugonia* (Hugonideae) was used as an outgroup.

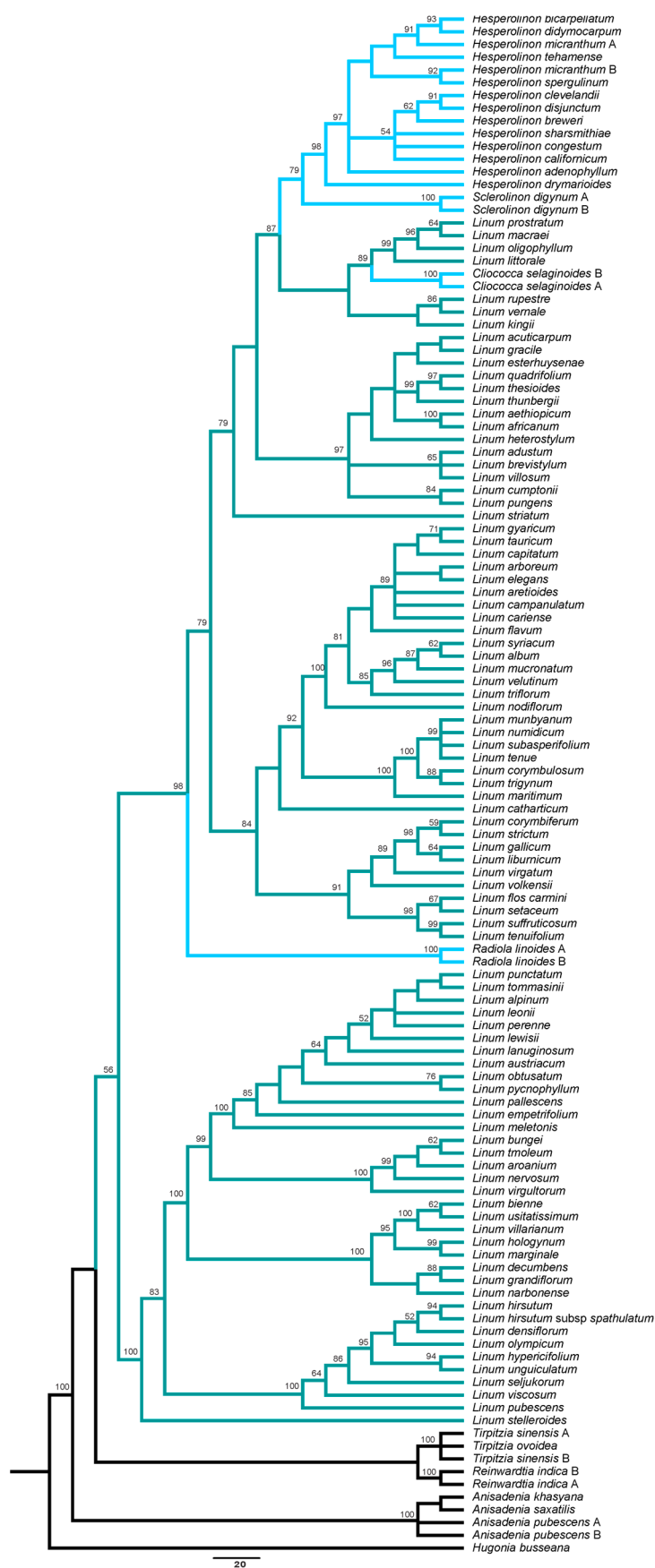


Figure S3. Parsimony Analysis tree of Linoideae based on combined plastid (*ndhF*, *matK*, *trnL-F*) and ITS dataset. Bootstrap values (BS) are labeled above the branches. *No support values. A representative of *Hugonia* (Hugonideae) was used as an outgroup.

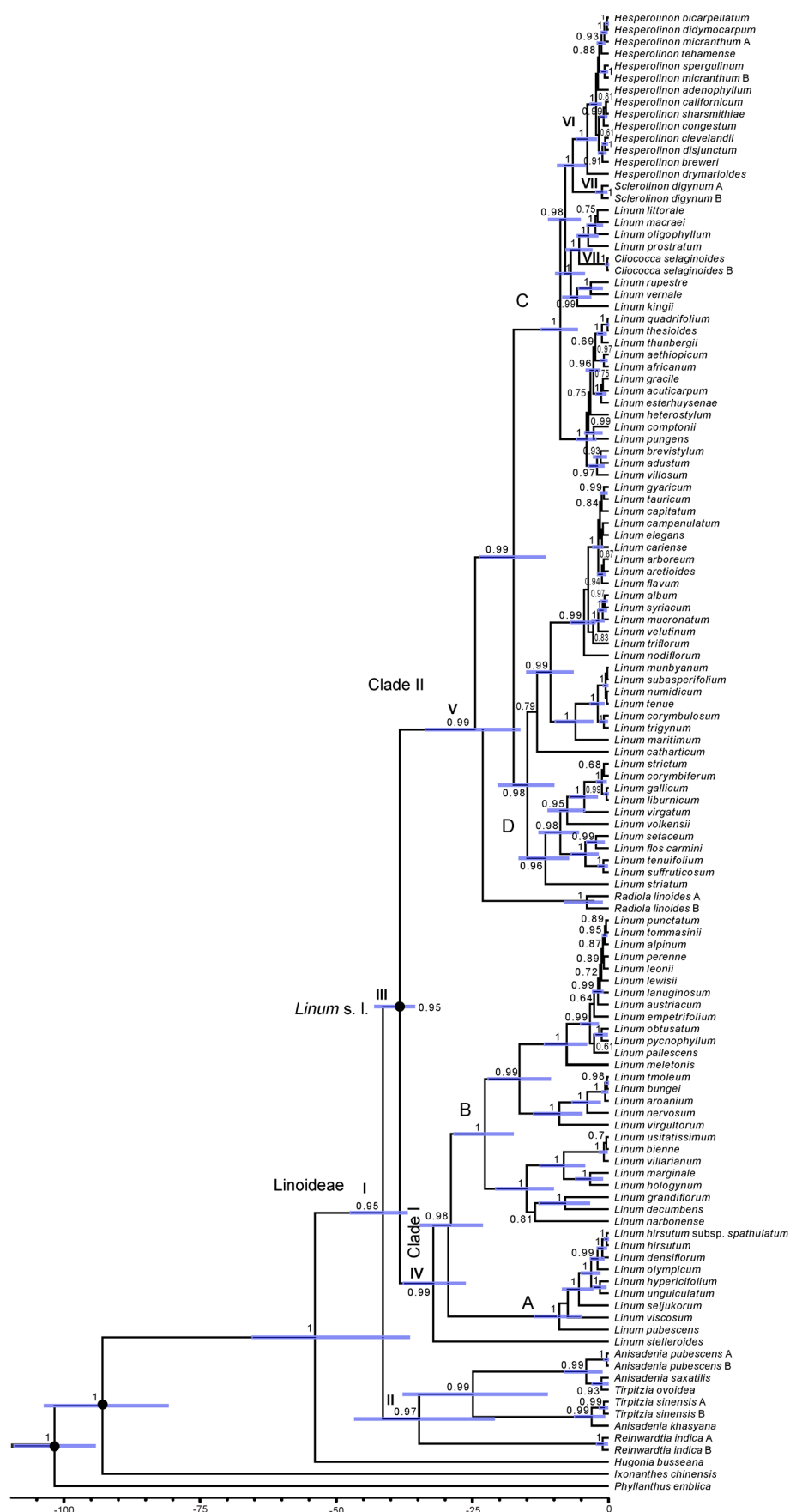


Figure S4. Beast maximum clade credibility tree of Linoideae inferred from combined ITS, *ndhF*, *matK*, *trnL-F*. Bayesian posterior probabilities > 0.6 are shown above the branches. Roman numerals below the branches indicate key nodes. Blue bars represent credibility intervals (95% highest posterior density) for the node ages. Nodes with black spots are those fixed as calibration points.

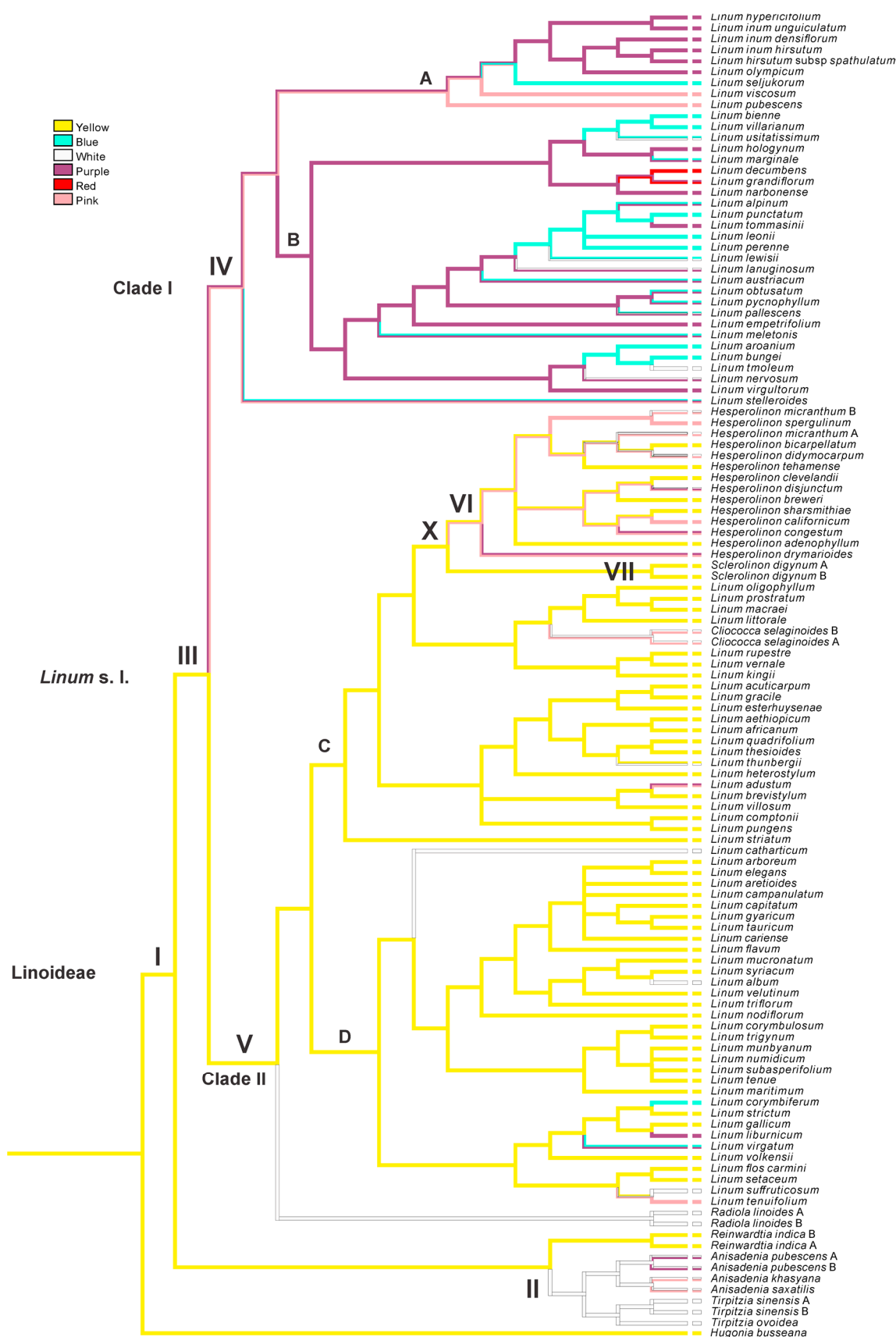


Figure S5. Reconstruction of ancestral states of flower color in the subfamily Linoideae based on Most Parsimonious Reconstruction. The colors along the branches indicate the color state estimated by Mesquite. The Roman numerals represent the key nodes. The colors at the tips represent the current color of the flower.