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Cynanchum (Apocynaceae: Asclepiadoideae): A pantropical Asclepiadoid genus revisited

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Taxon 65: 467–480

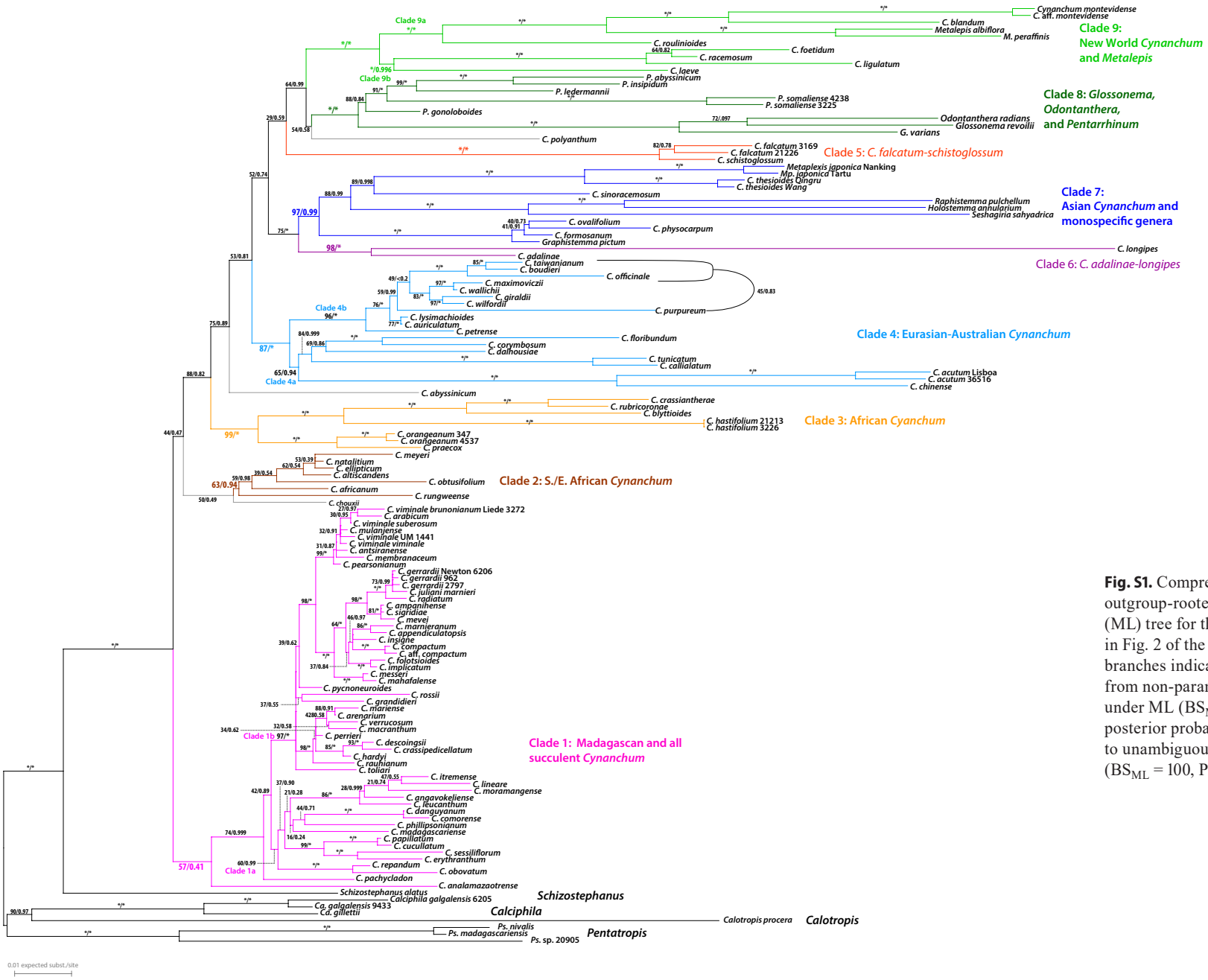

Fig. S1. Comprehensive version of the outgroup-rooted maximum likelihood (ML) tree for the Cynanchinae shown in Fig. 2 of the main paper. Numbers at branches indicate support as estimated from non-parametric bootstrapping under ML (BS_{ML}) and Bayesian-inferred posterior probabilities (PP). Asterisks refer to unambiguous support by both methods (BS_{ML} = 100, PP = 1).

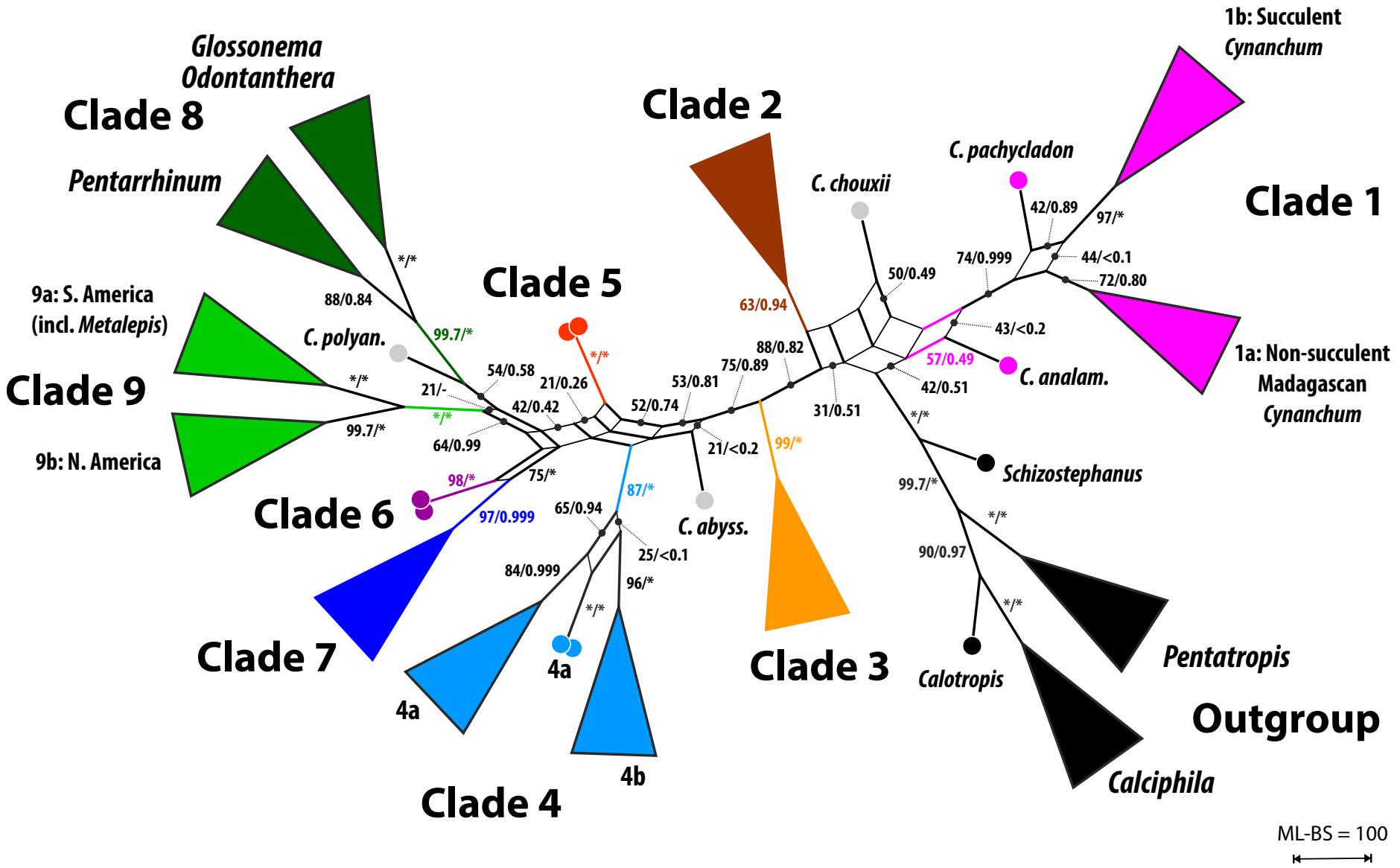

Fig. S2. Signal compatibility in the concatenated data. This bipartition network based on 350 maximum likelihood bootstrap replicates illustrates compatibility of backbone signals in the concatenated data. Edges correspond to potential branches in phylogenetic trees; their lengths are proportional to the occurrence frequency of the corresponding bipartition (edge/branch) in the bootstrap replicate tree sample. For better comparison, ML bootstrap support (BS_{ML}) values are also shown as values in addition to the Bayesian-inferred (BI) posterior probabilities (PP) of the according edge; asterisks indicate unambiguous support (BS_{ML} = 100, PP = 1). Bipartitions with frequencies <20% are not shown; terminal subtrees are represented by triangles (version with all leaves can be found in the electronic supplement Fig. S3).

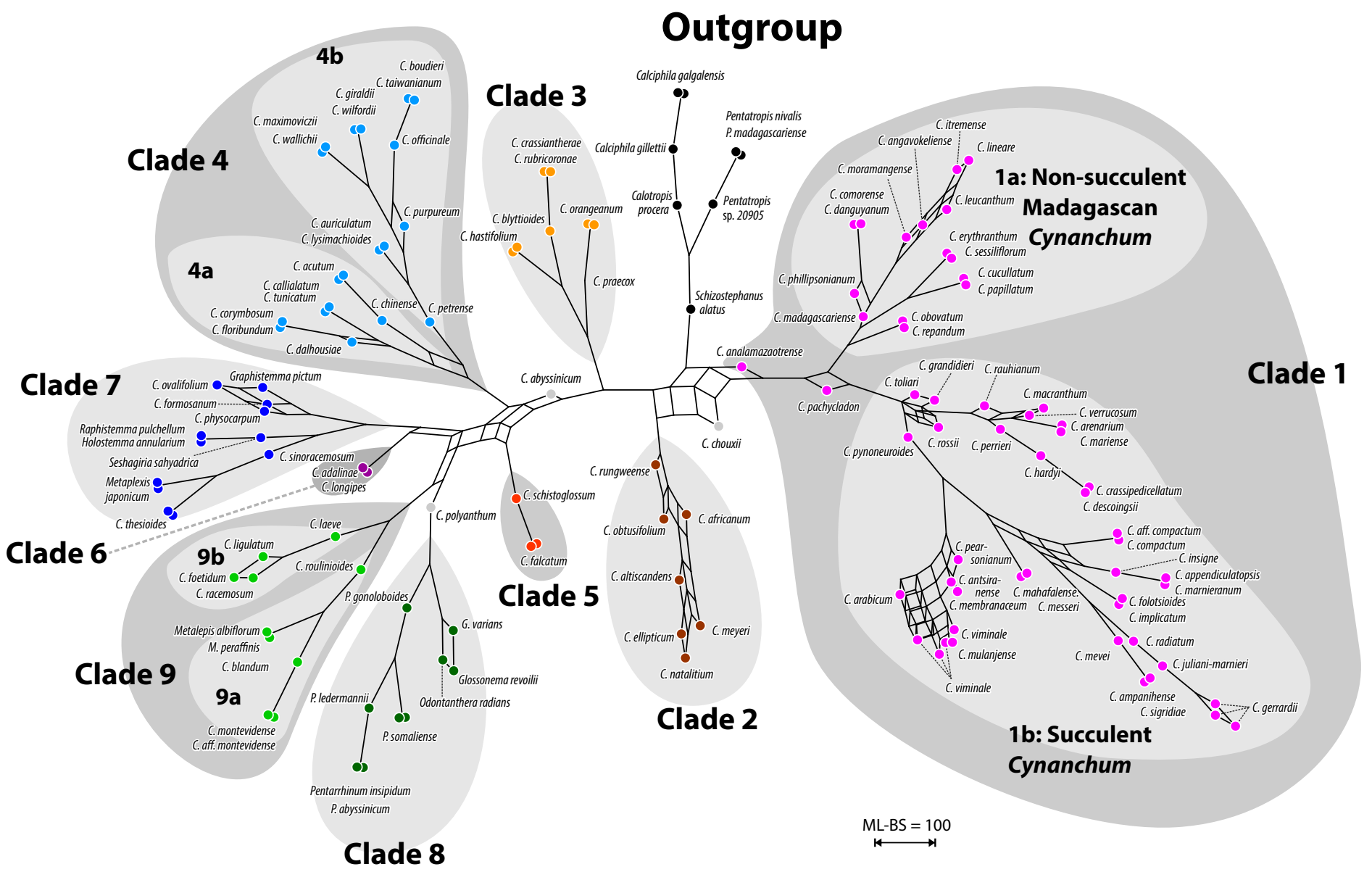

Fig. S3. Comprehensive bipartition network based on 350 maximum likelihood (ML) bootstrap (BS) replicates illustrating compatibility of phylogenetic signal in the concatenated data. Edges correspond to potential branches in phylogenetic trees; their lengths are proportional to the occurrence frequency of the corresponding bipartition (edge/branch) in the bootstrap replicate tree sample. See Fig. S2 for a version focussing on backbone topological alternatives providing support values from non-parametric bootstrapping under ML and Bayesian inference; Table S2 for a graphically enhanced tabulation of ML-BS support for ML-preferred and alternative bipartitions based on the concatenated data and one- or two-partition datasets.

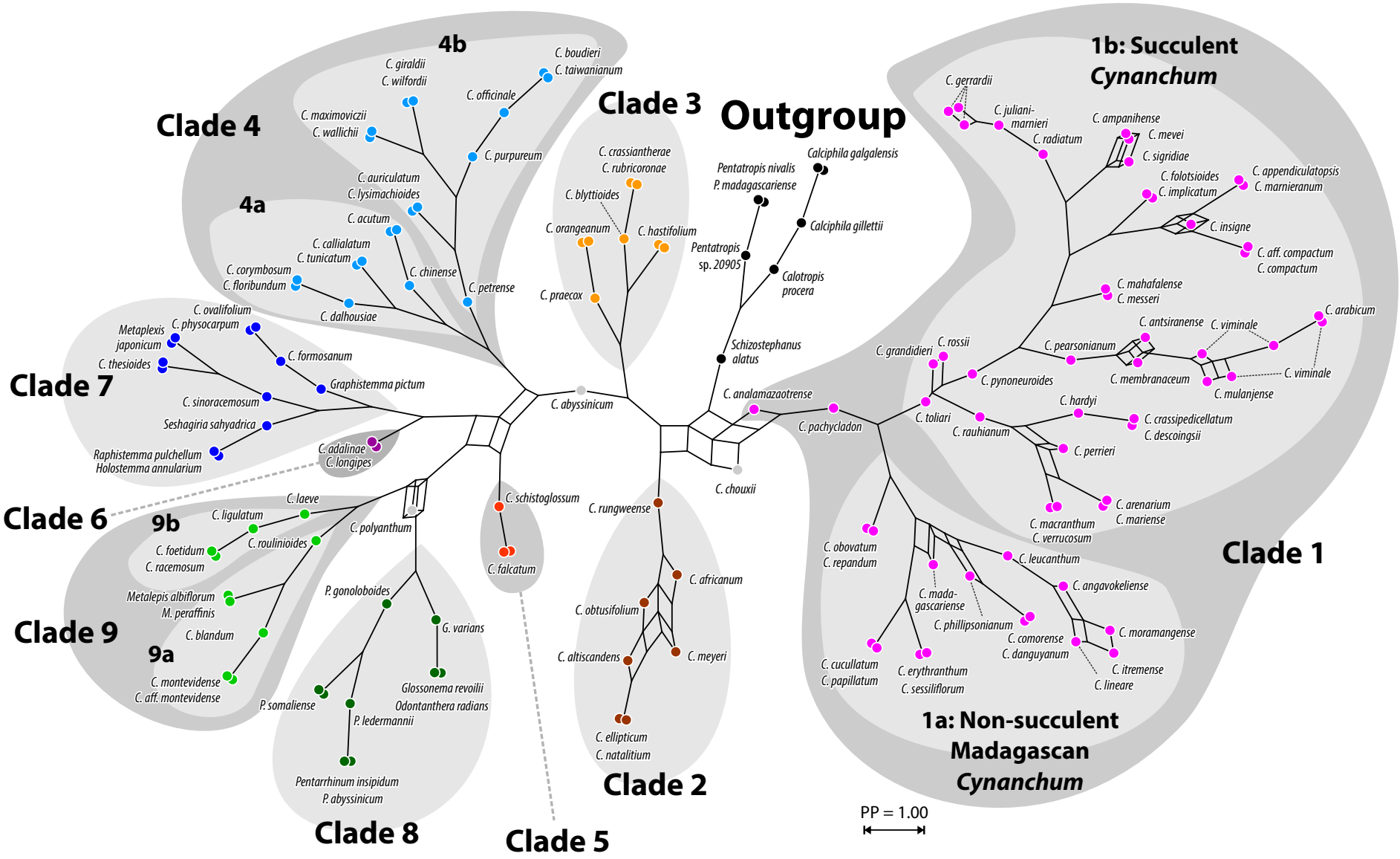

Fig. S4. Comprehensive bipartition network based on 2000 Bayesian-inferred sampled topologies (BIST) illustrating compatibility of phylogenetic signal in the concatenated data. Edges correspond to potential branches in phylogenetic trees; their lengths are proportional to the occurrence frequency of the corresponding bipartition (edge/branch) in the BIST tree sample. The posterior probabilities calculated from this sample are shown in Fig. 2 of the main paper and Figs. S1 and S2, and included in Table S2 for direct comparison with maximum likelihood non-parametric bootstrap support.

Table S1. Data coverage of Cynanchinae samples and selected outgroup taxa used in the current study.

				Number unambiguous sites									Number of covered partitions	
Accession	Provenance (country: province)	Distribution (continent, area)	Main clades (ML tree)	*trnH-psbA*	*trnTL*	*trnLi*	*trnLF*	*rps16i*	*At2606530a*	*At2g34620b*	*5' ETS*	*ITS*	cp	nc
Calciphila_galgalensis_6205	Somalia: Bari	Outgroup	Outgroup	373	790	513	376	761	502	511	344	661	4	4
Calciphila_galgalensis_9433	Somalia: Bari	Outgroup	Outgroup	389	790	513	370	791	503	510	343	0	4	3
Calciphila_gillettii	Somalia: Bari	Outgroup	Outgroup	372	791	513	370	791	501	511	363	660	4	4
Calotropis_procera	Gambia	Outgroup	Outgroup	450	797	504	382	797	212	512	344	668	4	4
Pentatropis_madagascariensis	Madagascar: Toliara	Outgroup	Outgroup	339	800	519	372	788	378	511	299	648	4	4
Pentatropis_nivalis	Kenya: Kilifi	Outgroup	Outgroup	337	800	519	371	804	0	0	298	649	4	2
Pentatropis_sp_20905	Ethiopia: Ogaden	Outgroup	Outgroup	353	799	519	363	788	0	0	360	667	4	2
Schizostephanus_alatus	Kenya: s. loc.	Outgroup	Outgroup	414	805	507	371	763	440	511	0	653	4	3
Cynanchum_abyssinicum	Tanzania: Arusha	Africa Arabia	No clade	364	736	507	353	791	502	512	0	666	4	3
Cynanchum_acutum_36516	Pakistan: Gilgit-Baltistan	Asia-Australia	4a	279	662	496	333	0	0	0	355	678	4	2
Cynanchum_acutum_Lisboa	Portugal: s. loc.	Asia-Australia	4a	288	685	517	351	815	412	510	355	678	4	4
Cynanchum_adalinae	Cameroon: Sud (Mt. Cameroon)	Africa Arabia	6	557	799	498	352	785	503	512	365	678	4	4
Cynanchum_africanum	South Africa: Western Cape	Africa Arabia	2	448	802	507	361	0	500	511	354	651	4	4
Cynanchum_altiscandens	Kenya: Kiambu	Africa Arabia	2	409	785	507	361	793	549	511	354	651	4	4
Cynanchum_ampanihense	Madagascar: Toliara	Madagascar	1b	505	777	500	370	0	503	510	368	669	4	4
Cynanchum_analamazaotrense	Madagascar: Antsiranana	Madagascar	1	570	788	495	351	805	502	0	368	670	4	3
Cynanchum_angavokeliense	Madagascar: s.loc.	Madagascar	1a	588	786	500	370	788	415	509	373	665	4	4
Cynanchum_antsiranense	Madagascar: Antsiranana	Madagascar	1b	492	777	492	352	792	503	509	369	669	4	4
Cynanchum_appendiculatopsis	Madagascar: s.loc.	Madagascar	1b	529	773	499	370	0	497	512	368	669	4	4
Cynanchum_arabicum	Yemen: Sana'a	Africa Arabia	1b	532	777	500	360	791	501	508	367	669	4	4
Cynanchum_arenarium	Madagascar: Toliara	Madagascar	1b	525	786	500	370	792	0	0	0	659	4	1
Cynanchum_auriculatum	Pakistan:Punjab	Asia-Australia	4b	464	788	513	370	792	498	513	357	672	4	4
Cynanchum_blandum	Ecuador: Napo	New World	9a	472	832	531	328	788	503	0	345	690	4	3
Cynanchum_blyttioides	Somalia: Bari	Africa Arabia	3	349	773	508	352	0	0	513	368	662	4	3

Table S1. Continued.

Cynanchum_boudieri	Japan:Kagoshima Pref.	Asia-Australia	4b	450	0	477	297	0	0	0	314	604	3	2
Cynanchum_callialatum	Mauritius	Asia-Australia	4a	495	815	510	347	791	497	513	380	673	4	4
Cynanchum_chinense	China: Neimenggu	Asia-Australia	4a	460	770	513	377	793	250	512	289	679	4	4
Cynanchum_chouxii	Madagascar: Fianarantsoa	Madagascar	No clade	641	777	498	369	0	0	512	0	0	4	1
Cynanchum_comorense	Comores: Mayotte	Madagascar	1a	556	794	500	370	0	0	0	0	670	4	1
Cynanchum_compactum	Madagascar: s.loc.	Madagascar	1b	525	777	500	370	0	287	509	368	669	4	4
Cynanchum_corymbosum	China: Guangdong	Asia-Australia	4a	603	745	513	361	786	0	0	357	672	4	2
Cynanchum_crassiantherae	Somalia: Balad / Shabeellaha Dhexe	Africa Arabia	3	441	768	508	351	0	502	512	371	667	4	4
Cynanchum_crassipedicellatum	Madagascar: Toliara	Madagascar	1b	568	786	500	370	660	501	510	370	659	4	4
Cynanchum_cucullatum	Madagascar: Antananarivo	Madagascar	1a	569	786	500	370	776	499	511	370	675	4	4
Cynanchum_dalhousiae	Pakistan: Punjab	Asia-Australia	4a	436	782	502	342	792	485	513	0	647	4	3
Cynanchum_danguyanum	Madagascar: Antsiranana	Madagascar	1a	550	794	500	370	783	503	511	305	670	4	4
Cynanchum_descoingsii	Madagascar: Toliara	Madagascar	1b	589	786	500	370	771	409	510	370	659	4	4
Cynanchum_ellipticum	South Africa: Eastern Cape	Africa Arabia	2	439	785	507	361	792	501	512	354	652	4	4
Cynanchum_erythranthum	Madagascar: Antsiranana	Madagascar	1a	562	807	500	370	755	503	513	371	688	4	4
Cynanchum_falcatum_21226	Ethiopia: Ogaden	Africa Arabia	5	480	737	498	360	780	0	512	356	649	4	3
Cynanchum_falcatum_3169	Ethiopia: Sidamo	Africa Arabia	5	0	737	498	360	0	0	0	0	650	3	1
Cynanchum_floribundum	Australia: Northern Territory	Asia-Australia	4a	426	786	512	361	780	457	500	0	669	4	3
Cynanchum_foetidum	Mexico: Oaxaca / Michoacan	New World	9b	803	740	514	346	780	415	512	359	680	4	4
Cynanchum_folotsioides	Madagascar: Toliara	Madagascar	1b	558	784	498	370	0	502	510	368	669	4	4
Cynanchum_formosanum	Taiwan	Asia-Australia	7	0	778	485	322	0	0	0	356	675	3	2
Cynanchum_gerrardii_2797	Madagascar: Toliara	Madagascar	1b	531	777	500	369	0	458	509	368	672	4	4
Cynanchum_gerrardii_962	Kenya: Northern Frontier	Africa Arabia	1b	531	777	500	368	0	0	0	368	672	4	2
Cynanchum_gerrardii_Newton_6206	Kenya: Makueni Distr.	Africa Arabia	1b	531	777	500	369	0	460	0	368	672	4	3
Cynanchum_giraldii	China: Shaanxi	Asia-Australia	4b	476	784	521	359	795	500	512	355	672	4	4
Cynanchum_grandidieri	Madagascar: s.loc.	Madagascar	1b	511	777	500	362	791	501	512	368	670	4	4
Cynanchum_hardyi	Madagascar: Mahajanga	Madagascar	1b	536	787	500	370	793	501	507	368	659	4	4
Cynanchum_hastifolium_21213	Ethiopia: Wardheer	Africa Arabia	3	371	832	514	352	796	0	511	0	645	4	2
Cynanchum_hastifolium_3226	Kenya: Northern Frontier	Africa Arabia	3	371	832	514	352	796	375	0	362	646	4	3
Cynanchum_implicatum	Madagascar: Antsiranana	Madagascar	1b	558	777	500	370	0	414	511	368	668	4	4
Cynanchum_insigne	Madagascar: Antananarivo	Madagascar	1b	588	773	499	370	0	496	512	368	669	4	4
Cynanchum_itremense	Madagascar: Fianarantsoa	Madagascar	1a	546	786	500	370	788	304	504	373	665	4	4
Cynanchum_juliani_marnieri	Madagascar: Toliara	Madagascar	1b	495	777	500	370	0	415	513	368	672	4	4
Cynanchum_laeve	USA: Missouri	New World	9b	424	810	507	351	792	503	513	363	691	4	4
Cynanchum_leucanthum	Madagascar: Antsiranana	Madagascar	1a	571	786	500	370	787	420	513	373	669	4	4
Cynanchum_ligulatum	Mexico: Sonora	New World	9b	644	740	513	356	777	414	512	359	669	4	4
Cynanchum_lineare	Madagascar: Fianarantsoa	Madagascar	1a	536	786	500	370	0	207	0	257	668	4	3

Table S1. Continued.

Cynanchum_longipes	Ghana: Brong-Ahafo Region	Africa Arabia	6	549	805	393	265	788	503	513	0	686	4	3
Cynanchum_lysimachioides	China: Sichuan	Asia-Australia	4b	471	787	513	361	793	0	0	357	672	4	2
Cynanchum_macranthum	Madagascar: Toliara	Madagascar	1b	568	786	500	370	793	503	513	368	654	4	4
Cynanchum_madagascariense	Madagascar: Toliara	Madagascar	1a	570	791	500	370	772	499	511	355	675	4	4
Cynanchum_mahafalense	Madagascar: Toliara	Madagascar	1b	531	777	500	376	0	503	511	368	669	4	4
Cynanchum_mariense	Madagascar: Toliara	Madagascar	1b	632	786	501	370	792	502	508	368	659	4	4
Cynanchum_marnieranum	Madagascar: Toliara	Madagascar	1b	545	773	499	370	0	450	507	368	669	4	4
Cynanchum_maximoviczii	Japan: Miyagi	Asia-Australia	4b	457	0	475	297	0	0	0	316	605	3	2
Cynanchum_membranaceum	Madagascar: Toliara	Madagascar	1b	532	777	500	361	680	503	510	368	669	4	4
Cynanchum_messeri	Madagascar: Toliara	Madagascar	1b	511	777	500	376	0	503	513	368	669	4	4
Cynanchum_mevei	Madagascar: Toliara	Madagascar	1b	508	777	500	370	0	498	511	368	669	4	4
Cynanchum_meyeri	Namibia	Africa Arabia	2	0	785	507	361	0	0	0	0	652	3	1
Cynanchum_montevidense	Argentina: Salta	New World	9a	502	778	533	340	774	495	0	348	691	4	3
Cynanchum_montevidense_aff	Brazil: Mato Grosso do Sul	New World	9a	502	778	531	340	775	501	511	350	690	4	4
Cynanchum_moramangense	Madagascar: Toamasina	Madagascar	1a	550	778	500	370	786	503	502	373	668	4	4
Cynanchum_mulanjense	Malawi	Africa Arabia	1b	532	777	499	361	792	503	509	0	669	4	3
Cynanchum_natalitium	South Africa: s. loc.	Africa Arabia	2	0	785	507	361	0	0	0	0	652	3	1
Cynanchum_obovatum	Madagascar: Antsiranana	Madagascar	1a	624	786	491	370	781	503	514	369	673	4	4
Cynanchum_obtusifolium	South Africa: Eastern Cape	Africa Arabia	2	486	811	507	361	794	499	512	355	643	4	4
Cynanchum_officinale	China: Anhui	Asia-Australia	4b	468	784	497	339	791	0	0	355	683	4	2
Cynanchum_orangeanum_347	Botswana: Kgalagadi	Africa Arabia	3	416	776	508	367	0	0	0	0	663	4	1
Cynanchum_orangeanum_4537	South Africa: Northern Cape	Africa Arabia	3	420	799	508	367	797	464	508	0	663	4	3
Cynanchum_ovalifolium	Philippines: Zamboanga	Asia-Australia	7	512	796	507	352	761	503	512	356	650	4	4
Cynanchum_pachycladon	Madagascar: Toliara	Madagascar	1	555	786	493	370	793	504	512	368	675	4	4
Cynanchum_papillatum	Madagascar: Fianarantsoa	Madagascar	1a	569	786	500	370	0	231	508	370	675	4	4
Cynanchum_pearsonianum	South Africa: Northern Cape	Africa Arabia	1b	532	777	500	370	792	502	509	0	669	4	3
Cynanchum_perrieri	Madagascar: s. loc.	Madagascar	1b	498	787	500	370	0	502	511	368	659	4	4
Cynanchum_petrense	Pakistan: Quetta	Asia-Australia	4b	476	783	482	334	0	0	512	360	0	4	2
Cynanchum_phillipsonianum	Madagascar: Antsiranana	Madagascar	1a	527	797	489	370	790	493	512	371	669	4	4
Cynanchum_physocarpum	Philippines: Mindoro	Asia-Australia	7	544	789	507	352	813	502	513	354	678	4	4
Cynanchum_polyanthum	Uganda: Buganda	Africa Arabia	No clade	0	794	504	361	0	0	0	0	675	3	1
Cynanchum_praecox	Tanzania: Ufipa/Rukwa	Africa Arabia	3	348	782	508	361	798	317	511	0	663	4	3
Cynanchum_purpureum	China: Neimenggu	Asia-Australia	4b	461	770	492	333	793	0	0	357	672	4	2
Cynanchum_pycnoneuroides	Madagascar: Fianarantsoa	Madagascar	1b	528	786	500	370	0	375	0	369	669	4	3
Cynanchum_racemosum	Mexico: Tamaulipas	New World	9b	0	741	514	357	0	0	0	0	686	3	1
Cynanchum_radiatum	Madagascar: Toliara	Madagascar	1b	510	777	500	370	0	502	498	366	672	4	4
Cynanchum_rauhianum	Madagascar: Toliara	Madagascar	1b	520	786	493	361	786	500	512	0	659	4	3

Table S1. Continued.

Cynanchum_repandum	Madagascar: Antananarivo	Madagascar	1a	657	786	494	370	789	503	511	370	673	4	4
Cynanchum_rossii	Madagascar: Toliara	Madagascar	1b	538	791	490	370	776	507	512	195	671	4	4
Cynanchum_roulinioides	Bolivia: Chuquisaca	New World	9a	449	799	508	342	792	501	499	349	674	4	4
Cynanchum_rubricoronae	Somalia: Hiiraan / Bari	Africa Arabia	3	448	767	500	350	0	379	511	372	663	4	4
Cynanchum_rungweense	Tanzania: Mbeya / Rukwa	Africa Arabia	2	391	796	524	360	0	502	0	356	647	4	3
Cynanchum_schistoglossum	Mozambique: Sofala	Africa Arabia	5	493	726	498	360	783	502	0	357	639	4	3
Cynanchum_sessiliflorum	Madagascar: Antsiranana	Madagascar	1a	605	807	500	370	783	0	512	370	678	4	3
Cynanchum_sigridiae	Madagascar: Toliara	Madagascar	1b	508	777	499	370	0	501	511	368	669	4	4
Cynanchum_sinoracemosum	China: Yunnan	Asia-Australia	7	579	839	507	352	812	500	512	358	677	4	4
Cynanchum_sp_nov_Webb	Madagascar	Madagascar	1b	525	778	500	370	656	496	511	368	669	4	4
Cynanchum_taiwanianum	Taiwan	Asia-Australia	4b	453	779	494	334	793	323	509	352	671	4	4
Cynanchum_thesioides_Qingru	China: Neimenggu	Asia-Australia	7	376	811	499	344	768	283	510	358	664	4	4
Cynanchum_thesioides_Wang	China: Gansu	Asia-Australia	7	376	811	499	344	768	502	508	358	663	4	4
Cynanchum_toliari	Madagascar: Toliara	Madagascar	1b	0	752	500	370	0	0	0	0	672	3	1
Cynanchum_tunicatum	India: Maharashtra	Asia-Australia	4a	493	815	487	327	0	496	0	0	674	4	2
Cynanchum_verrucosum	Madagascar: Toliara	Madagascar	1b	527	787	500	370	792	503	512	0	659	4	3
Cynanchum_viminale_brunonianum_	Philippines: Mindoro	Asia-Australia	1b	532	777	500	370	788	503	513	0	669	4	3
Cynanchum_viminale_suberosum	Zimbabwe: Bulawayo	Africa Arabia	1b	532	777	500	370	790	502	512	0	669	4	3
Cynanchum_viminale_UM_1441	Saudi Arabia	Africa Arabia	1b	532	777	500	370	791	502	511	367	669	4	4
Cynanchum_viminale_viminale	India: Maharashtra	Asia-Australia	1b	532	777	493	358	792	503	511	368	665	4	4
Cynanchum_wallichii	China: Yunnan	Asia-Australia	4b	475	758	513	361	793	0	0	357	673	4	2
Cynanchum_wilfordii	Japan: Miyagi Pref.	Asia-Australia	4b	452	0	475	297	0	0	0	316	604	3	2
Glossonema_revoilii	Kenya: Northern Frontier	Africa Arabia	8	642	838	507	344	795	0	0	0	707	4	1
Glossonema_varians	Iran: Hormoszgan	Africa Arabia	8	0	832	498	337	779	475	513	0	696	3	3
Graphistemma_pictum	China: Hong Kong	Asia-Australia	7	548	790	481	312	775	502	0	0	676	4	2
Holostemma_annularium	Bhutan	Asia-Australia	7	603	891	508	353	773	0	0	361	666	4	2
Metalepis_albiflora	Ecuador: Napo	New World	9a	0	867	508	334	0	0	0	0	665	3	1
Metalepis_peraffinis	Mexico: Chiapas	New World	9a	468	823	354	339	792	437	513	348	675	4	4
Metaplexis_japonica_Nanking	China: s. loc.	Asia-Australia	7	384	806	490	356	759	499	0	359	675	4	3
Metaplexis_japonica_Tartu	Japan: s. loc.	Asia-Australia	7	384	805	499	356	760	499	506	359	666	4	4
Odontanthera_radians	North Yemen: Hodeidah	Africa Arabia	8	580	848	507	355	796	457	0	364	711	4	3
Pentarrhinum_abyssinicum	Tanzania: Ufipa	Africa Arabia	8	507	824	516	346	0	502	0	357	685	4	3
Pentarrhinum_gonoloboides	Kenya: Naivasha	Africa Arabia	8	0	800	507	352	0	0	0	0	644	3	1
Pentarrhinum_insipidum	South Africa: Orange Free State	Africa Arabia	8	530	799	507	344	787	503	512	356	670	4	4
Pentarrhinum_ledermannii	Tanzania: Kilimanjaro	Africa Arabia	8	545	803	507	344	789	503	512	357	665	4	4
Pentarrhinum_somaliense_3225	Kenya: Northern Frontier	Africa Arabia	8	475	808	513	346	753	383	513	359	651	4	4
Pentarrhinum_somaliense_4238	Ethiopia: Sidamo	Africa Arabia	8	529	816	513	346	0	500	512	359	645	4	4

Table S1. Continued.

Raphistemma_pulchellum	Thailand: Satun	Asia-Australia	7	538	881	491	305	774	0	513	360	670	4	3
Seshagiria_sahyadrica	India: Maharashtra	Asia-Australia	7	500	781	483	302	753	501	0	0	637	4	2

Taxa included in artificial NUC2 clade with increased proportion of polymorphic base calls

Table S2. Tabulation of ML-BS support for ML-preferred and alternative bipartitions based on the concatenated data and single-region datasets.

Regions	All		tHpA		trnTLF		rps16i		5' ETS		ITS		NUC1		NUC2	
Number of accessions	137		127		137		92		106		134		104		96	
Number of necessary bootstrap replicates	350	—	450	—	350	—	500	—	650	—	350	—	750	—	950	—
	BS_{ML}	PP	BS_{ML}	PP	BS_{ML}	PP	BS_{ML}	PP	BS_{ML}	PP	BS_{ML}	PP	BS_{ML}	PP	BS_{ML}	PP
***Pentatropis* + *Calciphila* + *Calotropis* | Cynanchinae**	**99.7**	**1.00**	**<20**	**<0.2**	**91**	**1.00**	**55**	**0.99**	**N/A**	**N/A**	**58**	**0.83**	**<20**	**<0.2**	**<20**	**<0.2**
Calotropis + *Schizostephanus* | *Pentatropis* + *Calciphila* + *Cynanchum* s.l.	<1	0.00	<20	<0.2	<10	0.00	<10	<0.01	N/A	N/A	<20	<0.2	63	0.84	<20	<0.2
C. falcatum (Clade 5) + *Pentatropis* + *Calciphila* + *Schizostephanus* | *Calotropis* + rest	<1	0.00	<20	<0.2	<10	0.00	<15	0.00	N/A	N/A	<20	<0.2	<20	<0.2	37	0.78
C. falcatum (Clade 5) sister to *Pentatropis* (*madagascarensis*)	<1	0.00	<20	<0.2	<10	0.00	<15	0.00	<20	0.00	<20	<0.2	<20	<0.2	53	0.76
***Cynanchum* s.l. (Clades 1–9)**	**100**	**1.00**	**<20**	**<0.2**	**90**	**1.00**	**22**	**0.40**	**83**	**1.00**	**20**	**0.36**	**80**	**###**	**<20**	**<0.2**
(Ingroup) Clade excluding Clade 1 and *C. hastifolium* (Clade 3)	<20	<0.2	<20	<0.2	<20	<0.2	79	0.998	<20	<0.2	<20	<0.2	<20	<0.2	<20	<0.2
Clade 1, 3–9	<20	<0.2	<20	<0.2	<20	<0.2	<20	0.00	<20	<0.2	<20	<0.2	<20	<0.2	<20	<0.2
Clades 2–9	**44**	**0.51**	**<20**	**<0.2**	**<20**	**<0.2**	**<15**	**0.00**	**<20**	**<0.2**	**<20**	**<0.2**	**<20**	**<0.2**	**<20**	**<0.2**
C. hastifolium (Clade 3) not part of *Cynanchum* s.l. clade	<2	<0.2	<20	<0.2	<20	<0.2	88	1.00	<20	<0.2	<20	<0.2	<20	<0.2	<20	<0.2
C. chouxii + Clade 1	42	0.51	29	0.99	31	0.30	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<20	<0.2
***C. chouxii* + Clade 2**	**50**	**0.49**	**<20**	**<0.01**	**<20**	**<0.2**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**<20**	**<0.2**
Clade 1	**57**	**0.49**	**29**	**0.99**	**31**	**0.30**	**66**	**0.91**	**48**	**0.62**	**93**	**1.00**	**<20**	**<0.2**	**29**	**0.39**
***C. analamazaoense* sister to rest**	**74**	**0.999**	**29**	**0.99**	**31**	**0.30**	**57**	**0.69**	**63**	**0.97**	**29**	**<0.2**	**<20**	**<0.2**	**N/A**	**N/A**
C. pachycladon* sister to rest save *C. analamazaonese	**42**	**0.89**	**<20**	**<0.2**	**<20**	**<0.2**	**<20**	**<0.2**	**<20**	**<0.2**	**<20**	**<0.2**	**<20**	**<0.2**	**45**	**0.42**
C. pachycladon sister to Clade 1b	44	<0.1	<20	<0.2	<20	<0.2	<20	<0.2	<20	<0.2	<20	<0.2	<20	<0.2	<20	<0.2
Clade 1a: Not succulent, pure Madagascan subclade	**60**	**0.99**	**<20**	**<0.2**	**<20**	**<0.2**	**<20**	**<0.2**	**<20**	**0.69**	**25**	**0.82**	**<20**	**<0.2**	**<20**	**<0.2**
Clade 1b: Stem succulents	**97**	**1.00**	**<20**	**<0.2**	**41**	**0.52**	**<20**	**<0.2**	**<20**	**<0.2**	**93**	**1.00**	**<20**	**<0.2**	**<20**	**<0.2**
Clade 2	**63**	**0.94**	**<20**	**<0.2**	**55**	**0.85**	**<20**	**<0.2**	**40**	**0.64**	**23**	**0.73**	**<20**	**<0.2**	**<20**	**<0.2**
Clades 3–9	**88**	**0.82**	**<20**	**<0.2**	**<20**	**<0.2**	**25**	**0.23**	**<20**	**<0.2**	**<20**	**<0.2**	**<20**	**<0.2**	**<20**	**<0.2**
Clade 3	**99**	**1.00**	**63**	**###**	**88**	**###**	**<15**	**0.00**	**88**	**0.999**	**<20**	**0.50**	**73**	**0.95**	**27**	**0.72**
Clades 4–9 (incl. *C. abyssinicum*)	**75**	**0.89**	**<20**	**<0.2**	**<20**	**<0.2**	**54**	**0.95**	**<20**	**<0.2**	**<20**	**0.26**	**<20**	**<0.2**	**<20**	**<0.2**
C. abyssinicum sister to Clade 4	<20	<0.2	<20	<0.2	<20	<0.2	<20	<0.2	N/A	N/A	<20	<0.2	<20	<0.2	26	0.23
***C. abyssinicum* sister to Clades 4–9**	**53**	**0.81**	**<20**	**<0.2**	**<20**	**<0.2**	**<20**	**0.68**	**N/A**	**N/A**	**<20**	**<0.2**	**<20**	**<0.2**	**<20**	**<0.2**
Clade 4	**87**	**1.00**	**<20**	**<0.2**	**<20**	**0.42**	**<20**	**<0.2**	**<20**	**<0.2**	**<20**	**<0.2**	**<20**	**<0.2**	**42**	**0.63**
Clade 4a	**65**	**0.94**	**<20**	**<0.2**	**69**	**0.85**	**<20**	**<0.2**	**<20**	**<0.2**	**<20**	**<0.2**	**<20**	**<0.2**	**<20**	**<0.2**
C. acutum, C. chinense (4a) sister to 4b	25	<0.1	<20	<0.2	<20	<0.15	<20	<0.2	60	0.95	<20	<0.2	<20	<0.2	<20	<0.2
s	**96**	**1.00**	**97**	**###**	**84**	**1.00**	**<20**	**<0.2**	**65**	**0.23**	**97**	**1.00**	**<20**	**<0.2**	**76**	**0.97**
Clades 5–9	**52**	**0.74**	**<20**	**<0.2**	**<20**	**<0.2**	**<20**	**<0.2**	**<20**	**<0.2**	**<20**	**<0.2**	**<20**	**0.54**	**<20**	**<0.2**
Clades 5 + 8 + 9	**29**	**0.51**	**<20**	**<0.2**	**<20**	**<0.05**	**<20**	**<0.2**	**<20**	**<0.2**	**<20**	**<0.2**	**31**	**0.68**	**<20**	**<0.2**
Clades 6–9	42	0.42	<20	<0.2	<20	<0.2	<20	<0.2	<20	<0.2	<20	<0.2	<20	<0.2	<20	<0.2
Clade 5 (*C. falcatum* + *C. schistoglossum*)	**100**	**1.00**	**100**	**1.00**	**100**	**1.00**	**100**	**1.00**	**100**	**1.00**	**100**	**1.00**	**–***	**–***	**–***	**–***
C. leucanthum sister to Clade 5 (*C. schistoglossum*)	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	59	0.80	<20	<0.2
Clades 6 + 7	**75**	**1.00**	**<20**	**<0.2**	**<20**	**<0.05**	**<20**	**<0.2**	**70**	**1.00**	**<20**	**<0.2**	**<20**	**<0.2**	**<20**	**<0.2**
Clades 6 + 9	21	0.00	<20	<0.2	54	0.97	<20	<0.2	<20	0.00	<20	<0.2	<20	<0.2	<20	<0.2
Clade 7 + *Pentarrhinum* (subclade of 8)	<20	0.00	<20	<0.2	<20	<0.2	<20	<0.2	<20	0.00	<20	<0.2	<20	<0.2	36	0.86
Clade 6 (*C. adalinae* + *C. longipes*)	**98**	**1.00**	**22**	**<0.2**	**58**	**###**	**<20**	**<0.2**	**–***	**–***	**<20**	**<0.2**	**42**	**0.31**	**<20**	**<0.2**
Clade 7 (Asian-Australian cluster V)	**97**	**0.999**	**<20**	**<0.2**	**65**	**0.98**	**<20**	**<0.2**	**22**	**0.23**	**<20**	**<0.2**	**50**	**0.83**	**<20**	**<0.2**
C. longipes (Clade 6) sister to *C. sinoracemosum* (Clade 7)	<2	0.00	<20	<0.2	<20	~0	59	0.82	N/A	N/A	<20	<0.2	<20	<0.2	<20	<0.2
Clade 8 + 9 (incl. *C. polyanthum*)	**64**	**0.99**	**<20**	**<0.2**	**<20**	**<0.05**	**<20**	**<0.2**	**53**	**0.95**	**45**	**0.96**	**58**	**0.95**	**<20**	**<0.2**
***C. polyanthum* sister to Clade 8**	**54**	**0.58**	**N/A**	**N/A**	**<20**	**<0.2**	**N/A**	**N/A**	**N/A**	**N/A**	**<20**	**<0.2**	**N/A**	**N/A**	**N/A**	**N/A**
Clade 8 (*Pentarrhinum, Glossonema, Odontanthera*)	**99.7**	**1.00**	**<20**	**<0.2**	**99**	**1.00**	**<20**	**<0.2**	**78**	**0.998**	**40**	**0.41**	**<20**	**<0.2**	**40**	**0.54**
***Pentarrhinum* subclade**	**88**	**0.84**	**<20**	**<0.2**	**75**	**0.69**	**<20**	**<0.2**	**60**	**0.40**	**<20**	**<0.2**	**95**	**1.00**	**42**	**0.40**
Glossonema* + *Odontanthera	**100**	**1.00**	**99**	**1.00**	**100**	**1.00**	**100**	**1.00**	**–***	**–***	**100**	**1.00**	**97**	**1.00**	**–***	**–***
Clade 9 (New World *Cynanchum*)	**100**	**1.00**	**<20**	**<0.2**	**100**	**1.00**	**42**	**0.40**	**74**	**0.984**	**<20**	**<0.2**	**69**	**0.99**	**55**	**0.82**
Clade 9a (South America into Central America)	**100**	**1.00**	**95**	**0.97**	**98**	**1.00**	**<20**	**0.33**	**99.5**	**1.00**	**90**	**1.00**	**<20**	**<0.2**	**<20**	**<0.2**
Clade 9b (North and Central America)	**99.7**	**1.00**	**<20**	**<0.2**	**99**	**0.97**	**35**	**0.35**	**38**	**0.46**	**43**	**0.59**	**<20**	**<0.2**	**63**	**0.95**

Continued next page

Table S2. Continued.

* Single species
♯ One accession (*Pentatropis* sp. 20905) with ambiguous affinity to other outgroup accessions
† *C. pachycladon* nested in Clade 1b
‡ In contrast to the *C. hastifolium* accessions that group with the outgroup, the other two representatives of Clade 3 group are resolved as sister taxa with BS_{ML}/PP = 99.8/1.0, and are placed according to the concatenated tree
§ *C. chouxii* grouped with all Clade 1 members save *C. analamazaonese* and *C. purpurense*, the latter two unresolved
℗ *C. chouxii* grouped with all Clade 1 members save *C. analamazaonese*, the latter unresolved. Under BI, *C. erythrantum* is only indicated as potential relative of some Clade 1 members, but not all.
$ *C. calliatum* grouping with 1+5 (BS_{ML} = 47/38; PP = 0.59/0.37), *C. corymbosum* unresolved
¥ *C. corymbosum* nested in Clade 4b, *C. officinale* groups with members of Clade 4a
¶ *C. rungweense* (Clade 2) grouped with Clade 1, *C. africanum* unresolved; remainder BS_{ML}/PP = 91/0.75, placed as sister to rest of ingroup
‼ *C. orangeanum* 4537 unresolved
£ Several taxa with predominant polymorphic base calls group with Clade 2; an according (artificial) clade would receive BS_{ML}/PP = 86/0.87
₩ Only two species out of six covered (three without data, forth polymorphic£)
₡ Includes *C. pycnoneuroides*
₦ In the BIST sample, *C. anamalazotrense* nests within Clade 1a; a corresponding clade would receive a BS_{ML} = 35
€ Including *C. leucanthum* (Clade 1a)
ℓ *Glossonema+Odanthera* unresolved
₪ *C. purpureum* unresolved
₹ *C. roulinoides* unresolved
ȣ Excluding the two *C. hastifolium* accessions