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Table S1
Accession numbers of the sequences of the dataset.
Sequences noted by a * are available from http://herbarium.millersville.edu/pubs-support.php.

	atpB	*matK*	*rbcL*	*trnL-F*	*phyB*
Acion hookeri	-	GQ409019	-	-	-
Acion monocephalum	-	GQ409041	-	GQ408950	-
Alexgeorgea ganopoda	-	-	AF148759	AF148719	-
Alexgeorgea nitens	-	GQ409052	-	GQ408944	-
Alexgeorgea subterranea	-	GQ409034	GQ408918	GQ408988	-
Anarthria gracilis	-	-	-	GQ408982	-
Anarthria humilis	-	DQ257497	GQ408934	GQ409004	-
Anarthria prolifera	-	DQ257499	DQ307438	GQ409009	-
Anarthria scabra	-	-	-	GQ408983	-
Anthochortus capensis	-	-	-	AF175128	-
Anthochortus crinalis	*	*	*	*	-
Anthochortus ecklonii	-	-	-	AF175129	-
Anthochortus graminifolius	*	*	AM235091	*	-
Anthochortus insignis	-	-	-	AF175130	-
Anthochortus singularis	*	*	*	*	-
Apodasmia brownii	-	GQ409033	GQ408919	-	-
Apodasmia chilensis	-	-	AF307923	-	-
Apodasmia similis	-	-	AF307924	-	-
Askidiosperma albo-aristatum	AY881326	AY881474	AY881400	AY881546	-
Askidiosperma alticolum	*	*	*	*	-
Askidiosperma andreaeanum	AY881328	AY881476	AY881402	AY881548	-
Askidiosperma capitatum	AY881329	AY881477	AY881403	AY881549	-
Askidiosperma chartaceum	AY881330	AY881478	AY881404	AY881550	-
Askidiosperma delicatulum	AY881331	-	*	AY881551	-
Askidiosperma esterhuyseniae	AY881332	AY881479	*	AY881552	-
Askidiosperma insigne	AY881333	AY881480	AY881407	AY881553	-
Askidiosperma longiflorum	AY881334	AY881481	AY881408	AY881554	-
Askidiosperma nitidum	AY881335	AY881482	AY881409	AY881555	-
Askidiosperma paniculatum	AY881336	AY881483	AY881410	AY881556	-
Askidiosperma rugosum	AY881337	AY881484	AY881411	AY881557	-
Baloskion australe	-	GQ409014	-	GQ408945	-
Baloskion gracile	-	-	AF148764	AF148724	-
Baloskion longipes	-	GQ409017	-	-	-
Baloskion tetraphyllum	-	DQ257501	AF148761	AF148721	-
Calorophus elongatus	-	GQ409036	AF148765	AF148725	-
Calorophus erostris	-	-	GQ408930	GQ408999	-
Cannomois arenicola	*	*	*	*	-
Cannomois congesta	-	-	-	AF175136	-
Cannomois parviflora	*	*	*	*	-
Cannomois saundersii	*	*	*	*	-
Cannomois schlechteri	*	*	*	*	-
Cannomois scirpoides	*	*	*	*	-

Cannomois spicata	*	*	*	*	–
Cannomois virgata	–	–	–	AF175137	–
Catacolea enodis	–	GQ409049	–	GQ408946	–
Ceratocaryum argenteum	–	–	*	AF175131	–
Ceratocaryum caespitosum	*	*	*	*	KC513950
Ceratocaryum decipiens	–	–	–	AF175132	–
Ceratocaryum fimbriatum	*	*	*	*	–
Ceratocaryum fistulosum	*	*	*	*	–
Ceratocaryum pulchrum	*	*	*	*	–
Ceratocaryum xerophilum	*	*	*	*	–
Chaetanthus aristatus	–	DQ257508	AF148782	AF148743	–
Chaetanthus tenellus	–	–	–	GQ408947	–
Chordifex abortivus	–	GQ409022	GQ408921	GQ408990	–
Chordifex amblycoleus	–	GQ409026	AF148789	AF148750	–
Chordifex capillaceus	–	GQ409030	GQ408922	GQ408991	–
Chordifex chaunocoleus	–	–	–	GQ408948	–
Chordifex crispatus	–	DQ257510	GQ408923	GQ408992	–
Chordifex isomorphus	–	GQ409016	–	GQ408949	–
Chordifex jacksonii	–	–	AF148768	AF148729	–
Chordifex laxus	–	GQ409031	GQ408924	GQ408993	–
Chordifex microcodon	–	GQ409032	GQ408925	GQ408994	–
Chordifex sinuosus	–	–	–	GQ408951	–
Chordifex stenandrus	–	–	AF148767	AF148728	–
Coleocarya gracilis	–	GQ409023	AF148769	AF148730	–
Cytogonidium leptocarpoides	–	GQ409050	–	GQ408952	–
Dapsilanthus ramosus	–	–	AF148780	AF148741	–
Desmocladus asper	–	–	–	GQ408953	–
Desmocladus austrinus	–	GQ409042	–	GQ408954	–
Desmocladus biformis	–	–	–	GQ408955	–
Desmocladus castaneus	–	DQ257511	AF148770	AF148731	–
Desmocladus elongatus	–	GQ409044	–	GQ408956	–
Desmocladus fasciculatus	–	–	–	GQ408957	–
Desmocladus glomeratus	–	–	–	GQ408958	–
Desmocladus lateriticus	–	–	–	GQ408959	–
Desmocladus semiplanus	–	–	–	GQ408960	–
Dielsia stenostachya	–	–	AF148771	AF148732	–
Elegia acockii	AY881338	AY881485	AY881412	AY881558	–
Elegia aggregata	AY881339	AY881486	AY881413	AY881559	–
Elegia amoena	AY881351	AY881498	*	AY881571	–
Elegia asperiflora	AY881352	AY881499	AY881426	AY881572	–
Elegia atratiflora	AY881353	AY881500	AY881427	AY881573	–
Elegia caespitosa	AY881354	AY881501	AY881428	AY881574	–
Elegia capensis	AY881355	AY881502	AY881429	AY881575	–
Elegia coleura	AY881356	AY881503	AY881430	AY881576	–
Elegia cuspidata	AY881357	AY881504	AY881431	AF148735	–
Elegia decipiens	AY881340	AY881487	AY881414	AY881560	KC514030

Elegia deustum	AY881341	AY881488	AY881415	AY881561	KC514037
Elegia ebracteata	AY881342	AY881489	AY881416	AY881562	KC514024
Elegia elephantina	*	*	*	*	–
Elegia elephas	AY881343	AY881490	AY881417	AY881563	–
Elegia equisetacea	AY881358	AY881505	AY881432	AY881578	–
Elegia esterhuyseniae	AY881359	AY881506	AY881433	AY881579	–
Elegia extensa	AY881360	AY881507	AY881434	AY881580	–
Elegia fenestrata	AY881361	AY881508	AY123238	AY881581	KC514044
Elegia filacea	AY881362	AY881509	AY881436	AY881582	–
Elegia fistulosa	AY881363	AY881510	AY881437	AY881583	–
Elegia fucata	AY881364	AY881511	AY881438	AY881584	KC514010
Elegia galpinii	AY881365	AY881512	AY881439	AY881585	–
Elegia glomerata	AY881366	AY881513	AY881440	AY881586	–
Elegia grandis	AY881367	AY881514	AY881441	AY881587	–
Elegia grandispicata	AY881368	AY881515	AY881442	AY881588	–
Elegia hookeriana	AY881344	AY881491	AY881418	AY881564	KC513951
Elegia hutchinsonii	AY881369	AY881516	AY881443	AY881589	KC514038
Elegia intermedia	AY881370	AY881517	AY881444	AY881590	–
Elegia juncea	AY881371	AY881518	AY881445	AY881591	–
Elegia macrocarpa	AY881350	AY881497	AY881424	AY881570	–
Elegia microcarpa	AY881345	AY881492	AY881419	AY881565	–
Elegia mucronata	AY881346	AY881493	AY881420	AY881566	–
Elegia muirii	AY881372	AY881519	AY881446	AY881592	–
Elegia neesii	AY881373	AY881520	AY881447	AY881593	–
Elegia nuda	AY881347	AY881494	AY881421	AY881567	KC514026
Elegia persistens	AY881374	AY881521	AY881448	AY881594	KC514045
Elegia prominens	AY881375	AY881522	AY881449	AY881595	–
Elegia racemosa	AY881376	AY881523	AY881450	AY881596	–
Elegia recta	AY881348	AY881495	AY881422	AY881568	–
Elegia rigida	AY881377	AY881524	AY881451	AY881597	–
Elegia spathacea	AY881378	AY881525	AY881452	AY881598	KC514048
Elegia squamosa	AY881379	AY881526	AY881453	AY881599	–
Elegia stipularis	AY881380	AY881527	AY881454	AY881600	–
Elegia stokoei	AY881381	AY881528	AY881455	AY881601	–
Elegia tectorum	AY881349	AY881496	AY881423	AY881569	KC514027
Elegia thyrsifera	AY881382	AY881529	AY881456	AY881602	–
Elegia thyrsoidea	AY881383	AY881530	AY881457	AY881603	–
Elegia vaginulata	AY881384	AY881531	AY881458	AY881604	–
Elegia verreauxii	AY881385	AY881532	AY881459	AY881605	–
Empodisma minus	–	DQ257513	AF148775	AF148736	–
Eurychorda complanata	–	DQ257514	AF148790	AF148751	–
Guringalia dimorpha	–	–	AF148763	AF148723	–
Harperia confertospicata	–	–	GQ408926	GQ408995	–
Harperia eyreana	–	–	–	GQ408961	–
Harperia lateriflora	–	GQ409020	AF148776	AF148737	–
Hydrophilus rattrayi	–	–	–	AF175141	–

Hypodiscus aristatus	–	–	*	AF175142	–
Hypodiscus montanus	*	*	*	*	–
Hypodiscus squamosus	–	*	*	*	–
Hypodiscus willdenowia	–	–	–	AF175143	–
Hypolaena exsulca	–	–	GQ408927	–	–
Hypolaena pubescens	–	GQ409046	–	GQ408963	–
Hypolaena robusta	–	–	–	GQ408964	–
Kulinia eludens	–	–	AF148778	AF148739	–
Lepidobolus chaetocephalus	–	–	AF148779	AF148740	–
Lepidobolus desertii	–	–	–	GQ408965	–
Lepidobolus preissianus	–	–	–	GQ408966	–
Leptocarpus diffusus	–	–	–	GQ408970	–
Leptocarpus tenax	–	GQ409039	AF148781	AF148742	–
Lepyrodia glauca	–	DQ257521	AF148785	AF148746	–
Lepyrodia heleocharoides	–	DQ257522	GQ408931	GQ409000	–
Lepyrodia muirii	–	–	GQ408932	GQ409002	–
Lepyrodia scariosa	–	GQ409025	GQ408933	GQ409003	–
Loxocarya cinerea	–	GQ409047	–	GQ408996	–
Loxocarya gigas	–	–	AF148786	AF148747	–
Loxocarya striata	–	–	–	GQ408971	–
Mastersiella digitata	–	–	AM235098	AF175147	–
Mastersiella purpurea	*	–	*	*	–
Mastersiella spathulata	*	*	*	*	KC514046
Meeboldina cana	–	GQ409045	AF148783	AF148744	–
Meeboldina coangustata	–	GQ409043	AF148784	AF148745	–
Meeboldina scariosa	–	–	–	GQ408974	–
Melanostachya ustulata	–	GQ409035	AF148788	AF148749	–
Nevillea obtusissima	–	–	*	AF175148	–
Onychosepalum laxiflorum	–	–	–	GQ408975	–
Platycaulos acutus	–	*	*	*	KC514034
Platycaulos anceps	*	*	*	*	–
Platycaulos callistachyus	–	*	–	*	–
Platycaulos cascadensis	*	*	*	*	KC513952
Platycaulos compressus	AY881390	AY881537	AY881464	AY881610	–
Platycaulos depauperatus	–	*	–	*	–
Platycaulos mahonii	–	–	–	–	KC514047
Platycaulos major	AY881391	AY881538	AY881465	AY881611	KC513953
Platycaulos subcompressus	*	*	*	*	–
Platychorda applanata	–	GQ409040	GQ408928	GQ408997	–
Platychorda rivalis	–	–	GQ408929	GQ408998	–
Restio acockii	*	*	*	*	KC514029
Restio adpressus	–	*	*	*	–
Restio albotuberculatus	AY690743	AY640385	AY690743	AY690782	KC514011
Restio alticola	*	*	*	*	–
Restio andreaeanus	*	*	*	*	–
Restio anomalus	*	*	*	*	KC513963

Restio arcuatus	*	*	*	*	KC514015
Restio aridus	*	*	*	*	KC513983
Restio asperus	*	*	*	*	KC514039
Restio aureolus	*	*	*	*	–
Restio bifarius	*	*	*	*	–
Restio bifidus	AY881392	AY881539	AY881466	AY881612	–
Restio bifurcus	*	*	*	*	–
Restio bolusii	*	–	*	*	–
Restio brachiatus	–	–	*	*	KC514014
Restio brunneus	*	–	*	*	–
Restio burchellii	–	–	–	AF175157	–
Restio caespitosus	*	*	*	*	KC513987
Restio calcicola	*	*	*	*	–
Restio capensis	*	*	*	*	KC513972
Restio capillaris	–	*	–	*	–
Restio cincinnatus	*	*	*	AF175144	KC513996
Restio clandestinus	–	*	*	*	–
Restio coactilis	*	*	*	*	KC513966
Restio colliculospermus	*	*	*	*	–
Restio communis	*	*	*	*	–
Restio confusus	*	*	*	*	–
Restio constipatus	*	*	*	*	KC513992
Restio corneolus	*	*	*	*	–
Restio curvibracteatus	*	*	*	*	–
Restio curviramis	*	*	*	*	KC513994
Restio cymosus	–	–	–	*	–
Restio debilis	*	*	*	*	–
Restio decipiens	*	*	*	*	–
Restio degenerans	*	*	*	*	–
Restio dispar	–	*	AM235099	AF175158	–
Restio distans	*	*	*	*	–
Restio distichus	AY881393	AY881540	AY881467	AY881613	–
Restio distractus	–	*	*	*	KC513975
Restio distylis	*	*	*	*	–
Restio dodii	–	–	–	AF175159	–
Restio durus	AY881386	AY881533	AY881460	AY881606	KC514012
Restio duthieae	*	*	*	*	KC513971
Restio echinatus	–	*	–	*	–
Restio egregius	*	*	*	AF175160	–
Restio ejuncidus	*	–	*	*	–
Restio eleocharis	*	*	*	*	KC513970
Restio elsieae	*	*	*	*	KC514001
Restio esterhuyseniae	–	*	*	*	KC513974
Restio femineus	*	*	*	*	KC513997
Restio festuciformis	AY881394	AY881541	AY881468	AY881614	–
Restio filiformis	*	*	*	*	–

Restio fragilis	*	*	*	*	–
Restio fusiformis	*	–	*	*	–
Restio galpinii	*	*	*	*	KC514019
Restio gossypinus	*	*	*	*	KC513973
Restio harveyi	–	*	–	*	–
Restio hyalinus	*	*	*	AF175134	KC513999
Restio hystrix	*	*	*	*	KC513993
Restio implicatus	–	*	–	–	–
Restio impolitus	*	*	*	*	KC514028
Restio inconspicuus	*	*	*	*	–
Restio ingens	*	*	*	*	–
Restio insignis	AY690745	AY640387	AY690745	AY690784	–
Restio inveteratus	*	*	*	*	–
Restio karooicus	AY881388	AY881535	AY881462	AY881608	KC513989
Restio laniger	*	*	*	*	KC513968
Restio leptoclados	*	*	*	*	KC513978
Restio leptostachyus	*	*	*	*	–
Restio levynsiae	–	*	*	–	–
Restio longiaristatus	–	*	*	*	KC514036
Restio macer	*	*	*	*	KC513998
Restio marlothii	*	*	*	*	KC514002
Restio micans	*	–	*	*	–
Restio miser	*	*	*	*	–
Restio mlanjiensis	*	*	*	*	–
Restio monanthos	*	*	*	*	KC513976
Restio monostylis	*	*	*	*	–
Restio muirii	AY881387	AY881534	AY881461	AY881607	–
Restio multiflorus	–	*	*	*	–
Restio nanus	*	*	*	*	KC513995
Restio nodosus	*	*	*	*	–
Restio nubigenus	*	*	*	*	KC513964
Restio nudiflorus	*	*	*	*	KC514023
Restio nuwebergensis	*	*	*	*	KC514016
Restio obscurus	*	*	*	*	–
Restio occultus	*	–	*	*	–
Restio ocreatus	*	*	*	AF175145	–
Restio pachystachyus	*	*	*	*	–
Restio paludicola	–	*	–	–	–
Restio paludosus	*	*	*	*	–
Restio paniculatus	*	*	AM235093	AF175135	–
Restio papillosus	–	*	*	*	KC514000
Restio papyraceus	*	*	*	*	KC514017
Restio parthenocarpos	–	*	*	*	–
Restio parvispiculus	*	*	*	*	KC514006
Restio patens	*	*	*	*	–
Restio peculiaris	*	–	*	*	–

Restio pedicellatus	AY881389	AY881536	AY881463	AY881609	–
Restio perplexus	AY881395	AY881542	AY881469	AY881615	–
Restio perseverans	*	*	*	*	–
Restio pillansii	*	*	*	*	–
Restio praeacutus	*	*	*	*	KC514025
Restio pratensis	–	*	*	*	KC513967
Restio pulcher	*	*	*	*	–
Restio pulvinatus	–	–	–	*	–
Restio pumilus	*	*	*	*	–
Restio purpurascens	–	*	–	*	–
Restio pygmaeus	–	–	–	*	–
Restio quadratus	*	*	*	AF175162	KC514004
Restio quinquefarius	*	*	*	*	–
Restio ramosissimus	–	*	*	*	–
Restio rarus	*	*	*	*	–
Restio rigidus	*	*	*	*	–
Restio rigoratus	*	*	*	*	–
Restio rivulus	–	*	*	*	KC513985
Restio rottboellioides	–	*	*	*	KC514035
Restio rudolfii	*	*	*	*	–
Restio sabulosus	*	*	*	*	KC513980
Restio saroclados	–	*	–	–	–
Restio scaberulus	*	*	*	*	–
Restio schoenoides	*	*	*	*	KC513979
Restio secundus	–	*	*	*	–
Restio sejunctus	–	–	–	*	–
Restio setiger	–	*	–	*	–
Restio sieberi	*	*	*	*	KC513965
Restio similis	AY690746	AY640388	AY690746	AY690820	–
Restio sporadicus	*	*	*	*	KC513982
Restio stokoei	*	*	*	*	–
Restio strictus	*	*	*	*	–
Restio strobilifer	*	*	*	*	–
Restio subtilis	*	*	*	*	–
Restio subverticellatus	*	*	*	*	–
Restio tenuispicatus	*	*	*	*	–
Restio tenuissimus	*	*	*	*	KC513984
Restio tetragonus	*	*	*	*	–
Restio triflora	*	*	*	*	KC513969
Restio triticeus	*	*	*	*	–
Restio tuberculatus	*	*	*	*	–
Restio unispicatus	*	*	*	*	KC513977
Restio venustulus	*	*	*	*	KC513981
Restio verrucosus	*	*	*	*	–
Restio versatilis	*	*	*	*	KC514032
Restio vilis	–	*	–	*	KC513991

Restio vimineus	AY690744	AY640386	AY690744	AY690783	–
Restio virgeus	*	*	*	*	KC513986
Restio wallichii	–	*	*	*	KC513988
Restio wittebergensis	*	*	*	*	KC513990
Restio zuluensis	*	*	*	*	KC514003
Restio zwartbergensis	–	*	–	*	–
Rhodocoma alpina	*	AY640389	*	*	KC514013
Rhodocoma arida	AY690747	AY640390	AY690747	AY690785	KC514021
Rhodocoma capensis	AY690748	AY640391	AY690748	AY690786	–
Rhodocoma foliosa	*	AY640392	*	*	KC514008
Rhodocoma fruticosa	AY690749	AY640393	AY690749	AY690787	KC513955
Rhodocoma gigantea	AY690750	AY640394	AY690750	AY690788	–
Rhodocoma gracilis	AY881396	AY640395	AY881470	AY881616	–
Rhodocoma vleibergensis	AY690751	AY640396	AY690751	AY690789	KC514041
Saropsis fastigiata	–	GQ409051	–	–	–
Soroveta ambigua	–	*	*	*	KC513962
Sporadanthus ferrugineus	–	–	GQ130336	GQ130338	–
Sporadanthus gracilis	–	GQ409027	DQ307450	GQ409013	–
Sporadanthus tasmanicus	–	GQ409028	AF148793	AF148754	–
Sporadanthus traversii	–	–	GQ130337	GQ130339	–
Sporodanthus tasmanicus	–	*	*	*	–
Staberoha aemula	*	*	*	*	KC513956
Staberoha banksii	*	*	*	AF175155	KC514033
Staberoha cernua	AY881397	AY881543	AY881471	AY881617	KC514018
Staberoha distachyos	AY881398	AY881544	AY881472	AY881618	KC513961
Staberoha multispicula	AY881399	AY881545	AY881473	AY881619	KC513960
Staberoha ornata	*	*	*	*	–
Staberoha remota	*	*	*	*	KC513959
Staberoha stokoei	*	*	*	*	–
Staberoha vaginata	*	*	*	*	–
Stenotalis ramosissima	–	–	–	GQ408976	–
Taraxis grossa	–	GQ409038	AF148794	AF148755	–
Thamnochortus acuminatus	AY690752	AY690723	AY690752	AY690790	–
Thamnochortus arenarius	AY690768	AY690732	AY690768	AY690806	KC514022
Thamnochortus bachmannii	AY690769	AY690733	AY690769	AY690807	–
Thamnochortus cinereus	AY690753	AY690724	AY690753	AY690791	–
Thamnochortus dumosus	AY690770	AY690734	AY690770	AY690808	–
Thamnochortus erectus	AY690771	AY640397	AY690771	AY690809	–
Thamnochortus fraternus	AY690754	AY690725	AY690754	AY690792	–
Thamnochortus fruticosus	AY690755	AY640398	AY690755	AY690793	KC514031
Thamnochortus glaber	AY690756	AY690726	AY690756	AY690794	–
Thamnochortus gracilis	AY690757	AY640399	AY690757	AY690795	–
Thamnochortus guthrieae	AY690772	AY690735	AY690772	AY690810	KC514005
Thamnochortus insignis	AY690773	AY690736	AY690773	AY690811	KC513957
Thamnochortus karooica	AY690758	AY640400	AY690758	AY690796	–
Thamnochortus levynsiae	AY690759	AY640401	AY690759	AY690797	KC514042

Thamnochortus lucens	AY690774	AY640402	AY690774	AY690812	–
Thamnochortus muirii	AY690760	AY690727	AY690760	AY690798	KC513954
Thamnochortus nutans	AY690761	AY640403	AY690761	AY690799	–
Thamnochortus obtusus	AY690775	AY640404	AY690775	AY690813	–
Thamnochortus paniculatus	AY690762	AY640405	AY690762	AY690800	–
Thamnochortus papyraceus	AY690763	AY690728	AY690763	AY690801	–
Thamnochortus pellucidus	AY690776	AY690737	AY690776	AY690814	KC514007
Thamnochortus platypteris	AY690777	AY690738	AY690777	AY690815	KC514020
Thamnochortus pluristachyus	AY690764	AY690729	AY690764	AY690802	–
Thamnochortus pulcher	AY690765	AY640406	AY690765	AY690803	KC514009
Thamnochortus punctatus	AY690778	AY690739	AY690778	AY690816	KC514043
Thamnochortus rigidus	AY690766	AY690730	AY690766	AY690804	–
Thamnochortus schlechteri	AY690779	AY690740	AY690779	AY690817	KC514040
Thamnochortus spicigerus	AY690767	AY690731	AY690767	AY690805	KC513958
Thamnochortus sporadicus	AY690780	AY690741	AY690780	AY690818	–
Thamnochortus stokoei	AY690781	AY690742	AY690781	AY690819	–
Tremulina tremula	–	GQ409029	AF148792	AF148753	–
Tyrbastes glaucescens	–	GQ409037	AF148795	AF148756	–
Willdenowia arescens	*	*	*	*	–
Willdenowia glomerata	–	–	–	AF175150	–
Willdenowia incurvata	–	–	AM235103	–	–
Willdenowia rugosa	–	–	–	AF175151	–
Winifredia sola	–	GQ409021	AF148796	AF148758	–

Table S2

Gene-specific models selected under the AICc

Data set	AICc model
atpB	K2P+ Γ
matK	GTR+ Γ
phyB	GTR+I+ Γ
rbcL	K2P+I+ Γ
trnL-F	HKY+ Γ

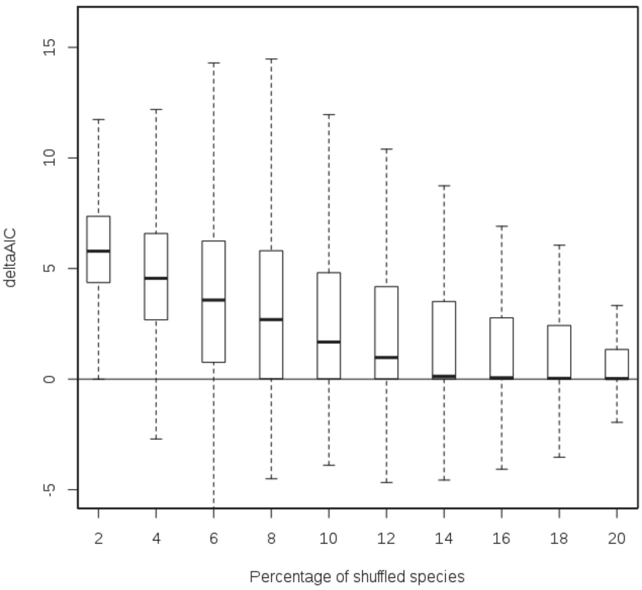

Figure S1.
Sensitivity analysis of the BiSSE analysis done on the South African clade. Difference in AIC values (y–axis) between the model inferred with the real data and replicates done with a certain number (x–axis) of species fire survival strategy randomly switched to the opposite state. Each boxplot represents the results of 1000 replicates.

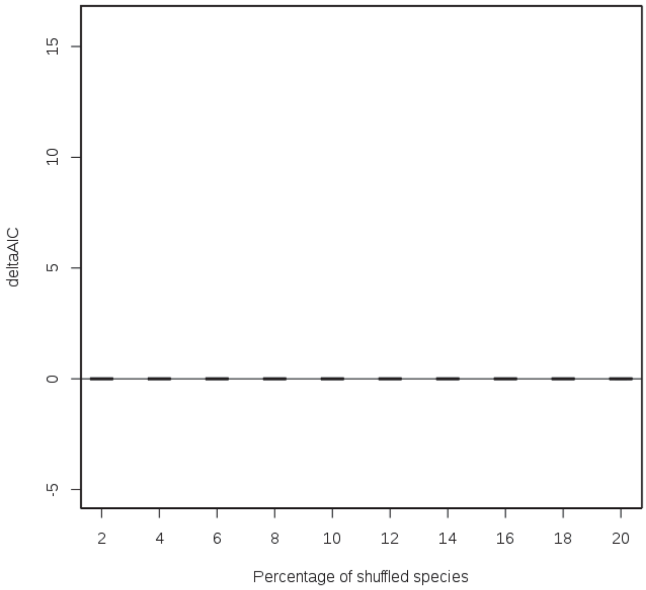

Figure S2.
Sensitivity analysis of the BiSSE analysis done on the Australian clade. Difference in AIC values (y-axis) between the model inferred with the real data and replicates done with a certain number (x-axis) of species fire survival strategy randomly switched to the opposite state. Each boxplot represents the results of 1000 replicates.

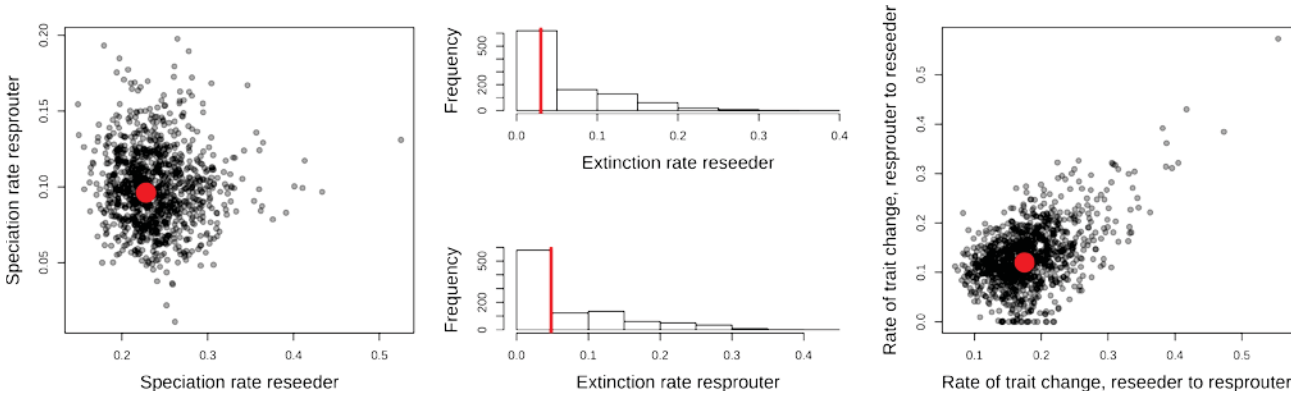

Figure S3.
We performed a simulation test to asses if BiSSE could accurately recover the parameter we infered in our study from simulated data. We simulated in the diversitree R package (FitzJohn, 2012) 1000 phylogenies with the following parameters (speciation reseeder =0.23, speciation resprouter: 0.10; extinction reseeder: 0.03, extinction resprouter: 0.05; rate of character change reseeder to resprouter: 0.17: rate of character change resprouter to reseeder: 0.12) and a final number of species of 200. Those number correspond to the maximum likelihood estimates of parameters for the South African Restionaceae dataset. We then each time estimate the parameters of the simulated dataset. Results of the simulations are given above with true values shown by the red dots or lines. The mode of the estimated parameters is always very close to the true values.

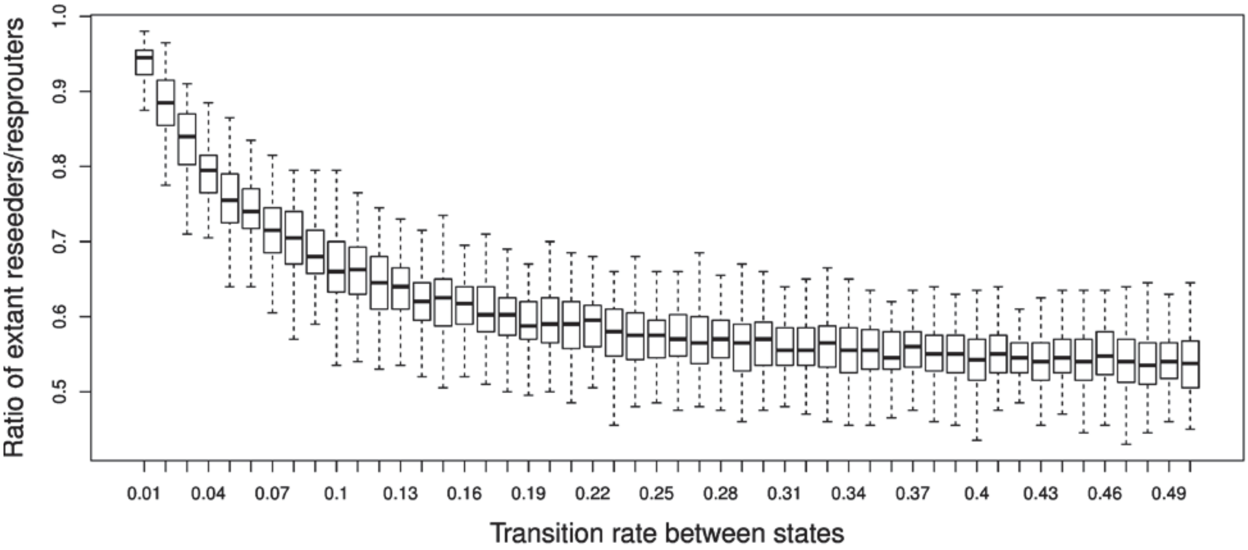

Figure S4

We performed simulation using the diversitree R package to measure the effect of the transition rate on the extant ratio of reseeders/resprouters. We simulated 100 trees using the parameters measured on the empirical data (speciation rate reseeders = 0.23,speciation rate resprouters =0.10, extinction rate reseeders = 0.03, extinction rate resprouters = 0.05; those parameters correspond to the mean of all replicated analyses done on the South African Restionaceae) and varying transition rate between states (from 0.01 to 0.5). The transition rates are always equal between states. We further measured the ratio of extant reseeders/resprouters for each batch of 100 simulated tree. The results show that the ratio of extant reseeders/resprouters stabilise quickly between 0.6 and 0.6. Extremely high transition rates (e.g. close to 0.5) are thus not mandatory to obtain a ratio of reseeders/resprouters that is close to even.

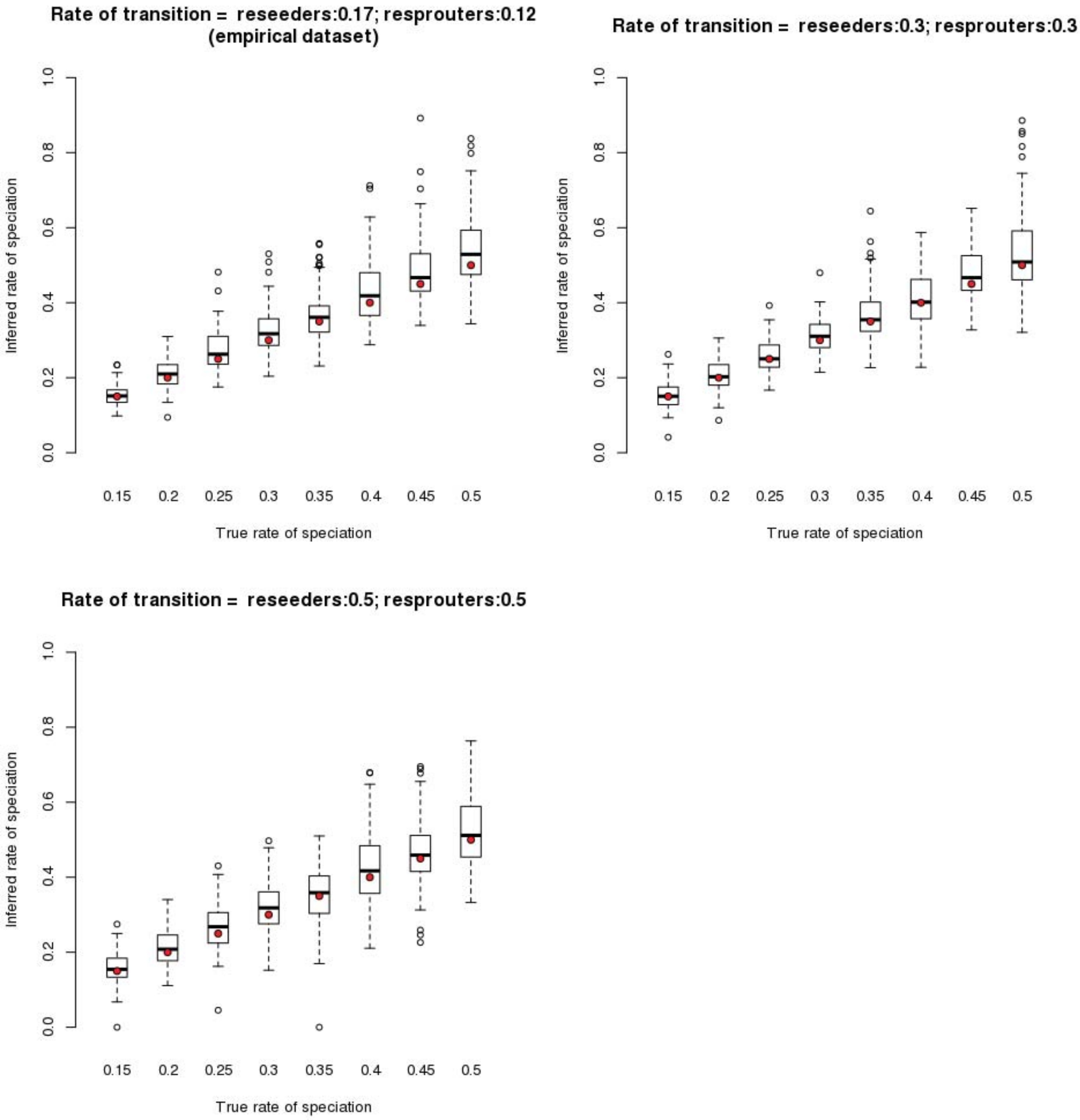

Figure S5
High rates of transition between binary states could create saturation in the dataset leading to wrong estimates of the parameter. To measure the effect of saturation on our dataset, we performed simulation using the diversitree R. We simulated 100 trees using the parameters measured on the empirical data (see the legend of figure S4) and varying the speciation rate (from 0.15 to 0.5). True speciation rate are shown by red dots. We tested three configuration of transition rate. First we used the mean value of the South African empirical dataset. Then we increased the transition rates to 0.3 and finally 0.5. The true value is, consistently across simulations, located in the confidence intervals of the simulations showing that even with high transition rates, BiSSE can accurately infer the speciation rates.