Lamont et al. (2020), Fire as a selective agent for both serotiny and nonserotiny over space and time. *Critical Reviews in Plant Science* 39 (2):140-172, DOI: 10.1080/07352689.2020.1768465

Supplementary Material

Table S1. Genera with serotinous seeds/fruits, including their geographic distribution, morphology of serotinous structures and seeds, number of serotinous species of those examined and total in genus, their habitat and that of any species lacking serotiny, and supporting references. We accept the view of Udovicic and Spencer (2012) on the taxonomy of Melaleuceae. Weak serotiny: at least some seeds held 1–4 y, moderate: 5–9 y, strong: 10+ y. Observations build on those given in Table 1 of Lamont et al. (1991) with new genera indicated by *. NA = not apply.

Family/ subfamily	**Genus**	**Distribution**	**Species serotinous/ examined/total in genus**	**Serotinous structure (all release seeds/fruits in response to fire and, to a lesser extent, the passage of time)**	**Dispersal unit, non-dormant unless indicated**	**Habitat serotinous (all fireprone)**	**Non-serotinous species**	**Habitat non-serotinous (variably fireprone)**	**References**
Cupressaceae ss	*Cupressus* ss	N Hemisphere	4/25 /25	Globular cone, 8–40 mm diameter, often warty with 4 scale complexes, and several seeds per scale	Weakly winged seeds (cones dehiscent)	Dry mountain forests	Yes,	Temperate, boreal forests or alpine uplands (non-fireprone)	Dallimore and Jackson 1966, Crisp et al. 2019
Cupressaceae ss	*Callitris* ss	Oceania, essentially Australia marginally to N Caledonia	13/16/16	Globular cone, 10–30 mm diameter, modertaly serotinous	Weakly winged seeds (cones dehiscent)	Sclerophyll heath to thickets of *Callitris*, small trees	Yes	Grassland savannas, desert	Crisp et al. 2019
Cupressaceae ss	*Actinostrobus*	SW Australia	3/3/3	Pyramidal cone, 15 mm long, with scale complexes and extra bracts, and a few seeds per scale, moderately serotinous	Weakly winged seeds (cones dehiscent)	Sclerophyll heath to thickets of *Acinostrobus* small trees	No	NA	Crisp et al. 2019
Cupressaceae ss	*Widdringtonia*	S Africa	3/4/4	Globular cone, 20–30 mm diameter, moderately serotinous	Weakly winged seeds (cones dehiscent)	fynbos, grasslands	Yes	woodlands, grasslands, fire-protected	Crisp et al. 2019

								microsites	
Cupressaceae ss	*Tetraclinis*	W Mediterranean Basin	1/1/1	Globular cone with 4 scale complexes, weakly serotinous	Weakly winged seeds (cones dehiscent)	Scleophyll shrubland	No	NA	Dallimore and Jackson 1966
Pinaceae	*Pinus*	N Hemisphere	24/115/115?	Conic to ovoid cone, 30–600 mm long, with scores of scale complexes arranged in a spiral pattern decreasing in size towards the tip of the cone, sometimes with sharp appendages attached to the apophyses, weakly to strongly serotinous (the oldest recorded may be partly embedded in supporting branch)	Strongly apically winged seeds (cones dehiscent)	Mediterranean shrublands to forests, temperate to subtropical woodlands and forests	Yes	Temperate, boreal forests or alpine uplands (non-fireprone) to or savanna woodlands (fireprone)	Table 6, He et al. 2012
Pinaceae	*Picea*	N America, N Europe	1/32/32	Pine-like, ovoid to cylindrical cone with spiralling loose scale complexes, weakly serotinous	Winged seeds (cones dehiscent)	Boreal forests	Yes (most)	Temperate, boreal forests	Safford 1974, He et al. 2012
Pinaceae	*Larix*	Temperate-cold zones of N Hemisphere	1/10/11	Cone with loose, petal-like, chartaceous scales varying greatly in size, with many seeds though often sterile, weakly serotinous. *L. gmelinii* is the only species to retain its cones after maturation	Winged seeds (cones dehiscent)	Temperate uplands to northern boreal lowlands	Yes (most)	Temperate, boreal forests or savanna woodlands	Table 3, He et al. 2012
Taxodiaceae ss	*Sequoiadendron*	California	1/1/1	Small, pine-like cone with thick apophyses, strongly serotinous (up to 20 years)	Lateral winged seeds (cones dehiscent)	Tall redwood forest in mountains	No	NA	https://en.wikipedia.org/wiki/Sequoiadendron_giganteum (6 Jan 2020)
Proteaceae/Grevilleoideae	*Banksia ss*	Australia, marginally to Papua New Guinea	76/86/86	Scattered, woody, rounded follicles, bearing two winged seeds and central winged plate, surrounded by mantle of fibrous bracts/bracteoles/(and sometimes persistent florets) attached to rachis to form a ‘cone’ (Fig. 1), weakly to strongly serotinous	Apically winged seeds (dehiscent fruits)	Sclerophyll low heath to forest	Yes (rare, nonstored)	Wetland, rock outcrop, savanna	George 1981, He et al. 2011
Proteaceae/Grevilleoideae	*Banksia* series *Dryandra*	SW Australia	48/50/94	Capitulum of thin, woody follicles, bearing two seeds and central winged plate, involucral bracts at base (and sometimes terminal foliage) wrap around fruits and are burnt off by fire, florets and bracts often deciduous, persistent style rarely modified into spine (*B. mimica*), weakly to strongly serotinous	Apically winged seeds (dehiscent fruits)	Sclerophyll low heath to forest	Yes (rare, nonstored)	Sclerophyll forest	B. Lamont, pers. observ.
Proteaceae/Grevilleoideae	*Hakea*	Australia	92/102/172	Solitary, or sometimes loosely clustered, extremely woody, axillary follicles bearing two winged seeds,	Apically, rarely annular, winged	Sclerophyll low heath to	Yes (rare, nonstored)	Wetland, rock outcrop, saline	Lamont et al. 2016a,b, 2017b, P.K. Groom,

				classifiable into three groups: cryptic fruits < 1 g within spiny foliage, tend to mimic leaves/stems, remain green and be weakly serotinous, and exposed fruits > 5 g on stout stems that resist bird granivory, turn grey/brown and be strongly serotinous, or are intermediate between these two extremes (Fig. 1)	seeds (dehiscent fruits)	forest		soils, savanna grasslands, sparsely vegetated desert sands	pers. comm.
Proteaceae/Grevilleoideae	*Strangea*	SW, E Australia	3/3/3	Solitary semiwoody follicle supporting one winged seed, weakly serotinous	Annular or bi-apically winged seeds (dehiscent fruits)	Sclerophyll wet/dry heath to open forest	No	NA	Hnatiuk 1995a
Proteaceae/Grevilleoideae	*Lambertia*	SW, E Australia	10/10/10	Solitary, woody, thin follicle supporting two flat seeds fitting into similar categories as for *Hakea* except all fruits < 1 g and tend to be cryptic, most are highly ornamented (Fig. 1), weakly serotinous	Narrowly winged or wingless flat seeds (dehiscent fruits)	Sclerophyll heath (mainly), mallee to forest	No	NA	Hnatiuk 1995b
Proteaceae/Grevilleoideae	*Xylomelum*	E, SW Australia	6/6/6	Solitary, extremely woody, pear-shaped follicle, 60–90 mm long, with velvety surface, bearing two winged seeds (Fig. 1), strongly serotinous	Apically winged seeds (dehiscent fruits)	Scrub-heath to dry sclerophyll forest	No	NA	Foreman 1995a
Proteaceae/Grevilleoideae	*Telopea**	SE Australia	1/5/5	Scattered, elongated, leathery follicles, 1–8, containing up to 20 winged seeds, some of which may persist in open follicles into the second year	Apically winged seeds (dehiscent fruits)	Sclerophyll forest	Yes (all)	Heath to temperate rainforest	Crisp and Weston 1995, pers. observ.
Proteaceae/Proteoideae	*Protea*	Africa, tropica l to temperate	77/112/112	Capitulum of spindle-shaped achenes with persistent florets supported by tightly or loosely wrapped involucre of bracts (Fig. 1), weakly to moderately serotinous	Hairy-based achenes with persistent style sometimes burnt off (indehiscent fruits)	Sclerophyll low heath to tall shrubland	Yes (derived, widespread lineage, nonstored)	Savanna, (sub)tropical grassland	Lamont et al. 2013
Proteaceae/Proteoideae	*Aulax*	S Africa	3/3/3	Semiwoody cupule with reduced racemes (variously empty, leaf-like bracteoles on rachises of vestigial cones) around a short central rachis (cone) supporting four or more achenes subtended by bracteoles	Hairy-based achenes with persistent style (indehiscent fruits)	Sclerophyll heath	No	NA	Rourke 1998, Lamont and He 2012
Proteaceae/Proteoi	*Leucadendron*	S Africa	44/81/82	Solitary terminal cone of tightly packed scales	Achenes either	Sclerophyll	Yes	Sclerophyll low	Williams 1972,

deae				(bracteoles) many subtending achenes, usually surrounded by a loose involucre of conspicuous, colorful bracts, weakly to moderately serotinous	variously winged or wingless nutlets rarely retaining the parachute-like perianth (indehiscent)	low heath to tall shrubland with emergent trees (*L. argenteum*)	(common, soil-stored nutlets)	heath to tall shrubland	Tonnabel et al. 2017,
Proteaceae/Proteoideae	*Petrophile*	Australia, mostly SWA	53/53/53	Solitary, rarely clustered, terminal or axillary cones of woody scales (bracteoles) each supporting compressed nuts with conspicuous tufts of hairs or wings (or sterile) wrapped loosely around a rachis, sometimes with involucral bracts at base (Fig. 1), weakly to moderately serotinous	Hairy or winged nuts (indehiscent fruits)	Sclerophyll low heath to forest	No	NA	Foreman 1995b
Proteaceae/Proteoideae	*Isopogon*	Australia, mostly SWA	35/35/35	Solitary, rarely clustered, terminal cones (drumsticks) of multiple spiralling woody scales (bracteoles) each supporting nuts with conspicuous tufts of hairs (or sterile) wrapped tightly around a rachis (Fig. 1), weakly to moderately serotinous	Hairy nuts (indehiscent fruits)	Sclerophyll low heath, wet/dry scrub-heath to mallee to forest	No	NA	Foreman 1995c, Pausas and Lamont 2018
Proteaceae/Proteoideae	*Conospermum* *	Australia, mostly SWA	2/53/53	Compound infructescence with swollen, moist branched peduncle whose tips engulf ovoid fruits in groups of three, moderately serotinous	Fruits with ring of hairs (indehiscent fruits)	Sclerophyll low heath to forest	Yes (most, geosporous)	Sclerophyll low heath to forest	Zhao and Ladd 2015
Casuarinaceae	*Allocasuarina*	Australia, half SWA	26/27/49 (E Australian spp not examined)	Solitary, woody, globular/cylindrical cones on short axillary peduncles, loosely clustered along branches, each bearing tightly clustered pairs of multiple spiralling valves (bracteoles, sometimes with sharp apices or appendages), subtended by an inconspicuous bract, almost all supporting single samaras, weakly to strongly serotinous (Fig. 1)	Samaras with hyaline, apical wings with midribs (indehiscent fruits)	Sclerophyll low heath to forest, sometimes forming thickets	No	NA	Grieve 1988, Wilson and Johnson 1989, Paczkowska and Chapman 2000
Lyginiaceae (Restionaceae)	*Lyginia**	SW Australia	3/3/3	Terminal, compressed globose, woody, trilocular capsule with persistent style, surrounded by chartaceous bracts, laterally dehiscent with one seed per chamber, weakly serotinous	Wingless rounded seed with spinules and medial flange (dehiscent fruits)	Sclerophyll low heath to Banksia woodland	No	NA	Meney and Pate 1999a, Briggs and Johnson 2000
Anarthriaceae (Restionaceae)	*Anarthria**	SW Australia	7/7/7	Terminal or subterminal, globose, woody, trilocular capsule with persistent styles, surrounded by	Wingless rounded seed, < 1 mm	Wet/dry heath to	No	NA	Meney and Pate 1999b, Briggs and Johnson

				persistent chartaceous perianth, laterally dehiscent with one seed per chamber, weakly serotinous	diameter (dehiscent)	sclerophyll woodland			2000
Restionaceae	*Askidosperma* *	S Africa	1/1/	weakly serotinous	Nut, germination benefits from smoke	Sclerophyll low heath to scrub-heath	?		Brown, Jamieson and Botha 1994
Restionaceae	*Cannomois**	S Africa	2/2/12	Short spike with six of so chitinous bracteoles subtended by inconspicuous bracts enclosing a single nut, weakly serotinous (Fig. 1)	Hard nut with aril (eliaosome), germination may benefit from smoke	Sclerophyll low heath to scrub-heath	?		Brown, Jamieson and Botha 1994
Restionaceae	*Hypodiscus**	S Africa	2/2	weakly serotinous	Nut, germination requirements unknown	Sclerophyll low heath to scrub-heath	?		Brown, Jamieson and Botha 1994
Restionaceae	*Willdenowia**	S Africa	1/1	weakly serotinous	Nut, germination requirements unknown	Sclerophyll low heath to scrub-heath	?		Brown, Jamieson and Botha 1994
Myrtaceae/ Leptospermoideae	*Eucalyptus* ss	Australia, marginally to New Guinea and SE Asia	399/403/~671 (SWA, Yalgoo, Coolgardie + few N-Central spp examined)	Solitary (large) to umbels with 3 to many (semi)woody globose, cup- to urn-shaped capsules, sessile (globular cluster) or pedicellate, with inserted or exserted valves and often ribbed, warty or other ornamentations on the hypanthial cup, with each of 3–8 chambers bearing 1 or more fertile seeds and many aborted seeds (Fig. 1), weakly to moderately serotinous	Angular to ellipsoid winged seeds (dehiscent fruits)	Sclerophyll heath to mallee to tall closed forest	Yes, poorly known (nonstored)	Grassy savannas, isolated on bare uplands – single trunk with remote crown	Grieve 1980a (excluding *Corymbia*, including hybrids), Paczkowska and Chapman 2000, Euclid 2006
Myrtaceae /Leptospermoidea e	*Corymbia* (*Eucalyptus* sl)*	Australia	7/14/~113 (SWA, Yalgoo, Coolgardie + few N-Central spp examined)	Clusters of urn-shaped, woody capsules with valves inserted below a distinct rim, with pedicels of varying lengths to form a flat-faced corymb, weakly to moderately serotinous	Flat, wingless, angular seeds (dehiscent fruits)	Sclerophyll woodland to tall forest	Yes, poorly recorded,common in N-Central Australia, Fig. 1 (nonstored)	Grassy savannas, isolated on bare uplands – single trunk with remote crown	Grieve 1980a (*Corymbia* sunk in *Eucalyptus*), Paczkowska and Chapman 2000, Euclid 2006
Myrtaceae/ Leptospermoideae	*Angophora (Eucalyptus* sl*)**	E Australia	3/6/16	(Compound) umbels of wineglass-shaped, semiwoody capsules with persistent sepals, ribbed hypanthium and sometimes hispid indumentum,	Flat, to ellipsoid winged seeds (dehiscent fruits)	mallee to sclerophyll forest	Yes, poorly recorded but appears	Sclerophyll woodland to forest	Chippendale, 1988, Euclid 2006

				weakly serotinous			common (nonstored)		
Myrtaceae/ Leptospermoideae	*Melaleuca* ss (excluding all other Melaleuceae listed here)	Australia, marginally to Lord Howe Isl, New Caledonia and Asia, as far W as Myanmar	177/177/~251 (only SWA spp + Yalgoo, Coolgardie regions examined)	Loose, cylindrical to tight, globular clusters of a few to scores of woody, cup- to urn-shaped capsules ~5 mm long, at first axillary, terminal or subterminal (rarely cauliflorous) then located at intervals along the bare supporting branches, hypanthium smooth rarely ribbed, valves inserted, 3-5 chambers with many seeds (Fig. 1), weakly to strongly serotinous	Tiny, elongated, angular seeds (dehiscent fruits) (Fig. 1)	Sclerophyll wet/dry heath to forest, often dominant small trees fringing water bodies	? (poorly recorded but must be common in N Australia, nonstored)	? Grassy savannas in N Australia	Grieve 1980b, Paczkowska and Chapman 2000
Myrtaceae/ Leptospermoideae	*Agonis*, includes *Taxandria* and *Paragonis*	SW Australia	12/12/16	Axillary, semiglobular clusters of < 10 woody capsules, < 10 mm long, with deciduous bracteoles and 2–5 chambers with inserted valves, weakly serotinous	Wingless, angular seeds (dehiscent fruits)	Fringing swamp vegetation, scrub-heath to forest	No	NA	Grieve 1980c, Paczkowska and Chapman 2000; Wheeler and Marchant 2007
Myrtaceae/ Leptospermoideae	*Beaufortia*	SW Australia	20/20/20	Tight, globular clusters of < 20 woody, cup-shaped capsules ~5 mm long, initially terminal or subterminal then located along the supporting woody branches, weakly to moderately serotinous	Wingless, angular seeds (dehiscent fruits)	Wet/dry low heath to scrub-heath	No	NA	Grieve 1980d, Paczkowska and Chapman 2000
Myrtaceae/ Leptospermoideae	*Callistemon*	Australia, mainly E temperate, marginally to N Caledonia	50/51/51	Tight, cylindrical clusters of woody, cup-shaped capsules ~5 mm long, initially subterminal then located at intervals along the bare supporting branches (Fig. 1), moderately to strongly serotinous	Tiny, elongated, angular seeds (dehiscent fruits) (Fig. 1)	Fringing swamp vegetation, scrub-heath to forest	Possibly *C. nervosus*	Lignotuberous mallee-like in grassland savanna with interfire recruits evident	Grieve 1980e, https://en.wikipedia.org/wiki/Callistemon (4 Jan 2020)
Myrtaceae/ Leptospermoideae	*Kunzea*	Mainly SW Australia, marginally NZ	22/24/25	Subterminal, or terminal on short axillary branchlets, globular clusters of <10, semiwoody capsules, with thin deciduous bracts and bracteoles, sepals sometimes persistent, 2–5 chambers with numerous small seeds, weakly or nonserotinous	Tiny, wingless angular seeds (dehiscent fruits)	Fringing wetland vegetation to rock outcrops, scrub-heath	Yes	Non-fireprone vegetation in NZ	Burrell 1965, Grieve 1980f, Paczkowska and Chapman 2000
Myrtaceae/ Leptospermoideae	*Calothamnus*	SW Australia	45/45/45	Globose to cup-shaped capsules crowded in loose clusters on one side of branch at intervals, sometimes partly embedded in branches, with	Wingless, rounded seeds (dehiscent fruits)	Sclerophyll low heath to open forest	No	NA	Grieve 1980g, Paczkowska and Chapman 2000

				inserted valves, inflexed woody sepals, smooth or warty hypanthium, 3–5 chambers with numerous small seeds, moderately serotinous					
Myrtaceae/ Leptospermoideae	*Leptospermum*	Australia, marginally to SE Asia, New Zealand	18/18/86 (only SWA ad NZ spp examined)	Solitary, semiwoody to woody, cup-shaped capsules, < 10 mm long, with 3–10 chambers with inserted valves and bearing numerous small seeds, *L. spinescens* corky (Fig. 1), weakly to moderately serotinous	Tiny, elongated, wingless, angular seeds (dehiscent fruits)	swamp vegetation sometimes forming thickets, scrub-heath to forest	Yes (nonserotinous spp and populations are known)	Alpine and other non-fireprone vegetation	Grieve 1980h, Paczkowska and Chapman 2000, Battersby et al. 2017
Myrtaceae/ Leptospermoideae	*Conothamnus*	SW Australia	3/3/3	Globular clusters of globose capsules < 5 mm long on bare branches, with remnants of involucral bracts in *C. trinervis*, weakly serotinous	Tiny, wingless, angular seeds (dehiscent fruits)	Wet/dry low heath to scrub-heath	No	NA	Grieve 1980i, Paczkowska and Chapman 2000
Myrtaceae/ Leptospermoideae	*Eremaea*	SW Australia	19/19/19	Solitary, woody, globose to cup-shaped capsules, < 10 mm long, sessile on old stems, sepals rarely retained, with 3–10 chambers with inserted or humped valves, and bearing numerous small seeds, weakly to moderately serotinous	Tiny, wingless, angular seeds (dehiscent fruits)	Sclerophyllous low heath to woodland	No	NA	Grieve 1980j, Paczkowska and Chapman 2000
Myrtaceae/ Leptospermoideae	*Phymatocarpus*	SW Australia	2/2/2	Globular to cylindrical clusters of < 15, globose capsules on bare branches with inserted valves, weakly to moderately serotinous	Tiny, wingless, angular seeds (dehiscent fruits)	Wet/dry heath	No	NA	Grieve 1980k, Paczkowska and Chapman 2000
Myrtaceae/ Leptospermoideae	*Regelia*	SW Australia	5/5/5	Globular clusters of 3–20, globose to cup-shaped capsules with inserted valves to three chambers with many seeds, weakly to moderately serotinous	Tiny, wingless, angular seeds (dehiscent fruits)	Scrub-heath	No	NA	Grieve 1980L, Paczkowska and Chapman 2000
Myrtaceae/ Leptospermoideae	*Lamarchea**	SW Australia	2/2/2	Solitary, axillary, globular, woody capsule with inserted valves to two chambers with numerous seeds, weakly to moderately serotinous	Wingless, angular seeds (dehiscent fruits)	Emergent in sclerophyll scrub-heath	No	NA	Grieve 1980m, Paczkowska and Chapman 2000
Myrtaceae/ Leptospermoideae	*Tristania* (different sp assessed in Lamont et al. 1991)	E Australia	0/1/1	(Umbels of leathery capsules similar in form to *Angophora*)	Wingless, angular, linear seeds (dehiscent fruits)	NA	Yes	Edge of waterways in sclerophyll forest	http://www.flickr.com/photos/tony_rodd/549359766
Myrtaceae/ Leptospermoideae	*Lophostemon**	E Australia,	1/4/4	(Compound) umbels of wineglass-shaped, semiwoody capsules with deciduous sepals, weakly	Wingless, angular, linear seeds	Sclerophyll woodland to	Yes	Rainforest margins to	Wilson and Waterhouse 1982

		marginally to New Guinea		serotinous	(dehiscent fruits)	tall forest		sclerophyll forest	
Myrtaceae/ Leptospermoideae	*Xanthostemon*	N Australia to Malesia, mostly New Caledonia	0/24/51	(Cymes of semiwoody, globose capsules with persistent calyx)	Flat to angular, orbicular seeds (dehiscent fruits)	Savanna woodland	Yes (almost all)	Rainforest and creek margins to sclerophyll forest	Wilson 1990, B. Lamont, pers. observ. in New Caledonia
Myrtaceae/ Leptospermoideae	*Syncarpia**	E Australia	2/2/3	Globular woody capsules fused at base to form compound fruit with persistent calyx and inserted valves with many seeds, weakly serotinous	Linear, angular seeds (dehiscent fruits)	Sclerophyll forest	?	Non-fireprone forest?	Bean 1995
Myrtaceae/ Leptospermoideae	*Tristaniopsis*	Australia, mostly SE Asia, New Caledonia	0/2/30	No serotinous species located	NA	NA	Yes (all?)	Edge of waterways in sclerophyll forest to rainforest	Wilson and Waterhouse 1982
Asteraceae	*Syncarpha ss** (*Helipterum*)	Cape, S Africa	2/15/21	Capitulum of many cypselas with pappuses held in place by papery involucral bracts wrapped around them, reflexing on death of plant, usually from fire, weakly serotinous	Cypsela fruits with a pappus of bristles varying from smooth to plumose and fused basally into a ring	Sclerophyll heath	yes	Sclerophyll heath	Bond 1985, Bergh, Haiden and Verboom 2015
Asteraceae	*Phaenocoma*	Cape, S Africa	1/1/1	Capitulum of many cypselas with pappuses held in place by papery involucral bracts wrapped around them, reflexing on death of plant, usually from fire, weakly serotinous	Cypsela fruits with a pappus	Sclerophyll low heath	No	NA	Bond 1985
Bruniacaeae	*Berzelia*	Cape, S Africa	13/13/16	Subglobular, few-fruited raceme of dry nutlets with red, fleshy sepals in some species to form a compound structure of berry-like fruits that gradually dry out to release nutlets	Single-seeded dry nutlets (indehiscent)	Sclerophyll low heath to scrub-heath	No?	?	Lamont et al. 1991, Claßen-Bockhoff 2016
Bruniacaeae	*Brunia*	Cape, S Africa	12/12/37	Globular, many-fruited raceme of dry nutlets (indehiscent) or woody capsules (dehiscent)	Wingless seeds or single-seeded nutlets	Sclerophyll low heath to scrub-heath	?	?	Lamont et al. 1991, Claßen-Bockhoff 2016
Bruniacaeae	*Audouinia*	Cape, S	1/5?/5	Subglobular, few-fruited raceme of sclerified	Wingless seeds	Sclerophyll	Yes	Sclerophyll low	Claßen-Bockhoff 2016

		Africa		capsules that dehisce laterally to release seeds after fire	(dehiscent)	low heath to scrub-heath		heath to scrub-heath	
Bruniacaeae	*Staavia*	Cape, S Africa	3/3/11	Solitary, smooth, semiglobose, woody capsules (dehiscent)	Wingless seeds, arillate	Sclerophyll low heath to scrub-heath	?	Sclerophyll low heath to scrub-heath	Claßen-Bockhoff 2016, B. Lamont observations from web images
Bruniacaeae	*Thamnia*	Cape, S Africa	1/1/9	Solitary, smooth, semiglobose, woody capsules (dehiscent)	Wingless seeds	Sclerophyll low heath to scrub-heath	?	Sclerophyll low heath to scrub-heath	Claßen-Bockhoff 2016, B. Lamont observations from web images
Ericaceae	*Erica*	Africa and Europe	1/859?/860	*E. sessiliflora*: subglobular, many-fruited spike of dry nutlets with red, fleshy sepals to form a compound structure of berry-like fruits at intervals along stem	Single-seeded dry nutlets (indehiscent)	Sclerophyll low heath to scrub-heath	Yes	Sclerophyll low heath to forest in Europe	Oliver and Oliver 2002

References cited (if not given here then listed in main text)

Battersby, P.F., Wilmshurst, J.M., Curran, T.J., McGlone, M.S. and Perry, G.L., 2017. Exploring fire adaptation in a land with little fire: serotiny in Leptospermum scoparium (Myrtaceae). Journal of Biogeography, 44(6), 1306-1318.

Bean, A.R. (1995). A revision of Syncarpia Ten. (Myrtaceae). Austrobaileya 4:337-344.

Bergh, N.G., Haiden, S.A. and Verboom, G.A., 2015. Molecular phylogeny of the 'Cape snow'genus Syncarpha (Asteraceae: Gnaphalieae) reveals a need for generic re-delimitation. South African Journal of Botany, 100, 219-227.

Bond, W.J. (1985). Canopy-stored seed reserves (serotiny) in Cape Proteaceae. South African Journal of Botany 651, 181-186.

Briggs, B. G. & Johnson, L. A. S. (2000). Hopkinsiaceae and Lyginiaceae, two new families of Poales in Western Australia, with revisions of Hopkinsia and Lyginia. Telopea 8, 477–502.

Brown, N. A. C., Jamieson, H. & Botha, P. A. (1994). Stimulation of seed germination in South African species of Restionaceae by plant-derived smoke. Plant Growth Regulation 15, 93–100.

Burrell, J. 1965: Ecology of Leptospermum in Otago. New Zealand Journal of Botany 3: 3-16.

Claßen-Bockhoff R. (2016) Bruniaceae. In: Kadereit J., Bittrich V. (eds) Flowering Plants. Eudicots. The Families and Genera of Vascular Plants, vol 14. Springer, Cham. pp. 108-115.

Crisp, M.D., Cook, L.G., Bowman, D.M., Cosgrove, M., Isagi, Y. and Sakaguchi, S., 2019. Turnover of southern cypresses in the post‐Gondwanan world: extinction, transoceanic dispersal, adaptation and rediversification. New Phytologist, 221(4), 2308-2319.

Dallimore, W. and Jackson, A.B. (1966). A Handbook of the Coniferae and Ginkgoaceae. 4th Ed., revised by S.G. Harrison. St Martin's Press, New York.
dos Santos, P., Matias, H., Deus, E., Águas, A., & Silva, J. S. (2015). Fire effects on capsules and encapsulated seeds from Eucalyptus globulus in Portugal. *Plant ecology*, *216*(12), 1611-1621.
Euclid – Eucalypts of Australia. 2006. CSIRO, Canberra (online , 5 Jan 2020)
Foreman, D.B. (1995a) 32. XYLOMELUM. Flora of Australia 16, 399-403.
Foreman, D.B. (1995b) 10. PETROPHILE. Flora of Australia 16, 149-193.
Foreman, D.B. (1995c) 11. ISOPOGON. Flora of Australia 16, 194-223.
George, A.S. (1981). The genus Banksia L.f. (Proteaceae). 3, 239-473.
Grieve, B.J. (1980a). How to Know Western Australian Wildflowers. Part 111A. Myrtaceae. Eucalyptus. University of WA Press. pp. 155-225.
Grieve, B.J. (1980b). How to Know Western Australian Wildflowers. Part 111A. Myrtaceae. Melaleuca. University of WA Press. pp. 103-134.
Grieve, B.J. (1980c). How to Know Western Australian Wildflowers. Part 111A. Myrtaceae. Agonis. University of WA Press. pp. 92-94.
Grieve, B.J. (1980d). How to Know Western Australian Wildflowers. Part 111A. Myrtaceae. Beaufortia. University of WA Press. pp. 135-141.
Grieve, B.J. (1980e). How to Know Western Australian Wildflowers. Part 111A. Myrtaceae. Callistemon. University of WA Press. pp. 101-102.
Grieve, B.J. (1980f). How to Know Western Australian Wildflowers. Part 111A. Myrtaceae. Kunzea. University of WA Press. pp. 97-101.
Grieve, B.J. (1980g). How to Know Western Australian Wildflowers. Part 111A. Myrtaceae. Calothamnus. University of WA Press. pp. 146-155.
Grieve, B.J. (1980h). How to Know Western Australian Wildflowers. Part 111A. Myrtaceae. Leptospermum. University of WA Press. pp. 94-97.
Grieve, B.J. (1980i). How to Know Western Australian Wildflowers. Part 111A. Myrtaceae. Conothamnus University of WA Press. pp. 134-135.
Grieve, B.J. (1980j). How to Know Western Australian Wildflowers. Part 111A. Myrtaceae. Eremaea. University of WA Press. pp. 143-145.
Grieve, B.J. (1980k). How to Know Western Australian Wildflowers. Part 111A. Myrtaceae. Phymatocarpus. University of WA Press. p. 141.
Grieve, B.J. (1980L). How to Know Western Australian Wildflowers. Part 111A. Myrtaceae. Regelia. University of WA Press. pp. 141-143.
Grieve, B.J. (1980m). How to Know Western Australian Wildflowers. Part 111A. Myrtaceae. Lamarchea. University of WA Press. p. 102.
Grieve, B.J. (1988). How to Know Western Australian Wildflowers. Part 1. Dicotyledons. Casuarinaceae. University of WA Press. pp. 47-55.
Hnatiuk, R.J. (1995a) 23. STRANGEA. Flora of Australia 16, 360-363.
Hnatiuk, R.J. (1995b) 40. LAMBERTIA. Flora of Australia 16, 425-436.
Lamont, B.B., Le Maitre, D. Cowling, R.M. and Enright, N.J. 1991. Canopy seed storage in woody plants. Botanical Review 57, 277-317.
Meney, K.A. and Pate, J.S. (1999a). Australian Rushes. Lyginia. University of WA Press. pp. 400-405.
Meney, K.A. and Pate, J.S. (1999b). Australian Rushes. Anarthria. University of WA Press. pp. 172-185.
Oliver, E. and Oliver, I. (2002). The genus Erica (Ericaceae) in southern Africa: taxonomic notes 1. Bothalia, 32(1), 37-61.

Paczkowska, G. and Chapman, A.R. (2000). The Western Australian Flora – a descriptive catalogue. Wildflower Society of Western Australia, Nedlands.

Rourke, J.P. (1998) A review of the systematics and phylogeny of the African Proteaceae. Australian Journal of Botany 11, 267-285.

Tierney, D. A., & Wardle, G. M. (2005). Differential seed ecology in the shrubs Kunzea rupestris, K. capitata and associated hybrids (Myrtaceae): the function of thin-walled fruit in a fire-prone vegetation. *Australian Journal of Botany*, *53*(4), 313-321.

Tonnabel, J., Schurr, F.M., Boucher, F., Thuiller, W., Renaud, J., Douzery, E.J. and Ronce, O., 2018. Life-history traits evolved jointly with climatic niche and disturbance regime in the genus Leucadendron (Proteaceae). The American Naturalist, 191(2), 220-234.

Safford (1974) cited in Lamont et al. (1991)

Udovicic, Frank and Spencer, Roger David (2012). New combinations in *Callistemon* (Myrtaceae). Muelleria. 30 (1): 23–25.

Wheeler, J.R. and Marchant, N.G. (2007). A revision of the Western Australian genus *Agonis* (Myrtaceae) and two new segregate genera *Taxandria* and *Paragonis*. *Nuytsia* 16, 393-433.

Williams, I.J. 1972. A revision of the genus *Leucadendron* (Proteaceae). Contributions of the Bolus Herbarium. Vol. 3.

Wilson, K.L. and L.A.S.Johnson (1989) Casuarinaceae. In A.S. George (ed.) Flora of Australia 3, 100-174.

Wilson, P.G. (1990). A revision of the genus Xanthostemon (Myrtaceae) in Australia. Telopea 3:451-476.

Wilson, P.G. and Waterhouse, J.T. (1982). A review of the genus Tristania R.Br. (Myrtaceae): a heterogeneous assemblage of five genera. Australian Journal of Botany 30:413-446.

Zhao, X. and Ladd, P.G., 2015. Seed germination and unusual serotiny in two species of Conospermum from fire-prone vegetation in Western Australia. Australian journal of botany, 62(6), 511-517.

Table S2. Typical values used and results obtained in a model to show the effect of serotiny on number of seeds stored per plant and gene support for serotiny available postfire over 10 y since reaching maturity. Note the progressive build up of the gene support and seeds stored with increasing retention of seeds with time. Thus, if some seeds were held for 6 y, the total gene support would be 232 units (50 for the current crop) and seed store 413 (100 for current crop) with a mean gene support for serotiny (S_6) of 0.561 per seed (0.500 initial crop).

Year	Seeds produced	Fraction of seeds retained	Viability of seeds retained	Progressive total gene support G ($S_1 = 0.5$)	Progressive seed store H	Mean gene support per seed S_x (G/H)
1 (current)	100	1.00	1.00	50	100	0.500
2	95	0.95	0.95	95	186	0.512
3	90	0.90	0.90	136	259	0.524
4	85	0.85	0.85	172	320	0.537
5	80	0.80	0.80	204	371	0.549
6	75	0.75	0.75	232	413	0.561
7	70	0.70	0.70	256	448	0.573
8	65	0.65	0.65	278	475	0.584
9	60	0.60	0.60	296	497	0.595
10	55	0.55	0.55	311	513	0.605

Table S3. Number of new lineages/species per 5-million-year intervals that are either serotinous (S) or nonserotinous (N) for *Pinus* (Pinaceae – Northern Hemisphere), Callitroideae (Cupressaceae – Southern Hemisphere), *Protea* (Proteaceae – Africa) and *Hakea* (Proteaceae – Australia) based on Bayesian ancestral trait reconstruction techniques (Lamont, He and Yan 2019a). 0 to the left of all other variables means lineages with that trait yet to evolve in that interval while 0 among other values means there was no trait proliferation in that interval. – means the clade did not exist at that time. S means rate of proliferation of S > N, N means rate of proliferation of N > S, = mean rates are the same. Values within the table in bold are the highest rate recorded for that trait and clade. When a 10-My interval from a previous analysis was converted to a 5-My interval with the margins at X and (X + 1) this was given as the mean, (X + 0.5).

		Million years ago at 5-million-y intervals												
Clade	**Trait**	**60-55**	**55-50**	**50-45**	**45-40**	**40-35**	**35-30**	**30-25**	**25-20**	**20-15**	**15-10**	**10-5**	**5-0**	**Source**
Pinus	Serotinous	0	1	3	3	3	3	4	7	10	16	20	**24**	Fig. 11
	Nonserotinous	1	3	6	6	9	13	17	22	33	43	66	**91**	Fig. 11
		N	N	N	N	N	N	N	N	N	N	N	N	
Callitr	Serotinous	0.5	1	1.5	2	1	0	4	**6**	4	3	4	5	Fig. 14
oideae	Nonserotinous	0	0	1	2	1.5	1	0.5	0	1.5	2	5	**8**	Fig. 14
		S	S	S	=	N	N	S	S	S	S	N	N	
Protea	Serotinous	–	–	–	–	–	–	1	1	3	11	36	**70**	Fig. 11
	Nonserotinous	–	–	–	–	–	–	0	0	0	1	6	**17**	Fig. 11
		–	–	–	–	–	–	S	S	S	S	S	S	
Hakea	Serotinous - strong	–	–	–	–	–	–	–	1	2	**18**	15	4	Fig. 10
	Serotinous - weak	–	–	–	–	–	–	–	0	0	0	**4**	0	Fig. 10*
	Nonserotinous	–	–	–	–	–	–	–	0	0	1	**4**	1	Fig. 10*
		–	–	–	–	–	–	–	S	S	S	S	S	
Global	Serotinous	–	–	–	–	–	–	–	15	19	48	75	**103**	As above
	Nonserotinous	–	–	–	–	–	–	–	22	34.5	47	81	**117**	As above
		–	–	–	–	–	–	–	N	N	S	N	N	

* plus Lamont et al. (2017b)

Figures

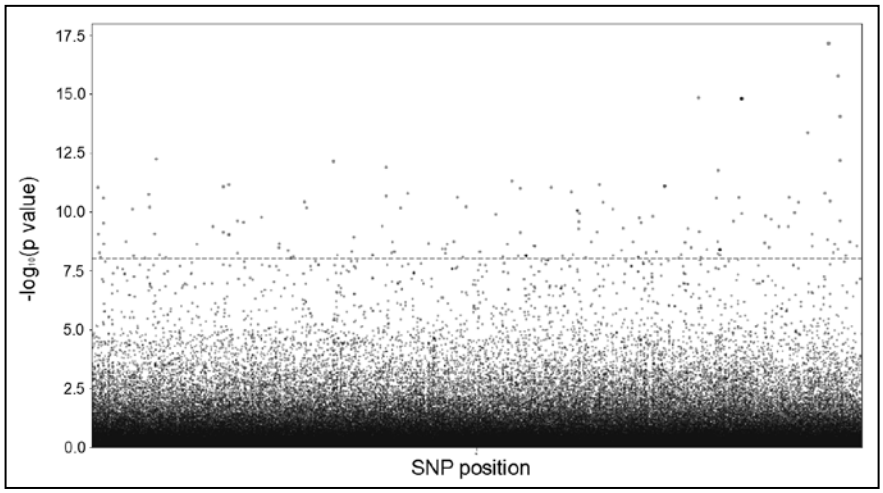

Fig. S1. Genome-wide association study showing the large number of single nucleotide polymorphisms (SNPs) associated with the level of serotiny in *Banksia attenuata*. The dotted line indicates the *P*-value threshold ($P = 2.62 \times 10^{-8}$, equivalent to $P = 0.010$ with Bonferroni correction for multiple tests). Leaves of this species were collected at nine locations along a rainfall gradient from the semi-arid region of Kalbarri to the high-rainfall *Cape Naturaliste* of SW Australia. He et al. (2016, 2019) generated a genome-wide (SNP) profile. We determined the level of serotiny at each location by calculating the percentage of closed follicles per cone for two representative one-y-old cones from five plants per location. The level of serotiny varied from non- to weak serotiny (0–5% closed follicles) at the mesic sites with low frequency of crown fires to strong serotiny (>90% closed follicles) at the xeric sites with moderately frequent crown fires, consistent with a shorter gradient assessed by Cowling and Lamont (1985a) who used the slope measure of serotiny. Following a linear mixed model implemented in the software FaST-LMM (Lippert et al., 2011), a genome-wide association study analysis was used to determine what SNPs are associated with the level of serotiny.

References

He T., H. D'Agui, S. L. Lim, N. J. Enright and Y. Q. Luo. 2016. Evolutionary potential and adaptation of *Banksia attenuata* (Proteaceae) to climate and fire regime in southwestern Australia, a global biodiversity hotspot. Scientific Reports 6: 26315.

He T., B. B. Lamont, N. J. Enright, H. D'Agui, and W. D. Stock 2019. Environmental drivers and genomic architecture of trait differentiation in fire-adapted *Banksia attenuata* ecotypes. Journal of Integrative Plant Biology 61:417–432.

Lippert, C., Listgarten, J., Liu, Y., Kadie, C. M., Davidson,R. I., and Heckerman, D. 2011. FaST linear mixed modelsfor genome-wide association studies.Nat. Meth.8:833–835. doi:10.1038/nmeth.1681