

**Family:** *Proteaceae*

**Taxon:** *Banksia ericifolia*

**Synonym:** *Banksia ericifolia* var. *macrantha* A. S. Georg **Common Name:** heath banksia  
heath leaf banksia

<b>Questionnaire :</b>	current 20090513	<b>Assessor:</b>	Chuck Chimera	<b>Designation:</b> H(HPWRA)
<b>Status:</b>	Assessor Approved	<b>Data Entry Person:</b>	Chuck Chimera	<b>WRA Score 9</b>
101	Is the species highly domesticated?		y=-3, n=0	n
102	Has the species become naturalized where grown?		y=1, n=-1	
103	Does the species have weedy races?		y=1, n=-1	
201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"		(0-low; 1-intermediate; 2-high) (See Appendix 2)	High
202	Quality of climate match data		(0-low; 1-intermediate; 2-high) (See Appendix 2)	High
203	Broad climate suitability (environmental versatility)		y=1, n=0	y
204	Native or naturalized in regions with tropical or subtropical climates		y=1, n=0	y
205	Does the species have a history of repeated introductions outside its natural range?		y=-2, ?=-1, n=0	y
301	Naturalized beyond native range		y = 1*multiplier (see Appendix 2), n= question 205	y
302	Garden/amenity/disturbance weed		n=0, y = 1*multiplier (see Appendix 2)	n
303	Agricultural/forestry/horticultural weed		n=0, y = 2*multiplier (see Appendix 2)	n
304	Environmental weed		n=0, y = 2*multiplier (see Appendix 2)	
305	Congeneric weed		n=0, y = 1*multiplier (see Appendix 2)	y
401	Produces spines, thorns or burrs		y=1, n=0	n
402	Allelopathic		y=1, n=0	n
403	Parasitic		y=1, n=0	n
404	Unpalatable to grazing animals		y=1, n=-1	
405	Toxic to animals		y=1, n=0	n
406	Host for recognized pests and pathogens		y=1, n=0	n
407	Causes allergies or is otherwise toxic to humans		y=1, n=0	n
408	Creates a fire hazard in natural ecosystems		y=1, n=0	y
409	Is a shade tolerant plant at some stage of its life cycle		y=1, n=0	
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)		y=1, n=0	y
411	Climbing or smothering growth habit		y=1, n=0	n

412	Forms dense thickets	y=1, n=0	y
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally	y=1, n=-1	
604	Self-compatible or apomictic	y=1, n=-1	y
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	n
607	Minimum generative time (years)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	3
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	n
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant	y=1, n=-1	
704	Propagules adapted to wind dispersal	y=1, n=-1	y
705	Propagules water dispersed	y=1, n=-1	n
706	Propagules bird dispersed	y=1, n=-1	n
707	Propagules dispersed by other animals (externally)	y=1, n=-1	n
708	Propagules survive passage through the gut	y=1, n=-1	
801	Prolific seed production (>1000/m <sup>2</sup> )	y=1, n=-1	y
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	y
803	Well controlled by herbicides	y=-1, n=1	
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	n
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	y=-1, n=1	

Designation: H(HPWRA)

WRA Score **9**

## Supporting Data:

101	2012. PlantNET. New South Wales flora online - Banksia ericifolia L.f. [Accessed 14 Aug 2012]. Royal Botanic Gardens & Domain Trust., Sydney <a href="http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&amp;lvl=sp&amp;name=Banksia~ericifolia">http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&amp;lvl=sp&amp;name=Banksia~ericifolia</a>	[Is the species highly domesticated? No evidence]
102	2012. WRA Specialist. Personal Communication.	NA
103	2012. WRA Specialist. Personal Communication.	NA
201	2012. PlantNET. New South Wales flora online - Banksia ericifolia L.f. [Accessed 14 Aug 2012]. Royal Botanic Gardens & Domain Trust., Sydney <a href="http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&amp;lvl=sp&amp;name=Banksia~ericifolia">http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&amp;lvl=sp&amp;name=Banksia~ericifolia</a>	[Species suited to tropical or subtropical climate(s) 2-High] "Distribution and occurrence: Grows in heath, dry sclerophyll forest and woodland, widespread on the coast and ranges, from Jervis Bay to the Qld border. NSW subdivisions: NC, CC, SC, CT, ST" [Collected at 28.3° S latitude, marginally subtropical]
202	2012. PlantNET. New South Wales flora online - Banksia ericifolia L.f. [Accessed 14 Aug 2012]. Royal Botanic Gardens & Domain Trust., Sydney <a href="http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&amp;lvl=sp&amp;name=Banksia~ericifolia">http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&amp;lvl=sp&amp;name=Banksia~ericifolia</a>	[Quality of climate match data 2-High]
203	2003. Elliot, R.. Australian Plants for Mediterranean Climate Gardens. Rosenberg Publishing, Kenthurst, Australia	[Broad climate suitability (environmental versatility)? Presumably Yes] "Another highly prized banksia is the Heath-leaved Banksia, Banksia ericifolia, which is an outstanding and highly attractive species from coastal and adjacent regions of New South Wales and Queensland. It has adapted successfully to cultivation in a wide range of conditions, from subtropical to cool temperate regions as well as Mediterranean areas."
204	2012. PlantNET. New South Wales flora online - Banksia ericifolia L.f. [Accessed 14 Aug 2012]. Royal Botanic Gardens & Domain Trust., Sydney <a href="http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&amp;lvl=sp&amp;name=Banksia~ericifolia">http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&amp;lvl=sp&amp;name=Banksia~ericifolia</a>	[Native or naturalized in regions with tropical or subtropical climates? Yes] "Distribution and occurrence: Grows in heath, dry sclerophyll forest and woodland, widespread on the coast and ranges, from Jervis Bay to the Qld border. NSW subdivisions: NC, CC, SC, CT, ST" [Collected at 28.3° S latitude, marginally subtropical]
205	2012. WRA Specialist. Personal Communication.	[Does the species have a history of repeated introductions outside its natural range? Yes] South Africa, Hawaiian Islands and New Zealand
301	2002. Heenan, P.B./de Lange, P.J./Cameron, E.K./Champion, P.D.. Checklist of dicotyledons, gymnosperms, and pteridophytes naturalised or casual in New Zealand: Additional records 1999–2000. New Zealand Journal of Botany. 40(2): 155-174.	[Naturalized beyond native range? Yes] "NOTES: Scattered adults, saplings and seedlings growing in roadside gum land scrub. This banksia is a popular garden plant in New Zealand, and further naturalisations are anticipated."
301	2007. Henderson, L.. Invasive, naturalized and casual alien plants in southern Africa: a summary based on the Southern African Plant Invaders Atlas (SAPIA). Bothalia. 37(2): 215–248.	[Naturalized beyond native range? Yes] "APPENDIX 4.—Summary of results for all naturalized and casual alien plants in the study area, Savanna Biome, Fynbos Biome, Forest habitats, Grassland Biome, Nama Karoo Biome, Succulent Karoo Biome and watercourse/wetland habitats" [Includes Banksia ericifolia]
301	2012. Protea Atlas Project. SubFamily Grevilleoideae [Accessed 16 Aug 2012]. <a href="http://protea.worldonline.co.za/Protea_Atlas_Grevilleoid.pdf">protea.worldonline.co.za/Protea_Atlas_Grevilleoid.pdf</a>	[Naturalized beyond native range? Yes] "About 75 species in Australia. Although several species have been identified as potentially invasive in South Africa, only the Needle-leaf Banksia B. ericifolia was recorded as spreading."
302	2007. Randall, R.P.. Global Compendium of Weeds - Banksia ericifolia. <a href="http://www.hear.org/gcw/species/banksia_ericifolia/">http://www.hear.org/gcw/species/banksia_ericifolia/</a>	[Garden/amenity/disturbance weed? Potential environmental weed]
303	2007. Randall, R.P.. Global Compendium of Weeds - Banksia ericifolia. <a href="http://www.hear.org/gcw/species/banksia_ericifolia/">http://www.hear.org/gcw/species/banksia_ericifolia/</a>	[Agricultural/forestry/horticultural weed? Potential environmental weed]
304	1992. Honig, M.A./Cowling, R.M./Richardson, D.M.. The invasive potential of Australian banksias in South African fynbos: A comparison of the reproductive potential of Banksia ericifolia & Leucadendron laureolum. Australian J of Ecology. 17(3): 305-314.	[Environmental weed? Potentially Yes] "The Bioclimatic Prediction System (BIOCLIM) was used to create a bioclimatic profile of B. ericifolia and identify climatically suitable areas in the Cape Province. Results show that its potential distribution covers most fynbos areas in the southwestern Cape. It is concluded that B. ericifolia has the potential to be highly invasive in fynbos."

304	2011. Mthembu, B./Geets, S.. <i>Banksia ericifolia</i> . [Accessed 16 Aug 2012]. South African National Biodiversity Institute (SANBI), <a href="http://www.sanbi.org/information/infobases/invasive-plant-alert/banksia-ericifolia">http://www.sanbi.org/information/infobases/invasive-plant-alert/banksia-ericifolia</a>	[Environmental weed? Potentially Yes] "Heath-leaved banksia is drought tolerant once established in a habitat. Its potential distribution covers most fynbos areas in the Western Cape and has the potential to be highly invasive in fynbos. Heath-leaved banksia outcompetes natural vegetation and is capable of forming monospecific stands under specific fire regimes, attaining twice the height of indigenous proteoids."
305	2008. Williams, P.A.. Biological Success and Weediness of Some Terrestrial Weeds Not Presently in the Northland Regional Council's RPMS. Landcare Research Contract Report: LC0708/079/. Landcare Research, New Zealand	[Congeneric weed? Yes] "Coastal banksia ( <i>Banksia integrifolia</i> )...Widespread coast weed in NZ. Not known as a weed elsewhere except in Western Australia where it has been introduced outside its native range...shades out native biota and competes with native species in vegetation succession."
305	2010. Fraser, T.. Can genetic diversity predict weeds?. What's New in Biological Control of Weeds?. 54(10): 4-5.	[Congeneric weed? Yes] "Coastal banksia ( <i>Banksia integrifolia</i> ) is an emerging weed in New Zealand and alpine wattle ( <i>Acacia pravissima</i> ) is starting to cause concern. Both species are potentially serious threats to New Zealand biodiversity yet lack of evidence to support a weedy classification means that they are not regarded uniformly across the country. In the case of coastal banksia, one North Island Regional Council enforces restrictions on its propagation while a neighbouring authority is actively planting it in reserves...Dr Houliston also compared the health of coastal banksia in Australia and New Zealand. 'The plant has a wide distribution in Australia but in some parts of its native range is so hard hit by natural enemies – herbivores and diseases – that it is hard to find a healthy plant. By contrast in New Zealand, where plants have had to undergo phytosanitary inspections prior to arriving in the country and have escaped from their natural enemies, it is doing extremely well.' "
401	2012. PlantNET. New South Wales flora online - <i>Banksia ericifolia</i> L.f. [Accessed 14 Aug 2012]. Royal Botanic Gardens & Domain Trust., Sydney <a href="http://plantnet.rbg Syd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&amp;lvl=sp&amp;name=Banksia~ericifolia">http://plantnet.rbg Syd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&amp;lvl=sp&amp;name=Banksia~ericifolia</a>	[Produces spines, thorns or burrs? No] "Tall bushy shrub or small tree to 6 m high, without lignotuber, single-stemmed at base; bark ± corky, grey-brown; branchlets smooth with lenticels. Leaves alternate, crowded, linear, 0.9–2 cm long, often c. 1 cm long and 1 mm wide, apex truncate or notched with a small tooth at each side, base attenuate, margins revolute, entire; lower surface tomentose; ± sessile. "
402	2002. Australian National Botanic Gardens. Growing Native Plants - <i>Banksia ericifolia</i> subsp. <i>Ericifolia</i> . <a href="http://www.anbg.gov.au/gnp/interns-2002/banksia-ericifolia.html">http://www.anbg.gov.au/gnp/interns-2002/banksia-ericifolia.html</a>	[Allelopathic? No evidence]
402	2007. Australian Native Plant Society. <i>Banksia ericifolia</i> [Accessed 14 Aug 2012]. <a href="http://anpsa.org.au/b-eri.html">http://anpsa.org.au/b-eri.html</a>	[Allelopathic? No evidence]
403	2012. USDA ARS National Genetic Resources Program. Germplasm Resources Information Network - (GRIN). <a href="http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl">http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl</a>	[Parasitic? No] Proteaceae
404	2006. Tasker, E. M./Bradstock, R.A.. Influence of cattle grazing practices on forest understorey structure in north-eastern New South Wales. <i>Austral Ecology</i> . 31: 490-502.	[Unpalatable to grazing animals? Unknown] "Fig. 4. Dominant understorey plant species in grazed and ungrazed sites" [ <i>Banksia</i> spp. Possess higher cover in ungrazed lands, but unknown if <i>Banksia ericifolia</i> is palatable to cattle]
405	2008. Wagstaff, D.J.. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	[Toxic to animals? No evidence from genus]
406	2002. Australian National Botanic Gardens. Growing Native Plants - <i>Banksia ericifolia</i> subsp. <i>Ericifolia</i> . <a href="http://www.anbg.gov.au/gnp/interns-2002/banksia-ericifolia.html">http://www.anbg.gov.au/gnp/interns-2002/banksia-ericifolia.html</a>	[Host for recognized pests and pathogens? No] "Being an eastern Australian <i>Banksia</i> it remains relatively resistant to the root rotting fungus <i>Phytophthora cinnamomi</i> . Damage by insect predators such as stem borers or psyllids occurs occasionally, but the plant generally remains pest free."
407	2008. Wagstaff, D.J.. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	[Causes allergies or is otherwise toxic to humans? No evidence from genus]
408	1988. Zammit, C./Westoby, M.. Pre-Dispersal Seed Losses, and the Survival of Seeds and Seedlings of Two Serotinous <i>Banksia</i> Shrubs in Burnt and Unburnt Heath. <i>Journal of Ecology</i> . 76(1): 200-214.	[Creates a fire hazard in natural ecosystems? Yes. Fire-prone heath] "We report on a field survey which compared pre-dispersal seed losses, and a field experiment which compared the survival of seeds and seedlings, in two co-occurring <i>Banksia</i> shrubs from a fire-prone heath. The obligate-seeder, <i>B. ericifolia</i> , is killed by fire whilst <i>B. oblongifolia</i> resprouts from a lignotuber. Both species are serotinous."

408	1992. Bradstock, R.A./Bedward, M.. Simulation of the Effect of Season of Fire on Post-Fire Seedling Emergence of Two Banksia Species Based on Long-Term Rainfall Records. Australian Journal of Botany. 40(1): 75-88.	[Creates a fire hazard in natural ecosystems? Yes] "In this paper we predict the effect of season of fire on the post-fire emergence of seedlings in two species common to fire prone communities in the Sydney region of south-eastern Australia, <i>Banksia ericifolia</i> L.f. and <i>Banksia serrata</i> L.f. These species are present as shrubs or small trees in woodlands and shrublands situated on soils derived from Hawkesbury Sandstone. Such plant communities are subject to a range of fire regimes, there being considerable variation in season and intensity of fire (National Parks and Wildlife Service, unpublished data). The species differ in their response to fire (Beadle 1940; Bradstock 1985): <i>B. ericifolia</i> relies totally on seedlings for postfire recovery (obligate seeder) whereas <i>B. serrata</i> can recover through both the establishment of seedlings and vegetative resprouting of surviving plants (facultative resprouter)."
408	2003. Tozer, M.G./Bradstock, R.A.. Fire-Mediated Effects of Overstorey on Plant Species Diversity and Abundance in an Eastern Australian Heath. Plant Ecology. 164(2): 213-223.	[Creates a fire hazard in natural ecosystems? Yes. A component of fire prone communities] "The population dynamics of the dominant shrub species, such as <i>Banksia ericifolia</i> , are strongly affected by fire regimes (Bradstock and Myerscough 1981; Bradstock and O'Connell 1988; Keith 1995; Bradstock et al. 1996), primarily due to the effect of the length of fire-interval on fecundity. An interval between fires less than the maturation period (< 5 y) will cause local extinction, whereas long intervals (e.g. 15-30 y) allow large seedbanks to develop resulting in the establishment of high density populations following fire. As a result, density of the over storey obligate seeder shrubs is highly variable, both spatially and temporally (0-70,000 stems/ha; Morris and Myerscough (1983) and Keith and Bradstock (1994)). Local and landscape-level fluctuations in density, including extinctions, have been observed to result from variations in fire frequency (Siddiqi et al. 1976; Clemens and Franklin 1980; Bradstock and O'Connell 1988; Bradstock et al. 1997). Keith (1995) described landscape-level fluxes in density of over storey shrubs including fragmentation of stands, extinction and re-colonisation, based on analysis of his torical aerial photography. His observations corroborate predictions, based on demographic studies at a landscape scale that the extent of shrub dominance is inversely related to fire frequency."
409	2002. Australian National Botanic Gardens. Growing Native Plants - <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> . <a href="http://www.anbg.gov.au/gnp/interns-2002/banksia-ericifolia.html">http://www.anbg.gov.au/gnp/interns-2002/banksia-ericifolia.html</a>	[Is a shade tolerant plant at some stage of its life cycle? Semi-shade] "In cultivation this species has proven to be fairly adaptable, very hardy and tolerant of frosts. Although it may successfully grow in wet areas, it prefers well drained soils and will grow in full sun or semi-shade conditions."
409	2007. Australian Native Plant Society. <i>Banksia ericifolia</i> [Accessed 14 Aug 2012]. <a href="http://anpsa.org.au/b-eri.html">http://anpsa.org.au/b-eri.html</a>	[Is a shade tolerant plant at some stage of its life cycle? Possibly] "It will grow successfully in full sun or semi shade and is one of the best plants for attracting honey-eating birds."
409	2012. Australian Native Plants Nursery. <i>Banksia ericifolia</i> [Accessed 16 Aug 2012]. <a href="http://www.australianplants.com/plants.aspx?id=1177">http://www.australianplants.com/plants.aspx?id=1177</a>	[Is a shade tolerant plant at some stage of its life cycle? Possibly] "Grows well in shade or full sun positions."
410	1991. Bradstock, R.A.. The Role of Fire in Establishment of Seedlings of Serotinous Species From the Sydney Region. Australian Journal of Botany. 39(4): 347-356.	[Tolerates a wide range of soil conditions? Possibly Yes] "In <i>B. ericifolia</i> and <i>B. serrata</i> , substrates posed less of a limitation to germinants: it is possible also that these species were less sensitive to a range of moisture conditions in the soil surface." ... "In contrast, the formation of dense and extensive stands of <i>B. ericifolia</i> could be aided by its less restricted substrate requirements for seedling establishment."
410	2002. Australian National Botanic Gardens. Growing Native Plants - <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> . <a href="http://www.anbg.gov.au/gnp/interns-2002/banksia-ericifolia.html">http://www.anbg.gov.au/gnp/interns-2002/banksia-ericifolia.html</a>	[Tolerates a wide range of soil conditions? Yes. Sand and loam] "It chiefly occurs in soils of sandy loam, deep sand or sand over sandstone in well drained areas."
410	2007. Australian Native Plant Society. <i>Banksia ericifolia</i> [Accessed 14 Aug 2012]. <a href="http://anpsa.org.au/b-eri.html">http://anpsa.org.au/b-eri.html</a>	[Tolerates a wide range of soil conditions? Possibly] "All forms of <i>B. ericifolia</i> have proven to be reliable in gardens in a wide range of districts. The plant prefers acid soils, preferably light to medium bodied and well drained."
410	2012. Plant this. <i>Banksia ericifolia</i> [Accessed 16 Aug 2012]. <a href="http://plantthis.com.au/plant-information.asp?gardener=9650">http://plantthis.com.au/plant-information.asp?gardener=9650</a>	[Tolerates a wide range of soil conditions? Yes] "Soil Moisture: dry for extended periods to usually boggy. Soil: ordinary soil, sand, acidic to alkaline"
411	2012. PlantNET. New South Wales flora online - <i>Banksia ericifolia</i> L.f. [Accessed 14 Aug 2012]. Royal Botanic Gardens & Domain Trust., Sydney <a href="http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&amp;lvl=sp&amp;name=Banksia~ericifolia">http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&amp;lvl=sp&amp;name=Banksia~ericifolia</a>	[Climbing or smothering growth habit? No] "Tall bushy shrub or small tree to 6 m high, without lignotuber, single-stemmed at base; bark ± corky, grey-brown; branchlets smooth with lenticels."

412	1987. Zammit, C./Westoby, M.. Population Structure and Reproductive Status of Two Banksia Shrubs at Various Times after Fire. <i>Vegetatio</i> . 70(1): 11-20.	[Forms dense thickets? Yes. Forms monospecific stands] "The density of <i>B. ericifolia</i> genets declined with increasing stand age. Similar mortality patterns occur in even-aged populations of the chaparral obligate-seeder <i>Ceanothus megacarpus</i> (Schlesinger & Gill, 1978), even aged populations of <i>Ceratiola ericoides</i> (Johnson, 1982) and monospecific <i>B. ericifolia</i> stands in a different heath area on Hawkesbury Sandstone (Morris & Myerscough, 1983)."
412	1988. Morris, E.C./Myerscough, P.J.. Survivorship, growth and self-thinning in <i>Banksia ericifolia</i> . <i>Australian Journal of Ecology</i> . 13: 181-189.	[Forms dense thickets? Yes] "High-density (dense) and low-density (sparse) plots were set up in naturally sown monospecific stands of <i>Banksia ericifolia</i> in coastal heath, 3 years after fire. This was done both in high-growth and low-growth areas. Plant mortality was recorded quarterly, and two harvests were made at 6 and 9 years to sample growth. Density-independent mortality at an exponential rate was observed in the low-growth treatments at both densities, and in the high-growth sparse treatment. Growth level affected mortality, with the half-life of populations in the high-growth sparse plots being double that of populations in the low growth plots. Density-dependent mortality (self-thinning) was seen only in the high growth dense plots. Seasonal effects on mortality were slight; maximum mortality was observed in the spring-summer period in plots subject to density-independent mortality, and in the winter-spring quarter in plots that had self-thinned. Yields in the high-growth plots and the low-growth dense plots were high for heath vegetation. The self-thinning populations did not exceed White's (1985) upper boundary for thinning lines of log intercept (K) = 5 on standardized axes. The data suggested a log intercept value in the range 4.8–4.9 in the high-growth stands assuming a thinning-line slope of – 1.5. <i>Banksia ericifolia</i> (a large shrub/small tree) has a high mean plant weight per given thinning density compared with trees, where an upper limit of log K= .4 has been suggested by White (1985). The volume of canopy space per plant in <i>B. ericifolia</i> is not unusual compared with other species. The amount of biomass packed into a given volume of canopy space was high in this <i>Banksia</i> , achieved by having leaves with a low ratio of area to weight (specific leaf area, SLA). For given values of density, leaf area index and proportion of shoot as leaf, plants with a low SLA will be several times heavier than plants with a high SLA. This achieves a high biomass to volume ratio without an erectophile canopy and may explain the high intercept seen for thinning lines of conifers."
412	1991. Bradstock, R.A.. The Role of Fire in Establishment of Seedlings of Serotinous Species From the Sydney Region. <i>Australian Journal of Botany</i> . 39(4): 347-356.	[Forms dense thickets? Yes] "In contrast, the formation of dense and extensive stands of <i>B. ericifolia</i> could be aided by its less restricted substrate requirements for seedling establishment."
412	2011. Mthembu, B./Geets, S.. <i>Banksia ericifolia</i> . [Accessed 16 Aug 2012]. South African National Biodiversity Institute (SANBI), <a href="http://www.sanbi.org/information/infobases/invasive-plant-alert/banksia-ericifolia">http://www.sanbi.org/information/infobases/invasive-plant-alert/banksia-ericifolia</a>	[Forms dense thickets? Yes] "Heath-leaved banksia is drought tolerant once established in a habitat. Its potential distribution covers most fynbos areas in the Western Cape and has the potential to be highly invasive in fynbos. Heath-leaved banksia outcompetes natural vegetation and is capable of forming mono-specific stands under specific fire regimes, attaining twice the height of indigenous proteoids."
501	2012. PlantNET. New South Wales flora online - <i>Banksia ericifolia</i> L.f. [Accessed 14 Aug 2012]. Royal Botanic Gardens & Domain Trust., Sydney <a href="http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&amp;lvl=sp&amp;name=Banksia~ericifolia">http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&amp;lvl=sp&amp;name=Banksia~ericifolia</a>	[Aquatic? No] "Grows in heath, dry sclerophyll forest and woodland, widespread on the coast and ranges, from Jervis Bay to the Qld border."
502	2012. USDA ARS National Genetic Resources Program. Germplasm Resources Information Network - (GRIN). <a href="http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl">http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl</a>	[Grass? No] Proteaceae
503	2012. USDA ARS National Genetic Resources Program. Germplasm Resources Information Network - (GRIN). <a href="http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl">http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl</a>	[Nitrogen fixing woody plant? No] Proteaceae
504	2002. Australian National Botanic Gardens. Growing Native Plants - <i>Banksia ericifolia</i> subsp. <i>Ericifolia</i> . <a href="http://www.anbg.gov.au/gnp/interns-2002/banksia-ericifolia.html">http://www.anbg.gov.au/gnp/interns-2002/banksia-ericifolia.html</a>	[Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)? No] "Once established it may be lightly pruned to retain its bushy dense habit, however at the Australian National Botanic Gardens in Canberra, plants are rarely pruned so as to maintain their rugged growth form. Certainly heavy pruning should be avoided as this species has no lignotubers."
504	2012. PlantNET. New South Wales flora online - <i>Banksia ericifolia</i> L.f. [Accessed 14 Aug 2012]. Royal Botanic Gardens & Domain Trust., Sydney <a href="http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&amp;lvl=sp&amp;name=Banksia~ericifolia">http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&amp;lvl=sp&amp;name=Banksia~ericifolia</a>	[Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)? No] "Description: Tall bushy shrub or small tree to 6 m high, without lignotuber, single-stemmed at base; bark ± corky, grey-brown; branchlets smooth with lenticels."

601	2007. Australian Native Plant Society. <i>Banksia ericifolia</i> [Accessed 14 Aug 2012]. <a href="http://anpsa.org.au/b-eri.html">http://anpsa.org.au/b-eri.html</a>	[Evidence of substantial reproductive failure in native habitat? No evidence] "Not considered to be at risk in the wild at the species level."
602	1987. Zammit, C./Westoby, M.. Seedling Recruitment Strategies in Obligate-Seeding and Resprouting <i>Banksia</i> Shrubs. <i>Ecology</i> . 68(6): 1984-1992.	[Produces viable seed? Yes] "Gradual but continuous germination of <i>B. ericifolia</i> seeds most likely has evolved in response to unpredictability in the probability of follow-up rains. Rainfall in the Sydney Basin environment is spread fairly uniformly over the year, but there is a 10-20% chance that there will not be follow-up rains during the 1st 20 d after rain (Bureau of Meteorology 1979). A single storm is likely to produce a moist soil surface for 7-15 d, during which time nearly complete germination of released <i>B. oblongifolia</i> seeds occurs, but only ~50% germination of released <i>B. ericifolia</i> seeds. Without a follow-up rain, seedling mortality would be high. Few <i>B. oblongifolia</i> seeds, but a substantial proportion of <i>B. ericifolia</i> seeds, would remain for a second germinating rainfall. Furthermore, <i>B. ericifolia</i> seeds are released more gradually, so that a smaller proportion of its total seed bank would be in germinable position before any given rainfall."
602	2000. Benson, D./McDougall, L.. Ecology of Sydney plant species. Part 7b. Dicotyledon families Proteaceae to Rubiaceae. <i>Cunninghamia</i> . 6(4): 1016-1202.	[Produces viable seed? Yes] "Fruit/seed: Cone with capsules 15–20 mm long that develop up to a year after flowering. Seed weight 24.2 mg ± 1.0 (Hammill et al. 1998), winged seed 17-20 mm long, retained in capsules for several years as canopy-stored seedbank. Seed production is greater when cross pollination occurs as opposed to self-pollination (Paton & Turner 1985)."
602	2007. Australian Native Plant Society. <i>Banksia ericifolia</i> [Accessed 14 Aug 2012]. <a href="http://anpsa.org.au/b-eri.html">http://anpsa.org.au/b-eri.html</a>	[Produces viable seed? Yes] "Propagation from seed or cuttings is relatively easy."
603	1994. Sedgley, M./Sierp, M.G./Maguire, T.L.. Interspecific Hybridization Involving <i>Banksia prionotes</i> Lind. and <i>B. menziesii</i> R.Br. (Proteaceae). <i>International Journal of Plant Sciences</i> . 155(6): 755-762.	[Hybridizes naturally? Possibly] "Some presumed interspecific hybrids have been recorded, both in the wild and under cultivation (Taylor and Hopper 1988). Interspecific hybridization is of interest from ecological, taxonomic, and economic viewpoints. Hybrids often occur in disturbed habitats, when the hybrid may have a competitive advantage over the parents (Anderson 1949; Potts and Reid 1985), and so can indicate ecological imbalances. Hybridization generally occurs only between taxonomically related taxa (Williams et al. 1990; Ellis et al. 1991), and interspecific relationships can thus have implications for the evolution and systematics of a group (Erikson et al. 1983). In economic terms, the value of interspecific hybrids frequently exceeds that of the parental species in ornamental horticulture and forestry (Sedgley and Griffin 1989; Williams et al. 1990). Most of the <i>Banksia</i> interspecific hybrids recorded to date have been between east Australian species (George 1988). In this study we investigate interspecific pistil-pollen interactions involving the west Australian species <i>Banksia prionotes</i> and <i>B. menziesii</i> , and morphological and biochemical characters of cv Waite Orange a putative natural interspecific hybrid between <i>B. prionotes</i> and <i>Banksia hookeriana</i> , which is registered in Australia as a cut-flower cultivar (Sedgley 1991)."
603	2000. Benson, D./McDougall, L.. Ecology of Sydney plant species. Part 7b. Dicotyledon families Proteaceae to Rubiaceae. <i>Cunninghamia</i> . 6(4): 1016-1202.	[Hybridizes naturally? Possibly Yes] "A shrub or small tree. Prostrate form genetically different (Auld & Morrison 1992). Appears to hybridize with <i>B. spinulosa</i> var. <i>spinulosa</i> (Harden 2000)."
603	2007. Australian Native Plant Society. <i>Banksia ericifolia</i> [Accessed 14 Aug 2012]. <a href="http://anpsa.org.au/b-eri.html">http://anpsa.org.au/b-eri.html</a>	[Hybridizes naturally? Possibly] "A popular <i>Banksia</i> cultivar, "Giant Candles" is thought to be a hybrid with <i>B.ericifolia</i> and <i>B.spinulosa</i> as its parents."
603	2011. Downing, A./Downing, K.. Plant of the Week - <i>Banksia ericifolia</i> subspecies <i>ericifolia</i> . The Heath-leaved <i>Banksia</i> . Macquarie University, Sydney, Australia	[Hybridizes naturally? Possibly. Cultivated hybrids exist] "At Macquarie, you can find it growing on sandy soil near sandstone outcrops in bushland on the northern side of the M2 Motorway. <i>Banksia</i> 'Giant Candles', a hybrid between <i>Banksia ericifolia</i> and <i>Banksia spinulosa</i> var. <i>cunninghamii</i> , has been planted on the northern side of Macquarie Engineering and Technical Services Buildings on the north eastern side of campus."

604	1985. Paton, D.C./Turner, V.. Pollination of <i>Banksia ericifolia</i> Smith: Birds, Mammals and Insects as Pollen Vectors. Australian Journal of Botany. 33(3): 271-286.	[Self-compatible or apomictic? Possibly No, but see Carthew et al. 1996] "In coastal heath, 12 km north of Sydney, <i>Banksia ericifolia</i> set fruit after cross pollination but not after controlled self-pollination." ... "We found that <i>Banksia ericifolia</i> set no seeds automatically, that only one of 23 self-pollinated inflorescences set seeds (perhaps a result of inadvertent cross-pollination), while 12 of 21 cross-pollinated inflorescences set seeds. We conclude, therefore, that <i>Banksia ericifolia</i> prefers cross pollination to self-pollination and is probably largely outbreeding, a conclusion also reached by Keighery (1980, 1982)." ... "Our hand-pollination experiments are inadequate to determine the breeding capabilities of <i>Banksia ericifolia</i> , and we cannot state that any individual plants were self-incompatible." ... " <i>Banksia ericifolia</i> may be self-fertile but only following insufficient cross-pollination." ... "Carpenter and Recher (1979) reported moderate seed production following self-pollination of <i>Banksia ericifolia</i> inflorescences near Warrah, N.S.W. They also treated only a few of the available inflorescences on plants. The greater success of their trials may reflect differences in the breeding capabilities of individuals between the two <i>B. ericifolia</i> populations, or reduced animal visitation to the untreated inflorescences. Higher seed production following self-pollination might occur if little cross-pollination occurred at untreated inflorescences, and two pieces of evidence suggest this might have occurred at Warrah."
604	1991. Goldingay, R.L./Schibeci, S.M./Walker, B.A .. Breeding System and Pollination Levels of <i>Banksia ericifolia</i> . Australian Journal of Botany. 39(4): 365-372.	[Self-compatible or apomictic? Yes, but with limited seed set] "Our self-pollinated and open-pollinated plants each had a large percentage of flowers with pollen tubes but only a single self-pollinated plant produced fruit (11% of those treated) compared with six of the open-pollinated plants (60%)." ... "The present study has no such ambiguity but demonstrates a limited capacity for self-compatibility by <i>B. ericifolia</i> ."
604	1996. Carthew, S.M./Whelan, R.J./Ayre, D.J.. Experimental Confirmation of Preferential Outcrossing in <i>Banksia</i> . International Journal of Plant Sciences. 157(5): 615-620.	[Self-compatible or apomictic? Yes. Although seed set is lowered] "In this study, we used experimental pollinations to test for evidence of preferential outcrossing within populations of <i>Banksia spinulosa</i> and <i>Banksia ericifolia</i> . Our allozyme analysis of progeny arrays indicates that the studied populations of both <i>B. spinulosa</i> from a prior study and <i>B. ericifolia</i> as determined for 27 plants in this study are highly outcrossed. Results from pollinations using applications of self- and cross-pollen and mixtures of the two indicated that, at the early prezygotic stage, all treatments had an equal potential to produce seed. This contrasts with the observation of almost no pollen tube growth from the autogamy treatment conducted on <i>B. spinulosa</i> . Seed-set from experimental treatments was low for both species, and only one inflorescence from each species produced seed after self-pollination" ... "Both species are capable of some self-fertilization. There appeared to be no inhibition of self-pollen tubes in the distal half of the style, and there was no difference in the ability of self-pollen, cross-pollen, or mixtures to produce pollen tubes (Carthew 1993b; Goldingay et al. 1991). Thus at an early, prezygotic stage, all treatments had equal potential for seed-set"
604	2001. Bell, D.T.. Ecological Response Syndromes in the Flora of Southwestern Western Australia: Fire Resprouters versus Reseeders. Botanical Review. 67(4): 417-440.	[Self-compatible or apomictic? Yes] " <i>Banksia ericifolia</i> is a reseeded species of the same habitat, which generally has a much higher level of seed set. Both species tend to be highly outcrossed, but <i>B. ericifolia</i> shows self-compatibility. The self-incompatibility breeding system of <i>B. spinulosa</i> ensures that the seeds will be of "superior quality." Being capable of surviving fires, this species can afford to maximize the quality of seed production. The requirement of producing some seed to ensure survival in the habitat for <i>B. ericifolia</i> has led to the acceptance of some selfing."

605	1978. Carpenter, F.L.. Hooks for Mammal Pollination?. <i>Oecologia</i> . 35(2): 123-132.	[Requires specialist pollinators? No. Rodents provide effective pollination] "31 birds were netted and 3 individuals of a native species of <i>Rattus</i> were trapped within the <i>B. ericifolia</i> area: the results for <i>Banksia</i> pollen are in Table 1, Part A. It is clear that birds were not bearing effectively transferrable loads of <i>B. ericifolia</i> pollen, in spite of the fact that three species (indicated in Table 1 Part A) frequently visited <i>B. ericifolia</i> . The data from <i>Rattus</i> suggested that small mammals pollinate this species. After this work was completed, supplementary pollen smears were made by H.F. Recher on 14 birds and 14 small mammals, and these confirmed the data herein." ... "The nectar of both <i>B. ericifolia</i> and <i>B. spinulosa</i> had a pungent odor that could aid in attraction of small mammals for pollination." ... "The fact that some pollen and nectar were presented during the day suggested either that these <i>Banksia</i> species are pollinator-generalists and can be pollinated to some extent by birds even though the pollen smears in this study did not reveal it, or else that these <i>Banksia</i> species are in the process of evolving a specialized strategy for mammal pollination from bird-pollinated ancestors. Incomplete specialization in this direction would explain the bright coloration of <i>B. ericifolia</i> , since reds and oranges are usually associated with bird-pollination (Grant, 1966). Rourke and Wiens (1977) have argued that pollination by nonflying mammals, if it exists, would likely evolve from bird-pollination in both African and Australian <i>Proteaceae</i> ." ... "The pollinators of <i>B. ericifolia</i> ? and of <i>B. spinulosa</i> by inference because of similar structure and timing of nectar and pollen presentation?are probably usually rats and possibly marsupials in the heath areas just north of Sydney. Besides rats, several species of nectar eating mammals occur with <i>Banksia</i> , in particular, the marsupial possums and gliders (Troughton, 1965; Ride, 1970). As evidence that mammals potentially can pollinate flowers in shrubs or even trees, <i>Rattus</i> and <i>Antechinus</i> have been captured as high as 4 m in <i>Banksia</i> (Morcombe, 1968) in western Australia. Bats are not abundant in heath habitats (Ride, 1970), and I netted no bats at night in the <i>Banksia</i> areas."
605	1985. Paton, D.C./Turner , V.. Pollination of <i>Banksia ericifolia</i> Smith: Birds, Mammals and Insects as Pollen Vectors. <i>Australian Journal of Botany</i> . 33(3): 271-286.	[Requires specialist pollinators? No] "In coastal heath, 12 km north of Sydney, <i>Banksia ericifolia</i> set fruit after cross pollination but not after controlled self pollination. Animals removed nectar and pollen from inflorescences during the day but not overnight. Introduced honeybees ( <i>Apis mellifera</i> ) and native birds ( <i>Meliphagidae</i> , <i>Zosteropidae</i> ) visited flowers frequently during the day, carried pollen on their body surfaces and were likely to transfer pollen between plants. Native bees, nocturnal moths and ants also visited flowers but were too infrequent, did not move between plants or foraged inappropriately to be important pollinators. No mammals were seen visiting flowers and the small mammals we caught carried no pollen. Exclusion experiments confirmed that pollination occurred during the day and not at night, but the experiments were insufficient to determine the relative importance of honeybees versus birds as pollinators. Only about 3% of the flowers of <i>Banksia ericifolia</i> developed follicles under natural conditions. Follicle production in this species was limited by resources and not by pollinators, since multiple cross- pollinations of flowers did not increase follicle production above the natural rate." ... " <i>Banksia ericifolia</i> depends on animals for cross pollination, especially pollencollecting honeybees and native birds. Both visited inflorescences frequently, contacted stigmatic surfaces, carried pollen on their bodies and moved between plants."
605	1994. Keith, D.A./Bradstock, R.A.. Fire and Competition in Australian Heath: A Conceptual Model and Field Investigations. <i>Journal of Vegetation Science</i> . 5(3): 347-354.	[Requires specialist pollinators? No] " <i>Banksia ericifolia</i> , the overstorey dominant, is a major winter food source for honeyeaters and nectar-feeding small mammals (Carpenter & Recher 1979)."
605	1997. Butz Huryn, V.M.. Ecological Impacts of Introduced Honey Bees. <i>The Quarterly Review of Biology</i> . 72(3): 275-297.	[Requires specialist pollinators? No] "Table 1. Importance of introduced honey bees as pollinators of native plants" [ <i>Banksia ericifolia</i> - 1 = major pollinator; 2 = secondary pollinator]
606	2000. Benson, D./McDougall, L.. Ecology of Sydney plant species. Part 7b. Dicotyledon families <i>Proteaceae</i> to <i>Rubiaceae</i> . <i>Cunninghamia</i> . 6(4): 1016-1202.	[Reproduction by vegetative fragmentation? No] "Vegetative spread: No"
606	2002. Australian National Botanic Gardens. Growing Native Plants - <i>Banksia ericifolia</i> subsp. <i>Ericifolia</i> . <a href="http://www.anbg.gov.au/gnp/interns-2002/banksia-ericifolia.html">http://www.anbg.gov.au/gnp/interns-2002/banksia-ericifolia.html</a>	[Reproduction by vegetative fragmentation? No evidence] "Propagation is most successful from seed rather than cuttings."
606	2011. Mthembu, B./Geets, S.. <i>Banksia ericifolia</i> . [Accessed 16 Aug 2012]. South African National Biodiversity Institute (SANBI), <a href="http://www.sanbi.org/information/infobases/invasiv e-alien-plant-alert/banksia-ericifolia">http://www.sanbi.org/information/infobases/invasiv e-alien-plant-alert/banksia-ericifolia</a>	[Reproduction by vegetative fragmentation? No evidence] "Heath-leaved <i>banksia</i> is spread by wind through seed dispersal. Seeds from old cones are released occasionally but seed release normally occurs in response to environmental triggers. Most seeds are released after fire. Plants resprout after cutting."

607	1988. Bradstock, R.A./O'Connell, M.A.. Demography of woody plants in relation to fire: <i>Banksia ericifolia</i> L.f. and <i>Petrophile pulchella</i> (Schrad) R.Br.. Australian Journal of Ecology. 13: 505-518.	[Minimum generative time (years)? 6] "Seeds were first available at 5 years in <i>P. pulchella</i> and 6 years in <i>B. ericifolia</i> . Exact replacement would be possible when burnt at these ages, if seedling establishment were very high. Low establishment would delay replacement to 13 years of age in both species. Late summer/autumn fires of high intensity favour high establishment. Such fires at 8–10 year intervals would be tolerated without any sustained decline in numbers. Fires at 10–15 year intervals could occur regardless of season or intensity with little risk of a population decline. Large increases in numbers and density would follow fires spaced at 15–30 years. Enough seeds would be available for replacement up to about 50 years in both species. Viable seed-release in unburnt conditions was sufficient to compensate for deaths in stands over 20 years old, even with very low levels of establishment."
607	1992. Honig, M.A./Cowling, R.M./Richardson, D.M.. The invasive potential of Australian banksias in South African fynbos: A comparison of the reproductive potential of <i>Banksia ericifolia</i> & <i>Leucadendron laurum</i> . Australian J of Ecology. 17(3): 305-314.	[Minimum generative time (years)] "The relative seedling growth rates of the two species were very similar (0.03 g per day), but below-ground biomass was greater and proteoid roots were more developed in <i>B. ericifolia</i> seedlings than in <i>L. laurum</i> after 100 days. Four year old <i>B. ericifolia</i> plants growing in the field had attained over twice the height of indigenous pro-teoids and accumulated up to 10 times the fresh biomass of <i>L. xanthoconus</i> , a species which is ecologically similar to <i>L. laurum</i> ."
607	1995. Whelan, R.J.. The Ecology of Fire. Cambridge University Press, Cambridge, UK	[Minimum generative time (years)? 3+] " <i>Banksia ericifolia</i> is a woody perennial shrub common in heath and woodland communities of eastern Australia. Observations on single cohorts suggest that time to first flowering is about 6 years (Fig. 5.8B). However, first flowering can occur in the third year in favourable sites, and may be delayed for 9 years or more in less favourable sites (Muston 1987). Observations of this first flowering in <i>B. ericifolia</i> , in whichever post-fire year it occurs, suggest that seed production is very poor (Bradstock and O'Connell 1988)."
607	2000. Benson, D./McDougall, L.. Ecology of Sydney plant species. Part 7b. Dicotyledon families Proteaceae to Rubiaceae. Cunninghamia. 6(4): 1016-1202.	[Minimum generative time (years)? 4+] "Primary juvenile period: 8–9 years at Brisbane Water NP (Benson 1985), 5 years (Bradstock & O'Connell 1988), 5 years at Lane Cove (P. Kubiak pers. comm.), 4 years (at Wollangambe Wilderness) but no fertile fruits (R. Lembit (pers. comm.)."
701	2000. Benson, D./McDougall, L.. Ecology of Sydney plant species. Part 7b. Dicotyledon families Proteaceae to Rubiaceae. Cunninghamia. 6(4): 1016-1202.	[Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)? No] "Seed weight 24.2 mg ± 1.0 (Hamill et al. 1998), winged seed 17-20 mm long, retained in capsules for several years as canopy-stored seedbank." ... "Dispersal, establishment & growth: Diaspore: seed, gravity and short distance winddispersed. Average dispersal distance 7.6 m (Honig et al 1992). Limited spontaneous release of seed during inter-fire period (Keith 1991)." [No evidence, and fairly large seeds lack means of external attachment]
702	2003. Elliot, R.. Australian Plants for Mediterranean Climate Gardens. Rosenberg Publishing, Kenthurst, Australia	[Propagules dispersed intentionally by people? Yes. Ornamental] "Another highly prized banksia is the Heath-leaved Banksia, <i>Banksia ericifolia</i> , which is an outstanding and highly attractive species from coastal and adjacent regions of New South Wales and Queensland."
703	2002. Australian National Botanic Gardens. Growing Native Plants - <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> . <a href="http://www.anbg.gov.au/gnp/interns-2002/banksia-ericifolia.html">http://www.anbg.gov.au/gnp/interns-2002/banksia-ericifolia.html</a>	[Propagules likely to disperse as a produce contaminant? Unknown, but may be possible to inadvertently disperse seeds in dry floral arrangements] "The cylindrical flower spikes of <i>B. ericifolia</i> are quite large at 4-6 cm wide and up to 30 cm long. Flowers open from the top of the spike down, in which the style characteristically remains a hooked shape. Flowering occurs over an extended period beginning in autumn and continuing through to early spring. They last well as cut flowers or indefinitely as dried flowers."
704	1992. Honig, M.A./Cowling, R.M./Richardson, D.M.. The invasive potential of Australian banksias in South African fynbos: A comparison of the reproductive potential of <i>Banksia ericifolia</i> & <i>Leucadendron laurum</i> . Australian J of Ecology. 17(3): 305-314.	[Propagules adapted to wind dispersal? Yes] " <i>Leucadendron laurum</i> released most of its seed a few days after the cones were burnt, whereas seed release in <i>B. ericifolia</i> was spread over 12 weeks. The seeds of <i>B. ericifolia</i> had lower wingloading and fall rates than <i>L. laurum</i> and were dispersed over greater distances."
705	2000. Benson, D./McDougall, L.. Ecology of Sydney plant species. Part 7b. Dicotyledon families Proteaceae to Rubiaceae. Cunninghamia. 6(4): 1016-1202.	[Propagules water dispersed? No evidence] "Dispersal, establishment & growth: Diaspore: seed, gravity and short distance wind dispersed. Average dispersal distance 7.6 m (Honig et al 1992). Limited spontaneous release of seed during inter-fire period (Keith 1991)."
706	1994. Hughes, L./Dunlop, M./French, K./Leishman, M.R./Rice, B./Rodgerson, L./Westoby, M.. Predicting Dispersal Spectra: A Minimal Set of Hypotheses Based on Plant Attributes. Journal of Ecology. 82(4): 933-950.	[Propagules bird dispersed? No evidence] "Table 2 Attributes and predicted dispersal modes of six selected species from the database of Westoby, Rice and Howell (1990) Dispersal modes have been predicted by the application of the 7 exclusion hypotheses and the seed size histogram (Fig. 1). U = unassisted, A = ant, V = vertebrate, Ad = adhesion, W = wind, B = ballistic, X = dispersal mode excluded" [ <i>Banksia ericifolia</i> - Actual dispersal mode = Wind]

707	1994. Hughes, L./Dunlop, M./French, K./Leishman, M.R./Rice, B./Rodgerson, L./Westoby, M.. Predicting Dispersal Spectra: A Minimal Set of Hypotheses Based on Plant Attributes. <i>Journal of Ecology</i> . 82(4): 933-950.	[Propagules dispersed by other animals (externally)? No evidence] "Table 2 Attributes and predicted dispersal modes of six selected species from the database of Westoby, Rice and Howell (1990) Dispersal modes have been predicted by the application of the 7 exclusion hypotheses and the seed size histogram (Fig. 1). U = unassisted, A = ant, V = vertebrate, Ad = adhesion, W = wind, B = ballistic, X = dispersal mode excluded" [Banksia ericifolia - Actual dispersal mode = Wind]
708	1986. Zammit, C./Hood, C.W.. Impact of flower and seed predators on seed-set in two Banksia shrubs. <i>Australian Journal of Ecology</i> . 11: 187-193.	[Propagules survive passage through the gut? Probably No, but not adapted for vertebrate consumption and internal dispersal. Depredated by insect seed predators] "A non-systemic Insecticide was used to exclude flower and seed predators from Banksia ericifolia and B. oblongifolia Inflorescences. In B. ericifolia this treatment doubled the number of inflorescences that set seeds, and increased by 40% the number of seeds produced per Inflorescence. Insecticide treatment did not alter either of these components of seed-set in B. oblongifolia partly because the experiment began too late to exclude flower predators In this species. The results obtained for B. ericifolia support the hypothesis that flower and seed predators explain, in part, the low incidence of seed bearing cones and the low seed:flower ratios reported for many Banksia species. Each Banksia species supports two guilds of Inflorescence predators. Two Lepidopteran species feed on young flowers; one of these causes tunnel damage to the rachis. Each Banksia species also supports five Lepidopteran and two Curculionid seed predators. About 40% of these herbivorous Insects are common to both shrubs."
801	1992. Honig, M.A./Cowling, R.M./Richardson, D.M.. The invasive potential of Australian banksias in South African fynbos: A comparison of the reproductive potential of Banksia ericifolia & Leucadendron lauroleum. <i>Australian J of Ecology</i> . 17(3): 305-314.	[Prolific seed production (>1000/m <sup>2</sup> )? Yes] "Eight year old B. ericifolia shrubs produced an average of 16 500 seeds per plant, which is thirty times more than the average of 570 seeds produced by 10 year old L. lauroleum shrubs. The seed bank of B. ericifolia was not only larger than that of L. lauroleum (1098 vs 525 viable seeds m <sup>-2</sup> projected canopy cover), but also considerably larger than that described for the species in its native environment (200–330 seeds m <sup>-2</sup> in a 9 year old stand north of Sydney)."
801	2004. Ruthrof, K.X.. Invasion by Eucalyptus megacornuta of an Urban Bushland in Southwestern Australia. <i>Weed Technology</i> . 18: 1376-1380.	[Prolific seed production (>1000/m <sup>2</sup> )? Presumably Yes] "Often, environmental weeds produce a higher number of viable seeds than endemic species (Amor and Piggin 1977; Fox and Adamson 1979). Bitou bush (Chrysanthemoides monilifera ssp. monilifera), for example, produces 23 times as many seeds in Australia than in its native habitat of South Africa (Scott 1996). Comparatively, prolific production of seed by the Australian species coastal wattle (Acacia cyclops) and heath banksia (Banksia ericifolia) was recorded in their alien habitat of South Africa (Gill 1984; Honig et al. 1992)."
802	1987. Zammit, C./Westoby, M.. Seedling Recruitment Strategies in Obligate-Seeding and Resprouting Banksia Shrubs. <i>Ecology</i> . 68(6): 1984-1992.	[Evidence that a persistent propagule bank is formed (>1 yr)? Yes. Canopy seed bank] "In B. ericifolia none of the seeds are clearly dormant. When seeds are kept moist, cumulative germination increases continuously until all live seeds have germinated. However selection for risk spreading requires only that there be several opportunities for germination that provide independent chances of success, and that variation between opportunities in the chance of success be large (den Boer 1968, Stearns 1976, Real 1980, Venable and Lawlor 1980, Rubenstein 1982, Goodman 1984, Bulmer 1985, Ellner 1985, Venable 1985, Brown and Venable 1986)."
802	1989. Copland, B.J./Whelan, R.J.. Seasonal Variation in Flowering Intensity and Pollination Limitation of Fruit Set in Four Co- Occurring Banksia Species. <i>Journal of Ecology</i> . 77(2): 509-523.	[Evidence that a persistent propagule bank is formed (>1 yr)? Yes] "Seeds produced annually by B. ericifolia plants are held in the infructescences until a fire ruptures the follicles and allows seed dispersal (Lamont, Collins & Cowling 1985; Whelan 1986). Years of prolific flowering thus contribute a high proportion of the seeds in this canopy-stored seed bank."
802	1992. Honig, M.A./Cowling, R.M./Richardson, D.M.. The invasive potential of Australian banksias in South African fynbos: A comparison of the reproductive potential of Banksia ericifolia & Leucadendron lauroleum. <i>Australian J of Ecology</i> . 17(3): 305-314.	[Evidence that a persistent propagule bank is formed (>1 yr)? Yes] "The invasive potential of Banksia ericifolia (Proteaceae) was investigated by comparing its recruitment potential with that of an indigenous proteaceous shrub, Leucadendron lauroleum. Both species are overstorey shrubs that are killed by fire and rely on canopy stored seeds (serotiny) for recruitment."
803	2011. Mthembu, B./Geets, S.. Banksia ericifolia. [Accessed 16 Aug 2012]. South African National Biodiversity Institute (SANBI), <a href="http://www.sanbi.org/information/infobases/invasive-alien-plant-alert/banksia-ericifolia">http://www.sanbi.org/information/infobases/invasive-alien-plant-alert/banksia-ericifolia</a>	[Well controlled by herbicides? Unknown] "Heath-leaved banksia is currently controlled by uprooting seedlings and cutting plants at ground level. There are no herbicides registered for this species in South Africa."
804	1987. Zammit, C./Westoby, M.. Population Structure and Reproductive Status of Two Banksia Shrubs at Various Times after Fire. <i>Vegetatio</i> . 70(1): 11-20.	[Tolerates, or benefits from, mutilation, cultivation, or fire? Not fire] "Banksia ericifolia L.f. is an obligate-seeder. In individuals (genets) are killed by fire and so depend entirely on successfully recruiting seedlings for the persistence of lineages."

804	1987. Zammit, C./Westoby, M.. Seedling Recruitment Strategies in Obligate-Seeding and Resprouting Banksia Shrubs. Ecology. 68(6): 1984-1992.	[Tolerates, or benefits from, mutilation, cultivation, or fire? Not fire. Killed by fire] "Banksia ericifolia is killed by fire and so depends upon seeds for persistence."
804	1988. Bradstock, R.A./O'Connell, M.A.. Demography of woody plants in relation to fire: Banksia ericifolia L.f. and Petrophile pulchella (Schrad) R.Br.. Australian Journal of Ecology. 13: 505-518.	[Tolerates, or benefits from, mutilation, cultivation, or fire? Not fire] "Plants of Banksia ericifolia and Petrophile pulchella are sensitive to fire. Changes in population size under different fire regimes were estimated, based on measurements of post-fire seedling emergence, seedling survival, survival and seed production in established plants of differing ages, survival of seeds held in serotinous cones and seed release in the periods between fire."
804	2001. Bradstock, R.A./Williams, J.E./Gill, M.A.. Flammable Australia: The Fire Regimes and Biodiversity of a Continent. Cambridge University Press, Cambridge, UK	[Tolerates, or benefits from, mutilation, cultivation, or fire? Reported as able to resprout in this reference] "Ingwersen (1977) reported that Banksia ericifolia (the archetype obligate seeder) resprouts at coastal headland sites at Jervis Bay, whereas plants are killed by fire at most other locations."
804	2012. Geerts, S. South African National Biodiversity Institute (SANBI) & Centre for Invasion Biology (CIB). Pers. Comm. 17 August, 2012.	[Tolerates, or benefits from, mutilation, cultivation, or fire? No] "We have cut down hundreds of trees and most of them die."
805	2012. WRA Specialist. Personal Communication.	[Effective natural enemies present locally (e.g. introduced biocontrol agents)? Unknown for Hawaiian Islands]

## Summary of Risk Traits

### High Risk / Undesirable Traits

- Naturalized in New Zealand and South Africa
- Broad climate suitability
- Other *Banksia* species have become invasive
- From fire prone ecosystems and may increase fire risk
- Forms dense, monotypic stands
- May hybridize with *Banksia spinulosa*
- Possesses limited self-compatibility
- Wind-dispersed seeds
- Forms canopy stored seed bank (serotiny)

### Low Risk / Desirable Traits

- Unarmed
- Non-toxic
- Landscaping and ornamental value (showy flowers)
- Attracts birds and other wildlife
- Not known to spread vegetatively
- Killed by fires and will not resprout after cutting