

<b>Taxon:</b> <i>Protea cynaroides</i> (L.) L.	<b>Family:</b> Proteaceae
<b>Common Name(s):</b> king protea	<b>Synonym(s):</b> Leucadendron cynaroides L.

<b>Assessor:</b> Chuck Chimera	<b>Status:</b> Assessor Approved	<b>End Date:</b> 19 Apr 2017
<b>WRA Score:</b> -2.0	<b>Designation:</b> L	<b>Rating:</b> Low Risk

**Keywords:** Woody Shrub, Unarmed, Lignotuber, Serotinous, Resprouter

Qsn #	Question	Answer Option	Answer
101	Is the species highly domesticated?	y=-3, n=0	n
102	Has the species become naturalized where grown?		
103	Does the species have weedy races?		
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)	Intermediate
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	n
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		
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)	n
305	Congeneric weed		
401	Produces spines, thorns or burrs	y=1, n=0	n
402	Allelopathic		
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals		
405	Toxic to animals	y=1, n=0	n
406	Host for recognized pests and pathogens		
407	Causes allergies or is otherwise toxic to humans	y=1, n=0	n
408	Creates a fire hazard in natural ecosystems		
409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	n
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y=1, n=0	y

Qsn #	Question	Answer Option	Answer
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets	y=1, n=0	n
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		
604	Self-compatible or apomictic	y=1, n=-1	n
605	Requires specialist pollinators	y=-1, n=0	y
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	n
704	Propagules adapted to wind dispersal	y=1, n=-1	y
705	Propagules water dispersed	y=1, n=-1	n
706	Propagules bird dispersed		
707	Propagules dispersed by other animals (externally)		
708	Propagules survive passage through the gut	y=1, n=-1	n
801	Prolific seed production (>1000/m <sup>2</sup> )	y=1, n=-1	n
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	y
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	y
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)		

**Supporting Data:**

Qsn #	Question	Answer
101	Is the species highly domesticated?	n
	Source(s)	Notes
	Jamieson, H. G. 2001. <i>Protea cynaroides</i> . PlantZAfrica. SANBI. <a href="https://www.plantzafrica.com/plantnop/proteacyna.htm">https://www.plantzafrica.com/plantnop/proteacyna.htm</a> . [Accessed 18 Apr 2017]	[No evidence] " <i>Protea cynaroides</i> has one of the widest distribution ranges of all the Proteaceae and occurs from the Cedarberg in the northwest to Grahamstown in the east. It occurs on all mountain ranges in this area, except for the dry interior ranges, and at all elevations, from sea level to 1500 meters high. The combination of the different climatic conditions with the large range of localities has resulted in a large variety of leaf- and flower sizes, as well as flower colours and flowering times. The different forms retain these characteristics even when grown under the same conditions on a commercial scale. This has made it possible to grow <i>Protea cynaroides</i> as a cut flower for a wide variety of export markets, where the flowers are needed at different times of the year. This South African protea is now grown in large quantities in New Zealand, Australia and Hawaii. In Mediterranean climates in Europe, America and Australia it can be grown successfully as a garden plant in the right type of soil."
102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. 2017. Personal Communication	NA
103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. 2017. Personal Communication	NA
201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	Intermediate
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. <a href="http://www.ars-grin.gov/npgs/index.html">http://www.ars-grin.gov/npgs/index.html</a> . [Accessed 18 Apr 2017]	"Native: Africa Southern Africa: South Africa - Cape Province" [In contrast to the rest of the South Africa, most of the Western Cape experiences a maritime Mediterranean climate*, with the winter months wet and cool, the summer hot and dry.]

Qsn #	Question	Answer
202	Quality of climate match data	High
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. <a href="http://www.ars-grin.gov/npgs/index.html">http://www.ars-grin.gov/npgs/index.html</a> . [Accessed 18 Apr 2017]	

203	Broad climate suitability (environmental versatility)	y
	Source(s)	Notes
	Carruthers, V. 2000. The Wildlife of Southern Africa: A Field Guide to the Animals and Plants of the Region. Struik Publishers, Cape Town, South Africa	"From SW to SE, coast to 1000 m."
	Jamieson, H. G. 2001. <i>Protea cynaroides</i> . PlantZAfrica. SANBI. <a href="https://www.plantzafrica.com/plantnop/proteacyna.htm">https://www.plantzafrica.com/plantnop/proteacyna.htm</a> . [Accessed 18 Apr 2017]	" <i>Protea cynaroides</i> has one of the widest distribution ranges of all the Proteaceae and occurs from the Cedarberg in the northwest to Grahamstown in the east. It occurs on all mountain ranges in this area, except for the dry interior ranges, and at all elevations, from sea level to 1500 meters high. The combination of the different climatic conditions with the large range of localities has resulted in a large variety of leaf- and flower sizes, as well as flower colours and flowering times."

204	Native or naturalized in regions with tropical or subtropical climates	n
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. <a href="http://www.ars-grin.gov/npgs/index.html">http://www.ars-grin.gov/npgs/index.html</a> . [Accessed 18 Apr 2017]	"Native: Africa Southern Africa: South Africa - Cape Province" [In contrast to the rest of the South Africa, most of the Western Cape experiences a maritime Mediterranean climate*, with the winter months wet and cool, the summer hot and dry.]
	Oakman, H. 1995. Harry Oakman's what flowers when: the complete guide to flowering times in tropical and subtropical gardens. Univ. of Queensland Press, St. Lucia, Australia	"Slow growing; needs full sun and good drainage; difficult under tropical conditions"

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	Notes
	Jamieson, H. G. 2001. <i>Protea cynaroides</i> . PlantZAfrica. SANBI. <a href="https://www.plantzafrica.com/plantnop/proteacyna.htm">https://www.plantzafrica.com/plantnop/proteacyna.htm</a> . [Accessed 18 Apr 2017]	"The different forms retain these characteristics even when grown under the same conditions on a commercial scale. This has made it possible to grow <i>Protea cynaroides</i> as a cut flower for a wide variety of export markets, where the flowers are needed at different times of the year. This South African protea is now grown in large quantities in New Zealand, Australia and Hawaii. In Mediterranean climates in Europe, America and Australia it can be grown successfully as a garden plant in the right type of soil."

Qsn #	Question	Answer
301	Naturalized beyond native range	
	Source(s)	Notes
	DAISIE. 2017. Species Factsheet - <i>Protea cynaroides</i> . <a href="http://www.europe-aliens.org/speciesFactsheet.do?speciesId=6144#">http://www.europe-aliens.org/speciesFactsheet.do?speciesId=6144#</a> . [Accessed 18 Apr 2017]	Country - Madeira Status - Alien/Established Contributor - Silva Vieira, R. M. da (2002)
	Wagner, W.L., Herbst, D.R. & Lorence, D.H. 2017. Flora of the Hawaiian Islands. Smithsonian Institution, Washington, D.C. <a href="http://botany.si.edu/">http://botany.si.edu/</a> . [Accessed 18 Apr 2017]	No evidence to date

302	Garden/amenity/disturbance weed	n
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

303	Agricultural/forestry/horticultural weed	n
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

304	Environmental weed	n
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

305	Congeneric weed	
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	A number of other <i>Protea</i> species are listed as naturalized and/or weeds, but unable to corroborate with references cited.

401	Produces spines, thorns or burrs	n
	Source(s)	Notes
	Jamieson, H. G. 2001. <i>Protea cynaroides</i> . PlantZAfrica. SANBI. <a href="https://www.plantzafrica.com/plantnop/proteacyna.htm">https://www.plantzafrica.com/plantnop/proteacyna.htm</a> . [Accessed 18 Apr 2017]	[No evidence] " <i>Protea cynaroides</i> is a woody shrub with thick stems and large dark green, glossy leaves. Most plants are one metre in height when mature, but may vary according to locality and habitat from 0.35 m to 2 metres in height."

402	Allelopathic	
	Source(s)	Notes
	WRA Specialist. 2017. Personal Communication	Unknown

Qsn #	Question	Answer
403	Parasitic	n
	Source(s)	Notes
	Jamieson, H. G. 2001. <i>Protea cynaroides</i> . PlantZAfrica. SANBI. <a href="https://www.plantzafrica.com/plantnop/proteacyna.htm">https://www.plantzafrica.com/plantnop/proteacyna.htm</a> . [Accessed 18 Apr 2017]	" <i>Protea cynaroides</i> is a woody shrub with thick stems and large dark green, glossy leaves. Most plants are one metre in height when mature, but may vary according to locality and habitat from 0.35 m to 2 metres in height. " [No evidence]

404	Unpalatable to grazing animals	
	Source(s)	Notes
	Davidge, C. (1976). Activity patterns of baboons ( <i>Papio ursinus</i> ) at Cape Point. MSc Thesis. University of Cape Town, Cape Town, South Africa	[Young inflorescences consumed by baboons] "Baboons of all age and sex classes plucked entire protea (generally <i>Leucospermum conocarpodendron</i> ) inflorescences, reaching up to them from the ground or while climbing in the shrubs. A baboon sometimes carried an inflorescence to a nearby rock before dealing with it. Young green inflorescences were most frequently taken. Discarded young inflorescences of <i>L. conocarpodendron</i> and <i>Protea cynaroides</i> , which I examined, showed that only a small portion was eaten. These inflorescences had been broken off from the peduncle to expose the pithy base of the capitulum, which was then hollowed out from the intact head."

405	Toxic to animals	n
	Source(s)	Notes
	Plants for a Future. 2017. <i>Protea cynaroides</i> . <a href="http://www.pfaf.org/user/Plant.aspx?LatinName=Protea+cynaroides">http://www.pfaf.org/user/Plant.aspx?LatinName=Protea+cynaroides</a> . [Accessed 19 Apr 2017]	"Known Hazards: None known"
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	No evidence

406	Host for recognized pests and pathogens	
	Source(s)	Notes

Qsn #	Question	Answer
	Knox-Davies, P. S., Van Wyk, P. S., & Marasas, W. F. O. (1985). Diseases of proteas and their control in the South-Western Cape. ISHS Acta Horticulturae 185: 189-200	"Most local protea diseases are caused by fungi belonging to the Loculoascomycotina and Deuteromycotina. There are no records of any rusts, smuts, powdery mildews, downy mildews, or bacterial or viral diseases. Many leaf specks, leaf blotches and leaf spots reduce the value of cut flowers. Important leaf spot diseases are those caused by <i>Mycosphaerella proteae</i> on <i>Protea neriifolia</i> and <i>Protea grandiceps</i> , by <i>Leptosphaeria protearum</i> on <i>Protea magnifica</i> and by <i>Batcheloromyces proteae</i> on certain <i>Protea cynaroides</i> ecotypes. Canker, die-back, anthracnose and blighting of shoots and twigs are especially common in older plantations. <i>Colletotrichum gloeosporioides</i> is important on <i>Protea compacta</i> and other species, whereas a <i>Drechslera</i> sp. causes blighting of certain <i>Leucospermum cordifolium</i> cultivars. The role of <i>Botryosphaeria</i> spp. is not clear, though they seem to be extremely successful opportunistic colonizers of protea shoots, flower parts and seeds. Scab is caused by an <i>Elsinoe</i> sp. Corky lesions develop on stems and leaves, particularly of <i>L. cordifolium</i> , and flowering is reduced. Control of above-ground fungal diseases is largely by applying sanitation measures, by avoiding susceptible species and cultivars, and by strategic use of fungicides. Witches' broom is an important disease of <i>P. cynaroides</i> , <i>P. neriifolia</i> and <i>P. compacta</i> X <i>P. neriifolia</i> hybrids. Control is by controlling the mite <i>Aceria proteae</i> and by strict sanitation. Damping-off and seedling blight occur sporadically. Some common pathogens are involved, but only <i>C. gloeosporioides</i> has been studied to any extent. It is controlled by thiram seed treatment. <i>Phytophthora cinnamomi</i> root rot is particularly severe on <i>Leucadendron argenteum</i> , <i>Leucospermum cordifolium</i> , <i>Leucadendron discolor</i> and <i>Leucadendron tinctum</i> . Losses are reduced by avoiding soils with a history of root rot and by planting tolerant species or cultivars. Cuttings sometimes die in mistbeds. A preplant treatment with captafol has given promising control. Postharvest diseases include rhizopus and botrytis decay of <i>L. cordifolium</i> blooms and blackening of <i>Protea</i> leaves. Use of disease-resistant cultivars is an important general disease control measure. But erosion of disease resistance in breeding programs means that shifts in importance of the different pathogens could occur. There is also the danger that indigenous pathogens will be disseminated on breeding material distributed to growers."
	The Royal Horticultural Society. 2017. <i>Protea cynaroides</i> . <a href="https://www.rhs.org.uk/Plants/13930/i-Protea-cynaroides-i/Details">https://www.rhs.org.uk/Plants/13930/i-Protea-cynaroides-i/Details</a> . [Accessed 19 Apr 2017]	"Pests Generally pest free Diseases May suffer from chlorosis induced by magnesium deficiency "
	Missouri Botanical Garden. 2017. <i>Protea cynaroides</i> . <a href="http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=d278">http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=d278</a> . [Accessed 19 Apr 2017]	"Problems: No known serious insect or disease problems."

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes
	Plants for a Future. 2017. <i>Protea cynaroides</i> . <a href="http://www.pfaf.org/user/Plant.aspx?LatinName=Protea+cynaroides">http://www.pfaf.org/user/Plant.aspx?LatinName=Protea+cynaroides</a> . [Accessed 19 Apr 2017]	"Known Hazards: None known" ... "The sweet nectar from the flowers is consumed directly"

Qsn #	Question	Answer
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	No evidence

408	Creates a fire hazard in natural ecosystems	
	Source(s)	Notes
	Jackson, W. P. U. (1976). Fire and flora on Constantia Ridge, Table Mountain. Veld & Flora, 62(1), 24-27	"They may be burnt down but rapidly regrow from resistant base or rootstock - again this can be illustrated by Proleaceae, e.g. <i>P. cynaroides</i> (giant or king Protea), and Ericaceae, particularly <i>Erica cerinthoides</i> ("red heath")."
	Jamieson, H. G. 2001. <i>Protea cynaroides</i> . PlantZAfrica. SANBI. <a href="https://www.plantzafrica.com/plantnop/proteacyna.htm">https://www.plantzafrica.com/plantnop/proteacyna.htm</a> . [Accessed 18 Apr 2017]	[Adapted to survive in fire prone ecosystems] " <i>Protea cynaroides</i> occurs in fire prone vegetation, where natural fires occur every ten to thirty years. This 'Mediterranean' type of vegetation grows in soils with very low amounts of nutrients. These nutrients are used up by the plants during their lifetime and need to be returned to the soil to provide the food for a new generation of plants. <i>Protea cynaroides</i> is adapted to survive the fires by its thick underground stem, which contains many dormant buds; these will produce the new growth after the fire."

409	Is a shade tolerant plant at some stage of its life cycle	n
	Source(s)	Notes
	The Royal Horticultural Society. 2017. <i>Protea cynaroides</i> . <a href="https://www.rhs.org.uk/Plants/13930/i-Protea-cynaroides-i/Details">https://www.rhs.org.uk/Plants/13930/i-Protea-cynaroides-i/Details</a> . [Accessed 19 Apr 2017]	"Full Sun"
	Plants for a Future. 2017. <i>Protea cynaroides</i> . <a href="http://www.pfaf.org/user/Plant.aspx?LatinName=Protea+cynaroides">http://www.pfaf.org/user/Plant.aspx?LatinName=Protea+cynaroides</a> . [Accessed 19 Apr 2017]	"It cannot grow in the shade." ... "Requires full exposure to the sun"
	Oakman, H. 1995. Harry Oakman's what flowers when: the complete guide to flowering times in tropical and subtropical gardens. Univ. of Queensland Press, St. Lucia, Australia	"Slow growing; needs full sun and good drainage"
	Missouri Botanical Garden. 2017. <i>Protea cynaroides</i> . <a href="http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=d278">http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=d278</a> . [Accessed 19 Apr 2017]	"Sun: Full sun"

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	Notes
	Missouri Botanical Garden. 2017. <i>Protea cynaroides</i> . <a href="http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=d278">http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=d278</a> . [Accessed 19 Apr 2017]	"...typically grown in acidic, poor to average, medium moisture, well-drained soils in full sun."
	The Royal Horticultural Society. 2017. <i>Protea cynaroides</i> . <a href="https://www.rhs.org.uk/Plants/13930/i-Protea-cynaroides-i/Details">https://www.rhs.org.uk/Plants/13930/i-Protea-cynaroides-i/Details</a> . [Accessed 19 Apr 2017]	"Moisture: Well-drained Soil: Loam, Sand pH: Acid, Neutral"



Qsn #	Question	Answer
	Plants for a Future. 2017. <i>Protea cynaroides</i> . <a href="http://www.pfaf.org/user/Plant.aspx?LatinName=Protea+cynaroides">http://www.pfaf.org/user/Plant.aspx?LatinName=Protea+cynaroides</a> . [Accessed 19 Apr 2017]	"Suitable for: light (sandy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: acid soils and can grow in very acid soils." ... "Requires a very well-drained light soi [1, 124], preferably on the poor side[200], with plenty of humus and sand[1]. Requires a pH of 6.5 or lower[200]. Plants are very difficult to grow [188], they are sensitive to nitrates and phosphates in the soil, these can prove toxic even at moderate levels[200]. Plants require reasonable potassium levels[260] and may also suffer from magnesium deficiency[200]."

411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Jamieson, H. G. 2001. <i>Protea cynaroides</i> . PlantZAfrica. SANBI. <a href="https://www.plantzafrica.com/plantnop/proteacyna.htm">https://www.plantzafrica.com/plantnop/proteacyna.htm</a> . [Accessed 18 Apr 2017]	" <i>Protea cynaroides</i> is a woody shrub with thick stems and large dark green, glossy leaves. Most plants are one metre in height when mature, but may vary according to locality and habitat from 0.35 m to 2 metres in height."

412	Forms dense thickets	n
	Source(s)	Notes
	Jamieson, H. G. 2001. <i>Protea cynaroides</i> . PlantZAfrica. SANBI. <a href="https://www.plantzafrica.com/plantnop/proteacyna.htm">https://www.plantzafrica.com/plantnop/proteacyna.htm</a> . [Accessed 19 Apr 2017]	[No evidence] " <i>Protea cynaroides</i> has one of the widest distribution ranges of all the Proteaceae and occurs from the Cedarberg in the northwest to Grahamstown in the east. It occurs on all mountain ranges in this area, except for the dry interior ranges, and at all elevations, from sea level to 1500 meters high. "
	Mucina, L., & Rutherford, M. (eds) 2006. The vegetation of South Africa, Lesotho and Swaziland. <i>Strelitzia</i> 19. South African National Biodiversity Institute, Pretoria	No evidence

501	Aquatic	n
	Source(s)	Notes
	Jamieson, H. G. 2001. <i>Protea cynaroides</i> . PlantZAfrica. SANBI. <a href="https://www.plantzafrica.com/plantnop/proteacyna.htm">https://www.plantzafrica.com/plantnop/proteacyna.htm</a> . [Accessed 18 Apr 2017]	[Terrestrial] " <i>Protea cynaroides</i> has one of the widest distribution ranges of all the Proteaceae and occurs from the Cedarberg in the northwest to Grahamstown in the east. It occurs on all mountain ranges in this area, except for the dry interior ranges, and at all elevations, from sea level to 1500 meters high."

502	Grass	n
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. <a href="http://www.ars-grin.gov/npgs/index.html">http://www.ars-grin.gov/npgs/index.html</a> . [Accessed 18 Apr 2017]	Proteaceae

503	Nitrogen fixing woody plant	n
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. <a href="http://www.ars-grin.gov/npgs/index.html">http://www.ars-grin.gov/npgs/index.html</a> . [Accessed 18 Apr 2017]	Proteaceae

504	<b>Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Jamieson, H. G. 2001. <i>Protea cynaroides</i> . PlantZAfrica. SANBI. <a href="https://www.plantzafrica.com/plantnop/proteacyna.htm">https://www.plantzafrica.com/plantnop/proteacyna.htm</a> . [Accessed 18 Apr 2017]	" <i>Protea cynaroides</i> is a woody shrub with thick stems and large dark green, glossy leaves. Most plants are one metre in height when mature, but may vary according to locality and habitat from 0.35 m to 2 metres in height."

601	<b>Evidence of substantial reproductive failure in native habitat</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Jamieson, H. G. 2001. <i>Protea cynaroides</i> . PlantZAfrica. SANBI. <a href="https://www.plantzafrica.com/plantnop/proteacyna.htm">https://www.plantzafrica.com/plantnop/proteacyna.htm</a> . [Accessed 18 Apr 2017]	" <i>Protea cynaroides</i> has one of the widest distribution ranges of all the Proteaceae and occurs from the Cedarberg in the northwest to Grahamstown in the east. It occurs on all mountain ranges in this area, except for the dry interior ranges, and at all elevations, from sea level to 1500 meters high. The combination of the different climatic conditions with the large range of localities has resulted in a large variety of leaf- and flower sizes, as well as flower colours and flowering times. The different forms retain these characteristics even when grown under the same conditions on a commercial scale. This has made it possible to grow <i>Protea cynaroides</i> as a cut flower for a wide variety of export markets, where the flowers are needed at different times of the year. This South African protea is now grown in large quantities in New Zealand, Australia and Hawaii. In Mediterranean climates in Europe, America en Australia it can be grown successfully as a garden plant in the right type of soil."

602	<b>Produces viable seed</b>	y
	<b>Source(s)</b>	<b>Notes</b>
	Oakman, H.1995. Harry Oakman's what flowers when: the complete guide to flowering times in tropical and subtropical gardens. Univ. of Queensland Press, St. Lucia, Australia	"Slow growing; needs full sun and good drainage; difficult under tropical conditions; propagated from seed; origin is South Africa."

Qsn #	Question	Answer
603	Hybridizes naturally	
	Source(s)	Notes
	Van der Walt, I. D., & Littlejohn, G. M. (1996). Pollen morphology, male hybrid fertility and pollen tube pathways in <i>Protea</i> . <i>South African Journal of Botany</i> , 62 (5), 236-246	[Unknown. Artificial hybrids possible] " <i>Protea cynaroides</i> is considered to be the most primitive species in the genus <i>Protea</i> and is classified on its own in the intrageneric classification of <i>Protea</i> (Rourke pers. commun.). This large intrageneric distance between <i>P. cynaroides</i> and the other species may explain the sterility of the two <i>P. cynaroides</i> hybrids."

604	Self-compatible or apomictic	n
	Source(s)	Notes
	Acton, Q. A. (Ed.). (2013). <i>Issues in Life Sciences—Botany and Plant Biology Research: 2013 Edition</i> . ScholarlyEditions, Atlanta, GA	" <i>Protea</i> have strong self-incompatibility systems. However, this assumption was based largely on studies conducted on a clade of bird-pollinated species that occur in the shrubby fynbos vegetation of the Cape region of southern Africa."

605	Requires specialist pollinators	y
	Source(s)	Notes
	Oakman, H. 1995. <i>Harry Oakman's what flowers when: the complete guide to flowering times in tropical and subtropical gardens</i> . Univ. of Queensland Press, St. Lucia, Australia	"Flowers are in terminal heads, 20 centimetres across, pink or red, and are attractive to birds and insects."
	Jamieson, H. G. 2001. <i>Protea cynaroides</i> . PlantZAfrica. SANBI. <a href="https://www.plantzafrica.com/plantnop/proteacyna.htm">https://www.plantzafrica.com/plantnop/proteacyna.htm</a> . [Accessed 18 Apr 2017]	"The flowers are pollinated by Scarab Beetles and <i>Protea</i> Beetles and many other insects, as well as by birds. The birds are attracted by the nectar as well as by the insects visiting the flowers."

606	Reproduction by vegetative fragmentation	n
	Source(s)	Notes
	Jamieson, H. G. 2001. <i>Protea cynaroides</i> . PlantZAfrica. SANBI. <a href="https://www.plantzafrica.com/plantnop/proteacyna.htm">https://www.plantzafrica.com/plantnop/proteacyna.htm</a> . [Accessed 18 Apr 2017]	[No evidence] " <i>Protea cynaroides</i> can be propagated from seed or from cuttings. The stems have to be thick and strong to carry the heavy flower heads, this makes the taking of cuttings quite difficult, but good colour forms or cultivars have to be propagated from cuttings."

607	Minimum generative time (years)	>3
	Source(s)	Notes
	Jamieson, H. G. 2001. <i>Protea cynaroides</i> . PlantZAfrica. SANBI. <a href="https://www.plantzafrica.com/plantnop/proteacyna.htm">https://www.plantzafrica.com/plantnop/proteacyna.htm</a> . [Accessed 18 Apr 2017]	"The plants are generally about four or five years old from seed before they flower. On older plants the side shoots tend to be quite short, so to encourage the development of new shoots and long stems, the stems bearing old flower heads should be cut back to ground level."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Bhattacharyya, B. 2015. Golden Greens: The Amazing World of Plants. The Energy and Resources Institute (TERI), New Delhi, India	"The seeds of Protea have long stiff trichomes that form a pappus-like structure. As the species is serotinous, the seeds are released from a woody cone-like fruit after a fire, when vegetative barriers to dispersal are at the minimum. The dispersal takes place in two stages. First, the seeds have a free fall from the cones, and there is subsequent dispersal by rolling over the soil in the second stage."

702	Propagules dispersed intentionally by people	y
	<b>Source(s)</b>	<b>Notes</b>
	Staples, G.W. & Herbst, D.R. 2005. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	"Several species are cultivated in Hawaii, of which the most spectacular are <i>Protea cynaroides</i> Linnaeus, King Protea, which has elliptic to round leaves with petioles 1.5-7" long and (usually) clear shell-pink flower heads 7-12" in diameter, encircled by fuzzy bracts covered in fine down"
	Jamieson, H. G. 2001. <i>Protea cynaroides</i> . PlantZAfrica. SANBI. <a href="https://www.plantzafrica.com/plantnop/proteacyna.htm">https://www.plantzafrica.com/plantnop/proteacyna.htm</a> . [Accessed 18 Apr 2017]	"The different forms retain these characteristics even when grown under the same conditions on a commercial scale. This has made it possible to grow <i>Protea cynaroides</i> as a cut flower for a wide variety of export markets, where the flowers are needed at different times of the year. This South African protea is now grown in large quantities in New Zealand, Australia and Hawaii."

703	Propagules likely to disperse as a produce contaminant	n
	<b>Source(s)</b>	<b>Notes</b>
	Protea Atlas Project. 2017. King Sugarbushes - Proteas. <a href="http://www.proteaatlas.org.za/sugar7.htm#prcyna">http://www.proteaatlas.org.za/sugar7.htm#prcyna</a> . [Accessed 19 Apr 2017]	"Fruit: Stored on plant for a few years Seed dispersal: Wind Seed storage: In seedheads on plant"

704	Propagules adapted to wind dispersal	y
	<b>Source(s)</b>	<b>Notes</b>
	Protea Atlas Project. 2017. King Sugarbushes - Proteas. <a href="http://www.proteaatlas.org.za/sugar7.htm#prcyna">http://www.proteaatlas.org.za/sugar7.htm#prcyna</a> . [Accessed 19 Apr 2017]	"Fruit: Stored on plant for a few years Seed dispersal: Wind Seed storage: In seedheads on plant"
	Bhattacharyya, B. 2015. Golden Greens: The Amazing World of Plants. The Energy and Resources Institute (TERI), New Delhi, India	"The seeds of Protea have long stiff trichomes that form a pappus-like structure. As the species is serotinous, the seeds are released from a woody cone-like fruit after a fire, when vegetative barriers to dispersal are at the minimum. The dispersal takes place in two stages. First, the seeds have a free fall from the cones, and there is subsequent dispersal by rolling over the soil in the second stage. Hence, these seeds are also known as "tumbleseeds" (Bond 1988). However, the rate of seedset, i.e., number of seeds formed per plant is quite low. The most important factor in its dispersal is the size of the tuft of hairs and the wing-loading of the seeds, i.e., how far they can move."

705	Propagules water dispersed	n
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Protea Atlas Project. 2017. King Sugarbushes - Proteas. <a href="http://www.proteaatlas.org.za/sugar7.htm#prcyna">http://www.proteaatlas.org.za/sugar7.htm#prcyna</a> . [Accessed 19 Apr 2017]	"Fruit: Stored on plant for a few years Seed dispersal: Wind Seed storage: In seedheads on plant"
<b>706</b>	<b>Propagules bird dispersed</b>	
	<b>Source(s)</b>	<b>Notes</b>
	Jamieson, H. G. 2001. <i>Protea cynaroides</i> . PlantZAfrica. SANBI. <a href="https://www.plantzafrica.com/plantnop/proteacyna.htm">https://www.plantzafrica.com/plantnop/proteacyna.htm</a> . [Accessed 19 Apr 2017]	"The seeds are quite large nuts, covered by hairs and stay in the old flower head for a year or more. They are released after a fire and dispersed by rodents and birds." [Seeds likely depredated by birds and rodents. Seeds that escape predation may be dispersed]
<b>707</b>	<b>Propagules dispersed by other animals (externally)</b>	
	<b>Source(s)</b>	<b>Notes</b>
	Jamieson, H. G. 2001. <i>Protea cynaroides</i> . PlantZAfrica. SANBI. <a href="https://www.plantzafrica.com/plantnop/proteacyna.htm">https://www.plantzafrica.com/plantnop/proteacyna.htm</a> . [Accessed 19 Apr 2017]	"The seeds are quite large nuts, covered by hairs and stay in the old flower head for a year or more. They are released after a fire and dispersed by rodents and birds." [Seeds likely depredated by birds and rodents. Seeds that escape predation may be dispersed]
<b>708</b>	<b>Propagules survive passage through the gut</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Jamieson, H. G. 2001. <i>Protea cynaroides</i> . PlantZAfrica. SANBI. <a href="https://www.plantzafrica.com/plantnop/proteacyna.htm">https://www.plantzafrica.com/plantnop/proteacyna.htm</a> . [Accessed 19 Apr 2017]	"The seeds are quite large nuts, covered by hairs and stay in the old flower head for a year or more. They are released after a fire and dispersed by rodents and birds." [Seeds likely depredated by birds and rodents. Seeds that escape predation may be dispersed]
<b>801</b>	<b>Prolific seed production (&gt;1000/m<sup>2</sup>)</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Jamieson, H. G. 2001. <i>Protea cynaroides</i> . PlantZAfrica. SANBI. <a href="https://www.plantzafrica.com/plantnop/proteacyna.htm">https://www.plantzafrica.com/plantnop/proteacyna.htm</a> . [Accessed 18 Apr 2017]	"The large flower heads produce a disappointingly small amount of good seeds, only 1 - 30 percent of flowers result in seed. The plant's need to produce nutrient-rich seeds in a nutrient-poor environment is thought to limit the amount of seeds it can produce."
<b>802</b>	<b>Evidence that a persistent propagule bank is formed (&gt;1 yr)</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	Jamieson, H. G. 2001. <i>Protea cynaroides</i> . PlantZAfrica. SANBI. <a href="https://www.plantzafrica.com/plantnop/proteacyna.htm">https://www.plantzafrica.com/plantnop/proteacyna.htm</a> . [Accessed 18 Apr 2017]	"The seeds are quite large nuts, covered by hairs and stay in the old flower head for a year or more."

Qsn #	Question	Answer
803	Well controlled by herbicides	
	Source(s)	Notes
	WRA Specialist. 2017. Personal Communication	Unknown. No information on herbicide efficacy or chemical control of this species

804	Tolerates, or benefits from, mutilation, cultivation, or fire	y
	Source(s)	Notes
	Jamieson, H. G. 2001. <i>Protea cynaroides</i> . PlantZAfrica. SANBI. <a href="https://www.plantzafrica.com/plantnop/proteacyna.htm">https://www.plantzafrica.com/plantnop/proteacyna.htm</a> . [Accessed 18 Apr 2017]	" <i>Protea cynaroides</i> is adapted to survive the fires by its thick underground stem, which contains many dormant buds; these will produce the new growth after the fire."
	Jackson, W. P. U. (1976). Fire and flora on Constantia Ridge, Table Mountain. <i>Veld &amp; Flora</i> , 62(1), 24-27	"They may be burnt down but rapidly regrow from resistant base or rootstock - again this can be illustrated by Proteaceae, e.g. <i>P. cynaroides</i> (giant or king Protea), and Ericaceae, particularly <i>Erica cerinthoides</i> ("red heath")."
	Manning, J. 2007. Field Guide to Fynbos. Struik Publishers, Cape Town, South Africa	[Resprouting] "Multi-stemmed, resprouting shrub to 3 m with hairless, long-petioled leaves that have an elliptical to rounded blade 120-300 mm long; bears large cup-shaped flowerheads 120-300 mm in diameter with pale or deep pink involucral bracts that are often silky outside; the style is 80-95 mm long. Moist sandstone slopes in the southwestern, southern and Eastern Cape."

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	WRA Specialist. 2017. Personal Communication	Unknown

**Summary of Risk Traits:**

## High Risk / Undesirable Traits

- Grows in maritime, Mediterranean climates
- Reported to be naturalized and/or a weed but evidence is inconclusive
- From fire-prone ecosystem. May increase fire risk in introduced range.
- Tolerates many soil types
- Reproduces by seeds
- May hybridize with other *Protea* species
- Seeds dispersed by wind & intentionally by people
- Birds and rodents may secondarily disperse seeds (but may primarily be seed predators)
- Serotinous seeds form a persistent canopy “seed bank”
- Tolerates regular pruning

## Low Risk Traits

- Unarmed (no spines, thorns, or burrs)
- Non-toxic
- Ornamentals
- Requires full sun
- Self-incompatible
- Reaches maturity in 4-5 years
- Not reported to spread vegetatively
- Relatively large, serotinous seeds unlikely to be inadvertently dispersed