

<b>Taxon:</b> <i>Aloe plicatilis</i> (L.) Mill.	<b>Family:</b> Xanthorrhoeaceae
<b>Common Name(s):</b> fan aloe	<b>Synonym(s):</b> <i>Aloe disticha</i> var. <i>plicatilis</i> L. <i>Aloe lingua</i> Thunb. <i>Gasteria lingua</i> (Thunb.) A. Berger

<b>Assessor:</b> Chuck Chimera	<b>Status:</b> Assessor Approved	<b>End Date:</b> 20 Sep 2016
<b>WRA Score:</b> -6.0	<b>Designation:</b> L	<b>Rating:</b> Low Risk

**Keywords:** Tree Aloe, Mediterranean Climate, Ornamental, Slow-Growing, Wind-Dispersed

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	n
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	y = 1*multiplier (see Appendix 2), n= question 205	n
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	n=0, y = 1*multiplier (see Appendix 2)	y
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	y=1, n=-1	n
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	y=1, n=0	n
409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	y

Qsn #	Question	Answer Option	Answer
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y=1, n=0	n
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets		
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		
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	y
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	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	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	n
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire		
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
	Van Jaarsveld, E., (2011). The tree aloes of southern and eastern Africa. <i>Cactus and Succulent Journal</i> 83(1), 9–21	[Not domesticated] "Aloe plicatilis is known only from the Hottentots Holland Mountain range and adjacent Paarl Mountain where it grows on lower mountain slopes in fynbos vegetation and especially on rocky ridges and scree."

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. 2016. 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
	Cousins, S. R. (2013). The ecology of <i>Aloe plicatilis</i> : a tree aloe endemic to the Cape fynbos, South Africa. MSc Thesis. University of the Witwatersrand, Johannesburg, South Africa	"Aloe plicatilis is endemic to the Cape fynbos in mountainous parts of the Cape Winelands (also known as the "Boland") within the Cape Floristic Region (CFR), south-western Cape, South Africa (Van Wyk and Smith, 2008). The CFR is characterized by a Mediterranean climate with hot, dry, windy summers (average midsummer temperatures = 15–25°C) and cool, wet winters (average midwinter temperatures = 7–15°C) (Manning, 2007; Keeley et al., 2012)."

202	Quality of climate match data	High
	Source(s)	Notes
	Cousins, S. R. (2013). The ecology of <i>Aloe plicatilis</i> : a tree aloe endemic to the Cape fynbos, South Africa. MSc Thesis. University of the Witwatersrand, Johannesburg, South Africa	

203	Broad climate suitability (environmental versatility)	n
	Source(s)	Notes
	Cousins, S. R. (2013). The ecology of <i>Aloe plicatilis</i> : a tree aloe endemic to the Cape fynbos, South Africa. MSc Thesis. University of the Witwatersrand, Johannesburg, South Africa	"Aloe plicatilis occurs at altitudes of 200–950 m, with average annual rainfall and temperatures of 420–1900 mm/year and 14–18°C, respectively (Mucina and Rutherford, 2006; Schulze, 1997)."

Qsn #	Question	Answer
204	<b>Native or naturalized in regions with tropical or subtropical climates</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Cousins, S. R. (2013). The ecology of <i>Aloe plicatilis</i> : a tree aloe endemic to the Cape fynbos, South Africa. MSc Thesis. University of the Witwatersrand, Johannesburg, South Africa	" <i>Aloe plicatilis</i> is endemic to the Cape fynbos in mountainous parts of the Cape Winelands (also known as the "Boland") within the Cape Floristic Region (CFR), south-western Cape, South Africa (Van Wyk and Smith, 2008). The CFR is characterized by a Mediterranean climate with hot, dry, windy summers (average midsummer temperatures = 15–25°C) and cool, wet winters (average midwinter temperatures = 7–15°C) (Manning, 2007; Keeley et al., 2012)."

205	<b>Does the species have a history of repeated introductions outside its natural range?</b>	y
	<b>Source(s)</b>	<b>Notes</b>
	Cousins, S. R. (2013). The ecology of <i>Aloe plicatilis</i> : a tree aloe endemic to the Cape fynbos, South Africa. MSc Thesis. University of the Witwatersrand, Johannesburg, South Africa	" <i>Aloe plicatilis</i> is artificially propagated in South Africa and traded locally, but is also exported to several countries such as Australia, Japan and Italy primarily for use in the horticultural industry (CITES Trade Database)."

301	<b>Naturalized beyond native range</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	McCormack, G. 2007. Cook Islands Biodiversity Database, Version 2007.2. Cook Islands Natural Heritage Trust, Rarotonga. <a href="http://cookislands.bishopmuseum.org">http://cookislands.bishopmuseum.org</a> . [Accessed 20 Sep 2016]	"COOK ISLANDS STATUS: Introduced - Recent, Not naturalised; Land, lowlands, gardens"
	Randall, R.P. 2007. The introduced flora of Australia and its weed status. CRC for Australian Weed Management, Glen Osmond, Australia	No evidence
	Wagner, W.L., Herbst, D.R.& Lorence, D.H. 2016. Flora of the Hawaiian Islands. Smithsonian Institution, Washington, D.C. <a href="http://botany.si.edu/">http://botany.si.edu/</a> . [Accessed 20 Sep 2016]	No evidence to date

302	<b>Garden/amenity/disturbance weed</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

303	<b>Agricultural/forestry/horticultural weed</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

Qsn #	Question	Answer
304	Environmental weed	n
	Source(s)	Notes
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

Qsn #	Question	Answer
305	<b>Congeneric weed</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	<p>Queensland Government. 2011. Weeds of Australia. Broad-leaf aloe. <i>Aloe maculata</i>. <a href="http://keyserver.lucidcentral.org/weeds/data/080c0106-040c-4508-8300-0b0a06060e01/media/Html/Aloe_maculata.htm">http://keyserver.lucidcentral.org/weeds/data/080c0106-040c-4508-8300-0b0a06060e01/media/Html/Aloe_maculata.htm</a>. [Accessed 19 Sep 2016]</p>	<p>"Broad-leaf aloe (<i>Aloe maculata</i>) is a moderately common environmental weed in south-eastern Australia. It is also seen as a minor weed or "sleeper weed" in other parts of the country. This succulent plant is widely cultivated as a garden ornamental and often becomes established in bushland after being dumped in garden waste." ... "Broad-leaf aloe (<i>Aloe maculata</i>) is currently of most concern in Victoria, where it is thought to pose a serious threat to one or more vegetation formations. This invasive succulent is listed as an environmental weed by several local and regional authorities in this state (e.g. in the City of Hume, the Mornington Peninsula Shire, the North Grampians Shire, Swan Hill Rural City, Banyule City and the Goulburn Broken Catchment). It is also regarded as an important environmental weed in French Island National Park and has been recorded in Yarra Bend Park in suburban Melbourne. In South Australia, broad-leaf aloe (<i>Aloe maculata</i>) is a problem in coastal dunes in the Adelaide Metropolitan area. It has also been recorded in conservation areas near Adelaide (i.e. Onkaparinga River Recreation Park and Para Wirra Recreation Park). In New South Wales, it has been occasionally recorded in the Tamworth and Sydney districts. However, it may also be naturalized on the south coast and in the Great Lakes Shire on the central coast (i.e. it is listed as a weed in Burgess Road Reserve)."</p>
	<p>Cousins, S. R. (2013). The ecology of <i>Aloe plicatilis</i>: a tree aloe endemic to the Cape fynbos, South Africa. MSc Thesis. University of the Witwatersrand, Johannesburg, South Africa</p>	<p>"The cosmopolitan <i>A. vera</i>, which is thought to have originated in Saudi Arabia, has been traded for leaf exudate since the fourth century BC, resulting in the species' movement along trade routes from the Arabian Peninsula to the Mediterranean, Indian subcontinent, the Americas and the Caribbean, where it has become naturalised (Grace, 2011). Apart from <i>A. vera</i>, there do not appear to be many <i>Aloe</i> species that have become alien invaders outside their natural distributions."</p>
	<p>Smith, G. F., &amp; Figueiredo, E. (2009). <i>Aloe arborescens</i> Mill (Asphodelaceae) is spreading in Portugal. <i>Bradleya</i>, 27: 165-167</p>	<p>"Two species of <i>Aloe</i> L., <i>Aloe vera</i> (L.) Burm.f. and <i>A. arborescens</i> Mill. have been recorded as naturalised in Portugal: <i>A. vera</i> as an occasional escape along the Algarve in the south, and <i>A. arborescens</i> from central coastal regions around Lisbon. Here we record the spread of <i>A. arborescens</i> further north along the Portuguese coast, especially around the coastal town of Nazaré. This species has become firmly established as part of the introduced flora of the country. Its potentially serious impact as an invasive species is emphasised."</p>
	<p>Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia</p>	<p>A number of <i>Aloe</i> species are naturalized and/or listed as weeds</p>

401	<b>Produces spines, thorns or burrs</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>

Qsn #	Question	Answer
	Van Jaarsveld, E., (2011). The tree aloes of southern and eastern Africa. <i>Cactus and Succulent Journal</i> 83(1), 9–21	"Plants erect, dichotomously-branched rounded shrubs, up to 2–3.5 m tall. Main branch often thickset and 400 mm in diameter, upper branches 40 mm in diameter below leaves. Bark grey, longitudinally grooved, distinctly corky. Leaves in apical clusters, distichous, glaucous green, soon softly succulent, not persistent, and soon deciduous, strap shaped up to 300 x 40 mm. Leaf sap clear, not bitter. The margin with an obscure cartilaginous edge, to almost entire, denticulate near the end, bearing a blunt tip."

402	Allelopathic	
	Source(s)	Notes
	Arowosegbe, S., Wintola, O. A., & Afolayan, A. J. (2012). Phytochemical constituents and allelopathic effect of <i>Aloe ferox</i> Mill. root extract on tomato. <i>Journal of Medicinal Plants Research</i> , 6(11), 2094-2099	[Unknown. Allelopathy documented in genus] "Phytochemical constituents of the root extract of <i>Aloe ferox</i> were estimated using standard quantitative analysis. The extract contained phenols, flavonoids, flavonols, tannins alkaloids and saponins in different proportions; with more of phenols and saponins. Allelopathic effect of the aqueous root extract of the plant on tomato was also investigated. The extract reduced the germination of the tomato seeds. However, root and shoot elongations of the tomato seedlings were significantly inhibited by the extract, with the percentage inhibition increasing as the concentration of the extract increased. The observed allelopathic activity of the root extract of <i>A. ferox</i> on the seed germination and seedling growth of tomato was attributed to the presence of the allelopathic phytochemicals in <i>A. ferox</i> roots."

403	Parasitic	n
	Source(s)	Notes
	Van Jaarsveld, E., (2011). The tree aloes of southern and eastern Africa. <i>Cactus and Succulent Journal</i> 83(1), 9–21	"Plants erect, dichotomously-branched rounded shrubs, up to 2–3.5 m tall." [Xanthorrhoeaceae. No evidence]

404	Unpalatable to grazing animals	n
	Source(s)	Notes
	Cousins, S. R. (2013). The ecology of <i>Aloe plicatilis</i> : a tree aloe endemic to the Cape fynbos, South Africa. MSc Thesis. University of the Witwatersrand, Johannesburg, South Africa	"Elephants have a predilection for consuming aloes and will selectively feed on them if available (Parker and Bernard, 2008; 2009). Greater kudu are also known to browse aloe leaves; baboons feed on the leaves and flowers, while porcupine and black rhinoceros are known to uproot entire plants (Parker and Bernard, 2009)."
	Breebaart, L., Bhikraj, R., & O'Connor, T. G. (2002). Impact of goat browsing on <i>Aloe ferox</i> in a South African savanna. <i>African Journal of Range and Forage Science</i> , 19(1), 77-78	[Goats browse on other <i>Aloe</i> species] "The extent and impact of the utilisation of <i>Aloe ferox</i> by Boer goats during winter in a South African savanna was determined using a plant-based approach. All <i>Aloe</i> plants rooted within the transects were eaten by goats, with small plants utilised more frequently than tall plants. The density of dying and dead <i>Aloe</i> plants was significantly greater than live plants. Mortality of <i>Aloe ferox</i> was a result of extensive browsing by Boer goats. The future survival of <i>Aloe ferox</i> in this savanna system is highly unlikely."

Qsn #	Question	Answer
405	<b>Toxic to animals</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	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
	Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence, but other Aloe species may have toxic properties or contribute to contact dermatitis

406	Host for recognized pests and pathogens	
	<b>Source(s)</b>	<b>Notes</b>
	Reynolds, T. 2004. Aloes: The genus Aloe. CRC Press, Boca Raton, FL	[Generic description] "Cultivated aloes are more susceptible to arthropod pests than those growing in their natural habitats. The main arthropod pests include mealy bugs, scales, beetles, mites and aphids."
	Kelly, J. and Olsen, M. 2011. Problems and Pests of Agave, Aloe, Cactus and Yucca. Cooperative Extension College of Agriculture and Life Sciences The University of Arizona Tucson, Arizona	[Generic description] "Mites are not insects, but are closely related to spiders. Mites are very small and can be observed only with a magnifying lens or microscope. The mites that attack aloe and other species such as Haworthia and Gasteria are eriophyid mites, a group of plant-feeding mites that often cause galling or abnormal growth of the host plant tissues..." ... "Unlike their spider mite relatives that have four sets of legs, aloe mites have only two sets of legs. They cause malformations in plants by injecting a chemical that induces galling into the plant tissue. Stems, leaves and flowers may be affected. The damage to the aloe plant is irreversible, and infected plants should be removed. After removal, place all infected plants in plastic trash bags to prevent re-infestation of remaining plants."

407	Causes allergies or is otherwise toxic to humans	n
	<b>Source(s)</b>	<b>Notes</b>
	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
	Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence, but other Aloe species may have toxic properties or contribute to contact dermatitis

408	Creates a fire hazard in natural ecosystems	n
	<b>Source(s)</b>	<b>Notes</b>
	Van Jaarsveld, E., (2011). The tree aloes of southern and eastern Africa. Cactus and Succulent Journal 83(1), 9–21	"It shares its habitat with fynbos shrubs and other succulent plants. The distinctly-corky bark is a unique feature of this species and an effective insulator to fire." [Does not carry fire]

409	Is a shade tolerant plant at some stage of its life cycle	y
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Cousins, S. R., Witkowski, E. T. F., Pfab, M. F., Riddles, R. E., & Mycock, D. J. (2013). Reproductive ecology of <i>Aloe plicatilis</i> , a fynbos tree aloe endemic to the Cape Winelands, South Africa. <i>South African Journal of Botany</i> , 87, 52-65	"Seedlings at this population occurred mostly in moist, shaded, rocky sites surrounded by dense vegetation on a hilltop that had not burned in 10 years, strongly suggesting establishment in the absence of a major disturbance event."
	Cousins, S. R. (2013). The ecology of <i>Aloe plicatilis</i> : a tree aloe endemic to the Cape fynbos, South Africa. MSc Thesis. University of the Witwatersrand, Johannesburg, South Africa	[Somewhat tolerant of shade] "In cultivation, <i>A. plicatilis</i> grown under shaded greenhouse conditions show markedly enhanced vigour compared to seedlings grown in full sun (S.R. Cousins pers. obs.). However, in most populations, <i>A. plicatilis</i> individuals were found growing in full sun, with low surrounding forb cover (~20%) compared to rock cover (~60%) (Cousins et al., in prep; Chapter five)."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	n
	<b>Source(s)</b>	<b>Notes</b>
	Cousins, S. R. (2013). The ecology of <i>Aloe plicatilis</i> : a tree aloe endemic to the Cape fynbos, South Africa. MSc Thesis. University of the Witwatersrand, Johannesburg, South Africa	"The highly specific habitat requirements of <i>A. plicatilis</i> – well-drained acidic soil on steep rocky mountain slopes – have safeguarded it to a degree from the farmlands and forestry plantations that often extend around the localities where it occurs (Agenbag and Helm, 2008)."
	Cousins, S. R., & Witkowski, E. T. F. (2012). African aloe ecology: a review. <i>Journal of Arid Environments</i> , 85: 1-17	"The soil requirements of <i>Aloe</i> species vary e some grow only in very alkaline soils, e.g. <i>Aloe arenicola</i> , <i>Aloe asperifolia</i> , <i>Aloe claviflora</i> , <i>Aloe hereroensis</i> and <i>Aloe littoralis</i> , while others prefer acidic soils e.g. <i>Aloe commixta</i> , <i>Aloe haemanthifolia</i> , <i>Aloe plicatilis</i> , and most grass aloe species (Giddy, 1973)."

411	Climbing or smothering growth habit	n
	<b>Source(s)</b>	<b>Notes</b>
	Cousins, S. R. (2013). The ecology of <i>Aloe plicatilis</i> : a tree aloe endemic to the Cape fynbos, South Africa. MSc Thesis. University of the Witwatersrand, Johannesburg, South Africa	" <i>Aloe plicatilis</i> (L.) Mill. (Asphodelaceae: Alooideae) is one of six tree aloes indigenous to South Africa, and is the only tree aloe that occurs in the Cape fynbos (Van Wyk and Smith, 2008). It is a long-lived, slow-growing shrub to small tree, with dichotomously branching stems, each ending in a set of 12–16 alternate strap-shaped leaves displayed in a fan-shaped arrangement, hence its common name, the fan aloe (Fig. 1.2.) (Reynolds, 1969; Van Wyk and Smith, 2008; Carter et al., 2011)."

412	Forms dense thickets	
	<b>Source(s)</b>	<b>Notes</b>

Qsn #	Question	Answer
	Cousins, S. R. (2013). The ecology of <i>Aloe plicatilis</i> : a tree aloe endemic to the Cape fynbos, South Africa. MSc Thesis. University of the Witwatersrand, Johannesburg, South Africa	[Possibly as a result of limited dispersal & clumped distribution of seedlings] "Quantification of natural fruit and seed set at three <i>A. plicatilis</i> populations revealed that large, dense populations exhibit higher seed production/plant relative to smaller and sparser ones, suggesting an Allee effect." ... "Aloe seeds are typically 3–5mm long, two-winged, smooth and triangular-elliptical in shape (Kamstra, 1971). They are wind-dispersed and in some <i>Aloe</i> species they possess a third wing, which may increase travelling distances (Jordan, 1996). The seeds of other <i>Aloe</i> species lack wings, probably resulting in poor dispersal, and hence the establishment of dense seedling stands close to parent plants (Jordan, 1996, 1999)."

501	Aquatic	n
	Source(s)	Notes
	Cousins, S. R. (2013). The ecology of <i>Aloe plicatilis</i> : a tree aloe endemic to the Cape fynbos, South Africa. MSc Thesis. University of the Witwatersrand, Johannesburg, South Africa	[Terrestrial] "The species grows in well-drained, acidic soils on steep rocky slopes and rocky outcrops in areas of high winter rainfall (Van Wyk and Smith, 2008; Carter et al., 2011)."

502	Grass	n
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network, 2016. 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 19 Sep 2016]	Family: Xanthorrhoeaceae Subfamily: Asphodeloideae

503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network, 2016. 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 19 Sep 2016]	Family: Xanthorrhoeaceae Subfamily: Asphodeloideae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Cousins, S. R. (2013). The ecology of <i>Aloe plicatilis</i> : a tree aloe endemic to the Cape fynbos, South Africa. MSc Thesis. University of the Witwatersrand, Johannesburg, South Africa	"The succulent growth form of <i>A. plicatilis</i> , its heavy mass and shallow root system may render this species particularly vulnerable to damage from strong winds."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes

Qsn #	Question	Answer
	Cousins, S. R. (2013). The ecology of <i>Aloe plicatilis</i> : a tree aloe endemic to the Cape fynbos, South Africa. MSc Thesis. University of the Witwatersrand, Johannesburg, South Africa	" <i>Aloe plicatilis</i> is classified as Least Concern (LC) on the 2009 IUCN Red List (Raimondo et al., 2009); however, although it is not threatened, it should be protected owing to its limited natural distribution (Van Wyk and Smith, 2008). In a Detailed Species Report compiled for the South African National Biodiversity Institute (SANBI) Threatened Species Program (TSP), Agenbag and Helm (2008) noted that <i>A. plicatilis</i> would benefit from both a survey of the global population and population monitoring as it could possibly qualify under the "C" criterion on the IUCN Red List (i.e. small population size and decline) if any declines could be detected."

602	Produces viable seed	y
	Source(s)	Notes
	Van Jaarsveld, E., (2011). The tree aloes of southern and eastern Africa. <i>Cactus and Succulent Journal</i> 83(1), 9–21	" <i>Aloe plicatilis</i> can easily be propagated from branch cuttings or seed. Cuttings root easily and can be planted in situ. Seeds are best sown during spring or summer, germinating rapidly within three weeks, and young plants are slow growing, reaching flowering size after 5–8 years."
	Cousins, S. R., Witkowski, E. T. F., Pfab, M. F., Riddles, R. E., & Mycock, D. J. (2013). Reproductive ecology of <i>Aloe plicatilis</i> , a fynbos tree aloe endemic to the Cape Winelands, South Africa. <i>South African Journal of Botany</i> , 87, 52-65	"Natural fruit and seed set determined for three populations (1325, 27,930 and 251,616 seeds/population) suggests low reproductive output compared to several other <i>Aloe</i> species. The smallest (31 individuals) and least dense (75 plants/ha) <i>A. plicatilis</i> population produced the lowest seed set/plant (128 seeds) and per population (1325 seeds), suggesting an Allee effect."

603	Hybridizes naturally	
	Source(s)	Notes
	Cousins, S. R. (2013). The ecology of <i>Aloe plicatilis</i> : a tree aloe endemic to the Cape fynbos, South Africa. MSc Thesis. University of the Witwatersrand, Johannesburg, South Africa	"Their unique aesthetic appeal, relative ease of cultivation, and marked ability to hybridize has endowed aloes with considerable popularity amongst gardeners and succulent enthusiasts (Van Wyk and Smith, 2008)." [Possibly, but no evidence of hybridization of <i>Aloe plicatilis</i> provided]
	Cousins, S. R., Witkowski, E. T. F., Pfab, M. F., Riddles, R. E., & Mycock, D. J. (2013). Reproductive ecology of <i>Aloe plicatilis</i> , a fynbos tree aloe endemic to the Cape Winelands, South Africa. <i>South African Journal of Botany</i> , 87, 52-65	No evidence

604	Self-compatible or apomictic	
	Source(s)	Notes

Qsn #	Question	Answer
	Cousins, S. R. (2013). The ecology of <i>Aloe plicatilis</i> : a tree aloe endemic to the Cape fynbos, South Africa. MSc Thesis. University of the Witwatersrand, Johannesburg, South Africa	[Possibly exhibits low levels of self-compatibility, but further study is recommended] "In terms of the potential for self-compatibility in <i>A. plicatilis</i> , the total exclusion treatment yielded very low fruit and seed set (mean of 2% fruit set and 7 seeds/inflorescence), which suggests a small degree of autonomous self-pollination. However, low reproductive success at JH suggests an inability to self-pollinate, for if isolated flowering plants were self-compatible, greater fruit and seed set in these individuals would be expected. Self-incompatibility is widespread in the genus <i>Aloe</i> ; though some recent studies suggest this may not be the case for certain species. Autonomous self-pollination has been observed in <i>Aloe maculata</i> All., <i>Aloe krausii</i> Baker, (Hargreaves et al., 2012), and <i>Aloe peglerae</i> Schönland (Arená et al., 2013). However, seed set/fruit was very low in all three species, especially <i>A. maculata</i> and <i>A. krausii</i> (0.02 and 0.11 seeds/fruit, respectively). While self-compatibility appears to be possible in <i>A. plicatilis</i> , detailed supplemental self- and cross-pollination experiments are necessary to confirm its breeding system." ... "Furthermore, since aloes are generally self-incompatible, and the pollinator exclusion results suggest that this is likely the case for <i>A. plicatilis</i> , reproductive failure may be exacerbated as isolated individuals cannot self-pollinate for reproductive assurance (Knight et al., 2005)."

605	Requires specialist pollinators	n
	Source(s)	Notes
	Cousins, S. R. (2013). The ecology of <i>Aloe plicatilis</i> : a tree aloe endemic to the Cape fynbos, South Africa. MSc Thesis. University of the Witwatersrand, Johannesburg, South Africa	"Table 2. Pollinators and visitors of selected African <i>Aloe</i> species, with reference to their distribution, growth form, inflorescence type and flowering time." [ <i>A. plicatilis</i> - Inflorescence description = Single laxly-flowered racemes with up to 30 tubular, scarlet flowers; Pollinators and visitors = Malachite Sunbirds & bees]

606	Reproduction by vegetative fragmentation	y
	Source(s)	Notes
	Van Jaarsveld, E., (2011). The tree aloes of southern and eastern Africa. <i>Cactus and Succulent Journal</i> 83(1), 9–21	"Chacma baboons ( <i>Papio ursinus</i> ) often damage branches; the heads often root while lying on the ground." ... "Branches lying on the ground will root."

607	Minimum generative time (years)	>3
	Source(s)	Notes
	Cousins, S. R. (2013). The ecology of <i>Aloe plicatilis</i> : a tree aloe endemic to the Cape fynbos, South Africa. MSc Thesis. University of the Witwatersrand, Johannesburg, South Africa	" <i>Aloe plicatilis</i> individuals generally reach reproductive maturity at SDrs >4 cm and heights >0.2 m (sub-adult phase), but adults sensu stricto are usually individuals of approximately >15 cm SDr and >0.8 m in height" ... "Most <i>A. plicatilis</i> individuals reach reproductive maturity at ~15 cm stem diameter and ~0.8 m in height" ... "Based on measurements of <i>A. plicatilis</i> plants of known age growing at the Kirstenbosch National Botanical Garden in Cape Town, the species has a height growth rate of ±3 cm/year under garden conditions. A 0.8 m tall individual in the wild would therefore be a minimum of 27 years old, while a very large 3 m plant would be ~100 years old."

Qsn #	Question	Answer
	Van Jaarsveld, E., (2011). The tree aloes of southern and eastern Africa. <i>Cactus and Succulent Journal</i> 83(1), 9–21	"It is slow growing. Plants take about 20 years to grow to a meter tall. At Kirstenbosch, plants planted on the nursery terraces in 1984 reached a size of 1700 mm (to leaf tips) by 2008." ... "Seeds are best sown during spring or summer, germinating rapidly within three weeks, and young plants are slow growing, reaching flowering size after 5–8 years."

<b>701</b>	<b>Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Van Jaarsveld, E., (2011). The tree aloes of southern and eastern Africa. <i>Cactus and Succulent Journal</i> 83(1), 9–21	"Capsule rounded 20 X 16 mm, seed winged, black 5 x 4 mm." ... "The winged seed is wind dispersed." [No means of external attachment]

<b>702</b>	<b>Propagules dispersed intentionally by people</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	Cousins, S. R. (2013). The ecology of <i>Aloe plicatilis</i> : a tree aloe endemic to the Cape fynbos, South Africa. MSc Thesis. University of the Witwatersrand, Johannesburg, South Africa	" <i>Aloe plicatilis</i> is a prized species in the horticultural trade in succulent plants, and a recent spike in exports of the species from South Africa, including consignments of reportedly wild-collected plants, has raised concerns about its persistence in the wild."

<b>703</b>	<b>Propagules likely to disperse as a produce contaminant</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Van Jaarsveld, E., (2011). The tree aloes of southern and eastern Africa. <i>Cactus and Succulent Journal</i> 83(1), 9–21	"The winged seed is wind dispersed. Branches lying on the ground will root." ... "Seeds are best sown during spring or summer, germinating rapidly within three weeks, and young plants are slow growing, reaching flowering size after 5–8 years." [No evidence. Long time to maturity will make contamination unlikely]

<b>704</b>	<b>Propagules adapted to wind dispersal</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	Cousins, S. R. (2013). The ecology of <i>Aloe plicatilis</i> : a tree aloe endemic to the Cape fynbos, South Africa. MSc Thesis. University of the Witwatersrand, Johannesburg, South Africa	"Between December and January longitudinally dehiscent capsules release relatively small, winged seeds which are wind-dispersed (Van Wyk and Smith, 2008)."
	Cousins, S. R., Witkowski, E. T. F., Pfab, M. F., Riddles, R. E., & Mycock, D. J. (2013). Reproductive ecology of <i>Aloe plicatilis</i> , a fynbos tree aloe endemic to the Cape Winelands, South Africa. <i>South African Journal of Botany</i> , 87, 52-65	"In terms of seedling establishment in <i>A. plicatilis</i> , consistent water availability and shading appear to be important. Wind-dispersed <i>A. plicatilis</i> seeds would probably be trapped in surrounding vegetation or rock crevices where suitable microsites for seedling establishment may occur."

<b>705</b>	<b>Propagules water dispersed</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>

Qsn #	Question	Answer
	Van Jaarsveld, E., (2011). The tree aloes of southern and eastern Africa. <i>Cactus and Succulent Journal</i> 83(1), 9–21	" <i>Aloe plicatilis</i> is known only from the Hottentots Holland Mountain range and adjacent Paarl Mountain where it grows on lower mountain slopes in fynbos vegetation and especially on rocky ridges and scree." ... "The winged seed is wind dispersed. Branches lying on the ground will root." [Unlikely. Wind-dispersed seeds maybe buoyancy, but does not occur in riparian areas]

706	Propagules bird dispersed	n
	Source(s)	Notes
	Van Jaarsveld, E., (2011). The tree aloes of southern and eastern Africa. <i>Cactus and Succulent Journal</i> 83(1), 9–21	"Capsule rounded 20 X 16 mm, seed winged, black 5 x 4 mm." ... "The winged seed is wind dispersed."

707	Propagules dispersed by other animals (externally)	n
	Source(s)	Notes
	Van Jaarsveld, E., (2011). The tree aloes of southern and eastern Africa. <i>Cactus and Succulent Journal</i> 83(1), 9–21	"Capsule rounded 20 X 16 mm, seed winged, black 5 x 4 mm." ... "The winged seed is wind dispersed. Branches lying on the ground will root." [No means of external attachment]

708	Propagules survive passage through the gut	n
	Source(s)	Notes
	Van Jaarsveld, E., (2011). The tree aloes of southern and eastern Africa. <i>Cactus and Succulent Journal</i> 83(1), 9–21	"Capsule rounded 20 X 16 mm, seed winged, black 5 x 4 mm." ... "The winged seed is wind dispersed. Branches lying on the ground will root." [No evidence that capsules or seeds are consumed or would survive gut passage]

801	Prolific seed production (>1000/m2)	n
	Source(s)	Notes
	Cousins, S. R., Witkowski, E. T. F., Pfab, M. F., Riddles, R. E., & Mycock, D. J. (2013). Reproductive ecology of <i>Aloe plicatilis</i> , a fynbos tree aloe endemic to the Cape Winelands, South Africa. <i>South African Journal of Botany</i> , 87, 52-65	"Natural fruit and seed set determined for three populations (1325, 27,930 and 251,616 seeds/population) suggests low reproductive output compared to several other <i>Aloe</i> species. The smallest (31 individuals) and least dense (75 plants/ha) <i>A. plicatilis</i> population produced the lowest seed set/plant (128 seeds) and per population (1325 seeds), suggesting an Allee effect."

802	Evidence that a persistent propagule bank is formed (>1 yr)	n
	Source(s)	Notes

Qsn #	Question	Answer
	Cousins, S. R., Witkowski, E. T. F., Pfab, M. F., Riddles, R. E., & Mycock, D. J. (2013). Reproductive ecology of <i>Aloe plicatilis</i> , a fynbos tree aloe endemic to the Cape Winelands, South Africa. <i>South African Journal of Botany</i> , 87, 52-65	"Soil seed bank samples collected from 13 populations yielded close to zero seedling emergence, indicating the absence of persistent seed banks. <i>A. plicatilis</i> seeds stored under ambient laboratory conditions for 3, 18 and 24 months were germinated in an environmental control chamber and a laboratory. High percentage germination was recorded for 18- and 24-month-seed (86 and 80%, respectively), while germination of 3-month-old seeds was three times lower, suggesting the need for after-ripening. Germination of fresh and one-year-old seed under ambient nursery conditions at the Karoo Desert National Botanical Garden in Worcester yielded emergence percentages of 67 and 44%, respectively, and were therefore less successful than germination under more controlled conditions."

803	Well controlled by herbicides	
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	Unknown. No information on herbicide efficacy or chemical control of this species

804	Tolerates, or benefits from, mutilation, cultivation, or fire	
	Source(s)	Notes
	Cousins, S. R., & Witkowski, E. T. F. (2012). African aloe ecology: a review. <i>Journal of Arid Environments</i> , 85: 1-17	[Tolerates fire, but not mechanical damage] "Habitats generally preclude fires except for <i>A. plicatilis</i> in the fire-prone fynbos; this species has corky bark that protects against fire" ... "Dichotomous branching species: <i>A. dichotoma</i> , <i>A. pillansii</i> , <i>A. plicatilis</i> and <i>A. ramosissima</i> generally do not resprout (E. Van Jaarsveld, pers. comm.). <i>A. barberae</i> resprouts vigorously" ... " <i>A. plicatilis</i> , a bare-stemmed tree aloe, and the only aloe that has corky bark, is restricted to rocky outcrops in the Cape fynbos (Van Jaarsveld, 1989; Van Wyk and Smith, 2008). After a fire has passed through an <i>A. plicatilis</i> population, the plants appear dead; however, they often recover by resprouting from their growing points (Van Jaarsveld, 1989). Their thick, insulating bark protects against fire, but large, hot fires in old, dense fynbos stands can engulf and destroy whole aloes (pers. obs.)."

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	Unknown

**Summary of Risk Traits:**

## High Risk / Undesirable Traits

- Other Aloe species have become invasive
- Seedlings are shade tolerant
- Reproduces by seeds & vegetatively by fallen branches that root
- May exhibit low levels of self-compatibility
- Seeds dispersed by wind & intentionally by people
- Corky bark protects against fire

## Low Risk Traits

- No confirmed evidence of invasiveness or naturalization to date
- Almost unarmed leaves
- Non-toxic
- Ornamental
- Requires acidic soils
- Slow growth rate; reaches maturity in 6-8 years
- Does not form a persistent seed bank
- Limited seed production when populations occur at low densities