Taxon: Gladiolus dalenii Van Geel

Family: Iridaceae

Common Name(s): dragon's head lily
maid-of-the-mist
Natal lily
parrot lily
sword lily

Synonym(s): Gladiolus cooperi Baker
Gladiolus leichtlinii Baker
Gladiolus natalensis Reinw. ex Hook.
Gladiolus primulinus Baker
Gladiolus psittacinus Hook. f.
Gladiolus psittacinus var. cooperi
Gladiolus quartinianus A. Rich.
Watsonia natalensis Eckl.

Assessor: No Assessor **Status:** Assessor Approved **End Date:** 11 Jun 2018

WRA Score: 8.0 **Designation:** H(HPWRA) **Rating:** High Risk

Keywords: Tropical Geophyte, Naturalized, Ornamental, Wind-Dispersed, Spread Vegetatively

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)	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)	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

Qsn #	Question	Answer Option	Answer
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	n
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	y
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		
606	Reproduction by vegetative fragmentation	y=1, n=-1	y
607	Minimum generative time (years)		
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	y
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant		
704	Propagules adapted to wind dispersal	y=1, n=-1	y
705	Propagules water dispersed		
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		
801	Prolific seed production (>1000/m2)		
802	Evidence that a persistent propagule bank is formed (>1 yr)		
803	Well controlled by herbicides	y=-1, n=1	y
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**
	Goldblatt, P., Takei, M., & Razzaq, Z. (1993). Chromosome Cytology in Tropical African Gladiolus (Iridaceae). Annals of the Missouri Botanical Garden, 80(2), 461-470	[Widely cultivated, but not domesticated] "The significance of polyploidy in G. dalenii is difficult to gauge. It is one of the most successful species of the genus, and certainly the one with the widest geographical distribution (Goldblatt, 1989; in prep.). It extends from the eastern Cape, South Africa, to Senegal in West Africa and from Madagascar to Ethiopia and Yemen. Perhaps polyploidy has played a role in enabling the species to thrive under the wide range of conditions that occur across its range. The role of humans in its dispersal may also be important. The species is cultivated in West Africa, and as an important medicinal plant it may have been spread over long distances by human agency."

102	**Has the species become naturalized where grown?**	
	Source(s)	**Notes**
	WRA Specialist. 2018. Personal Communication	NA

103	**Does the species have weedy races?**	
	Source(s)	**Notes**
	WRA Specialist. 2018. 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"**	**High**
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 9 Jun 2018]	Native Africa NORTHEAST TROPICAL AFRICA: Chad, Eritrea, Ethiopia, Sudan EAST TROPICAL AFRICA: Kenya, Tanzania, Uganda WEST-CENTRAL TROPICAL AFRICA: Burundi, Cameroon, Central African Republic, Congo, Rwanda, Zaire WEST TROPICAL AFRICA: Benin, Burkina Faso, Cote D'Ivoire, Ghana, Guinea, Guinea-Bissau, Mali, Nigeria, Senegal, Togo SOUTH TROPICAL AFRICA: Angola, Malawi, Mozambique, Zambia, Zimbabwe SOUTHERN AFRICA: Botswana, Lesotho, Namibia, South Africa, [KwaZulu-Natal, Free State, Eastern Cape, Limpopo, Mpumalanga] Swaziland WESTERN INDIAN OCEAN: Madagascar Asia-Temperate ARABIAN PENINSULA: Saudi Arabia, Yemen

202	**Quality of climate match data**	**High**

Qsn #	Question	Answer
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 9 Jun 2018]	

203	Broad climate suitability (environmental versatility)	y
	Source(s)	**Notes**
	Lim, T.K. 2014. Edible Medicinal And Non-Medicinal Plants. Volume 8, Flowers. Springer, Dordrecht	"In its native range of summer rainfall areas, it is found in open grasslands, savanna woodlands and scrub and in rocky areas, often among rocks along streams, at altitudes up to 2,500 m. G. dalenii is absent from the winter rainfall (Cape) regions and from the semiarid and arid regions including the Karoo, Kalahari and Namib. It is cold hardy and tolerant of low temperatures down 0 °C."
	Goldblatt, P., Takei, M., & Razzaq, Z. (1993). Chromosome Cytology in Tropical African Gladiolus (Iridaceae). Annals of the Missouri Botanical Garden, 80(2), 461-470	"It is one of the most successful species of the genus, and certainly the one with the widest geographical distribution (Goldblatt, 1989; in prep.). It extends from the eastern Cape, South Africa, to Senegal in West Africa and from Madagascar to Ethiopia and Yemen. Perhaps polyploidy has played a role in enabling the species to thrive under the wide range of conditions that occur across its range."

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 9 Jun 2018]	Native Africa NORTHEAST TROPICAL AFRICA: Chad, Eritrea, Ethiopia, Sudan EAST TROPICAL AFRICA: Kenya, Tanzania, Uganda WEST-CENTRAL TROPICAL AFRICA: Burundi, Cameroon, Central African Republic, Congo, Rwanda, Zaire WEST TROPICAL AFRICA: Benin, Burkina Faso, Cote D'Ivoire, Ghana, Guinea, Guinea-Bissau, Mali, Nigeria, Senegal, Togo SOUTH TROPICAL AFRICA: Angola, Malawi, Mozambique, Zambia, Zimbabwe SOUTHERN AFRICA: Botswana, Lesotho, Namibia, South Africa, [KwaZulu-Natal, Free State, Eastern Cape, Limpopo, Mpumalanga] Swaziland WESTERN INDIAN OCEAN: Madagascar Asia-Temperate ARABIAN PENINSULA: Saudi Arabia, Yemen Naturalized Australasia AUSTRALIA: Australia Northern America SOUTHEASTERN U.S.A.: United States [Alabama, Louisiana] Pacific NORTH-CENTRAL PACIFIC: United States [Hawaii]

Qsn #	Question	Answer
205	**Does the species have a history of repeated introductions outside its natural range?**	**y**
	Source(s)	**Notes**
	Goldblatt, P. & Manning, J. C. 2008. The Iris Family: Natural History & Classification. Timber Press, Portland, OR	"A strikingly ornamental plant, Gladiolus dalenii is widely cultivated, not only in its native Africa. A late-summer-flowering form from southern Africa is perhaps the best known in horticulture. More important than its value as a wild species for garden display is its the role as one of the parents in the original crosses that led to the development of the large-flowered Gladiolus hybrids, today one of the world's most important cut-flower crops."

301	**Naturalized beyond native range**	**y**
	Source(s)	**Notes**
	Franck, A. R., Anderson, L. C., Burkhalter, J. R., & Dickman, S. (2016). Additions to the flora of Florida, USA (2010-2015). Journal of the Botanical Research Institute of Texas, 10(1): 175–190	"^Gladiolus dalenii Van Geel (Iridaceae). Numerous specimens of this Paleotropical species (Goldblatt 2002) were previously identified as G. ×gandavensis Van Houtte. Gladiolus dalenii typically has red to orange tepals with yellow markings on the outer tepals."
	Hosking, J. R., Conn, B. J., Lepschi, B. J., & Barker, C. H. 2011. Plant species first recognised as naturalised or naturalising for New South Wales in 2004 and 2005. Cunningham, 12(1): 85-114	"Gladiolus dalenii … North Coast, Central Tablelands and Central Coast. Widely naturalised on sandy soils in the Blue Mountains and at Port Stephens." … "Spread by seed and discarded bulbs. This species has been planted as an ornamental in many locations in N.S.W. Naturalised plants are scattered from the Cumberland Plain to the upper Blue Mountains, and in the Port Stephens area. It is probably much more widely naturalised. Gladiolus dalenii is recorded as doubtfully naturalised in South Australia (Barker et al. 2005) and naturalised in New Zealand and the USA (Healy & Edgar 1980, Goldblatt in Morin 2002)."
	Payne, D. (2010). A Survey of the Vascular Flora of Beaufort County, South Carolina. MSc. Thesis. Clemson University, Clemson, SC	"Gladiolus dalenii Van Geel ssp. dalenii. Introduced from Africa. Frequently naturalized in ruderal areas: DCP 2168, 14 June 2005."
	Frohlich, D.& Lau, A. 2014. New plant records for the Hawaiian Islands 2012–2013. Bishop Museum Occasional Papers 115: 7–17	"Gladiolus dalenii, native to parts of Africa (Staples & Herbst 2005) and previously collected as naturalized on the islands of Maui and Hawai‘i (Imada 2012), was found in a disturbed mesic, non-native forest in Schofield Barracks, growing among Citharexylum caudatum and non-native grasses, including Andropogon virginicus. Over a hundred plants were found in the area."
	Starr, F., Starr, K. & Loope, L.L. 2004. New plant records from the Hawaiian Archipelago. Bishop Museum Occasional Papers 79: 20-30	"Native to Eastern Cape of South Africa and through tropical Africa to Ethiopia and W. Arabian Peninsula (Brickell & Zuk, 1997), and previously not known in the state, G. dalenii has recently been collected from pastures in Kula, Maui and Waimea, Hawai'i." … "These collections represent a new state record for Hawai'i. Material examined: MAUI: East Maui, Kula, side of road near Rice Park on Kula Hwy, 3040 ft [926 m], 31 Aug 2000, Starr & Martz 000831-1. HAWAI'I: Waimea, in open dry pasture near Waikoloa Stream, 23 May 2000, Herbst 9879."

302	**Garden/amenity/disturbance weed**	**n**
	Source(s)	**Notes**

Qsn #	Question	Answer
	Hosking, J. R., Conn, B. J., Lepschi, B. J., & Barker, C. H. 2011. Plant species first recognised as naturalised or naturalising for New South Wales in 2004 and 2005. Cunningham, 12(1): 85-114	[Naturalized, but not documented to cause negative impacts] "Spread by seed and discarded bulbs. This species has been planted as an ornamental in many locations in N.S.W. Naturalised plants are scattered from the Cumberland Plain to the upper Blue Mountains, and in the Port Stephens area. It is probably much more widely naturalised. Gladiolus dalenii is recorded as doubtfully naturalised in South Australia (Barker et al. 2005) and naturalized in New Zealand and the USA (Healy & Edgar 1980, Goldblatt in Morin 2002)."
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	[No evidence] "Global-N-85, United States of America-N-839, Australia-W-853, Australia-N-855, United States of America- N-1292, La Reunion-N-1321, North America-N-1760, New Zealand-N-2048, United States of America-N-2092, Australia-W-1977, India-W-1977."

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	y
	Source(s)	**Notes**
	Weber, E. 2017. Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Gladiolus undulates" … "The plant spreads rapidly in Australia, displaces native species and inhibits their establishment by shading the ground. The plant is a serious threat to seasonal wetlands and riparian habitats, because it is able to invade undisturbed vegetation."

401	Produces spines, thorns or burrs	n
	Source(s)	**Notes**
	Lim, T.K. 2014. Edible Medicinal And Non-Medicinal Plants. Volume 8, Flowers. Springer, Dordrecht	[No evidence] "Gladiolus dalenii is a deciduous evergreen perennial cormous geophyte, 70–100 cm (up to 2 m) tall. Leaves grey-green, erect, ensiform (sword shaped), about 20 mm wide, and equitant (in a loose fan)."

402	Allelopathic	
	Source(s)	**Notes**
	WRA Specialist. 2018. Personal Communication	Unknown. No evidence found

403	Parasitic	n

Qsn #	Question	Answer
	Source(s)	**Notes**
	Lim, T.K. 2014. Edible Medicinal And Non-Medicinal Plants. Volume 8, Flowers. Springer, Dordrecht	"Gladiolus dalenii is a deciduous evergreen perennial cormous geophyte, 70–100 cm (up to 2 m) tall. Leaves grey-green, erect, ensiform (sword shaped), about 20 mm wide, and equitant (in a loose fan)." [Iridaceae. No evidence]

404	Unpalatable to grazing animals	n
	Source(s)	**Notes**
	Latham, P. 2008. Plants visited by bees, and other useful plants of Umalila, Southern Highlands, Tanzania. Fourth edition. United Kingdom Department for International Development	"Management Porcupines may dig up and eat the corms."
	Ngalo, S. 2011. Gladiolus dalenii. PlantZAfrica. SANBI. http://pza.sanbi.org/gladiolus-dalenii. [Accessed 11 Jun 2018]	"The corms are eaten by bush pigs."

405	Toxic to animals	n
	Source(s)	**Notes**
	Latham, P. 2008. Plants visited by bees, and other useful plants of Umalila, Southern Highlands, Tanzania. Fourth edition. United Kingdom Department for International Development	"Porcupines may dig up and eat the corms." [No evidence]
	Ngalo, S. 2011. Gladiolus dalenii. PlantZAfrica. SANBI. http://pza.sanbi.org/gladiolus-dalenii. [Accessed 11 Jun 2018]	"The corms are eaten by bush pigs." [No evidence]

406	Host for recognized pests and pathogens	
	Source(s)	**Notes**
	Ecoman. 2013. Gladiolus dalenii. http://www.ecoman.co.za/green/green_docs/gladiolus_dalenii.html. [Accessed 11 Jun 2018]	"Disease and pest resistance - Thrips can be a problem"

Qsn #	Question	Answer
407	**Causes allergies or is otherwise toxic to humans**	**n**
	Source(s)	**Notes**
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	"Bulb maceration used as eye and ear drops; for cough, eat the crushed bulb; corm as an enema for constipation. Roots, abortion or prevention pregnancy. Veterinary medicine."
	Lim, T.K. 2014. Edible Medicinal And Non-Medicinal Plants. Volume 8, Flowers. Springer, Dordrecht	"The flowers can be eaten raw or cooked after removal of the anthers. They are added to salads or used as boiled vegetable (Fox et al. 1982 ; Facciola 1990 ; Roberts 2000 ; Newman and O'Connor 2009 ; Deane 2007–2012 , 183). Children suck the flowers for their copious quantities of nectar. Corms of G. dalenii are also used as food in southern Congo (Zaire) (Goldblatt and Manning 1998). The starchy corms are boiled and then leached in water before consumption."

408	**Creates a fire hazard in natural ecosystems**	**n**
	Source(s)	**Notes**
	Latham, P. 2008. Plants visited by bees, and other useful plants of Umalila, Southern Highlands, Tanzania. Fourth edition. United Kingdom Department for International Development	"Ecology The plant is common in grassland above 2,000 m in the Southern Highlands. It is widespread throughout tropical and southern Africa and prefers a well drained, fertile soil." [No evidence found]
	Lim, T.K. 2014. Edible Medicinal And Non-Medicinal Plants. Volume 8, Flowers. Springer, Dordrecht	[No evidence. Not found in fire prone areas] "In its native range of summer rainfall areas, it is found in open grasslands, savanna woodlands and scrub and in rocky areas, often among rocks along streams, at altitudes up to 2,500 m. G. dalenii is absent from the winter rainfall (Cape) regions and from the semiarid and arid regions including the Karoo, Kalahari and Namib."

409	**Is a shade tolerant plant at some stage of its life cycle**	**n**
	Source(s)	**Notes**
	Ngalo, S. 2011. Gladiolus dalenii. PlantZAfrica. SANBI. http://pza.sanbi.org/gladiolus-dalenii. [Accessed 11 Jun 2018]	"It should preferably be planted in light, well-drained, sandy loam soil in full sun."
	Lim, T.K. 2014. Edible Medicinal And Non-Medicinal Plants. Volume 8, Flowers. Springer, Dordrecht	"It thrives in sunny but sheltered locations on light sandy or gritty loamy soil, with neutral to slightly acid soils of pH between 6.5 and 7."

410	**Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)**	**n**
	Source(s)	**Notes**
	Lim, T.K. 2014. Edible Medicinal And Non-Medicinal Plants. Volume 8, Flowers. Springer, Dordrecht	"It thrives in sunny but sheltered locations on light sandy or gritty loamy soil, with neutral to slightly acid soils of pH between 6.5 and 7."
	Ngalo, S. 2011. Gladiolus dalenii. PlantZAfrica. SANBI. http://pza.sanbi.org/gladiolus-dalenii. [Accessed 11 Jun 2018]	"Soil type: Loam" … "PH: Neutral"

Qsn #	Question	Answer
411	**Climbing or smothering growth habit**	**n**
	Source(s)	**Notes**
	Lim, T.K. 2014. Edible Medicinal And Non-Medicinal Plants. Volume 8, Flowers. Springer, Dordrecht	"Gladiolus dalenii is a deciduous evergreen perennial cormous geophyte, 70–100 cm (up to 2 m) tall. Leaves grey-green, erect, ensiform (sword shaped), about 20 mm wide, and equitant (in a loose fan)."

412	Forms dense thickets	
	Source(s)	**Notes**
	Cantor, M., & Tolety, J. (2011). Gladiolus. In Wild Crop Relatives: Genomic and Breeding Resources (pp. 133-159). Springer, Berlin Heidelberg	[Generic description. Potentially] "Major predators are baboons, porcupines, molerats and other rodents, as well as some birds, notably guinea fowl, and they account annually for huge reductions in population numbers of mature plants. Therefore, in the absence of predators, species of Gladiolus and other corm-bearing Iridaceae may form dense stands and even become noxious weeds."
	Lim, T.K. 2014. Edible Medicinal And Non-Medicinal Plants. Volume 8, Flowers. Springer, Dordrecht	[No evidence, but see Cantor & Tolety, 2011] "In its native range of summer rainfall areas, it is found in open grasslands, savanna woodlands and scrub and in rocky areas, often among rocks along streams, at altitudes up to 2,500 m. G. dalenii is absent from the winter rainfall (Cape) regions and from the semiarid and arid regions including the Karoo, Kalahari and Namib."

501	Aquatic	n
	Source(s)	**Notes**
	Friis, I,. & Vollesen, K. (2005). Flora of the Sudan-Uganda Border Area East of the Nile: Catalogue of vascular plants, 2nd pt. Vegetation and phytogeography. Kgl. Danske Videnskabernes Selskab, Copenhagen, Denmark	[Terrestrial] "General habitat range: in lowland, medium-altitude and montane grassland, wooded grassland, woodland and in glades in forests, usually flowering a few weeks after the beginning of the rainy season."

502	Grass	n
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 9 Jun 2018]	Family: Iridaceae Subfamily: Ixioideae Tribe: Ixieae

503	Nitrogen fixing woody plant	n
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 9 Jun 2018]	Family: Iridaceae Subfamily: Ixioideae Tribe: Ixieae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y

Qsn #	Question	Answer
	Source(s)	**Notes**
	Lim, T.K. 2014. Edible Medicinal And Non-Medicinal Plants. Volume 8, Flowers. Springer, Dordrecht	"Gladiolus dalenii is a deciduous evergreen perennial cormous geophyte, 70–100 cm (up to 2 m) tall. Leaves grey-green, erect, ensiform (sword shaped), about 20 mm wide, and equitant (in a loose fan)."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	**Notes**
	Lim, T.K. 2014. Edible Medicinal And Non-Medicinal Plants. Volume 8, Flowers. Springer, Dordrecht	"Gladiolus dalenii is one of the most widely distributed species of Gladiolus, occurring from eastern South Africa and Madagascar throughout tropical Africa and into western Arabia."
	Goldblatt, P., Takei, M., & Razzaq, Z. (1993). Chromosome Cytology in Tropical African Gladiolus (Iridaceae). Annals of the Missouri Botanical Garden, 80(2), 461-470	"The significance of polyploidy in G. dalenii is difficult to gauge. It is one of the most successful species of the genus, and certainly the one with the widest geographical distribution (Goldblatt, 1989; in prep.). It extends from the eastern Cape, South Africa, to Senegal in West Africa and from Madagascar to Ethiopia and Yemen. Perhaps polyploidy has played a role in enabling the species to thrive under the wide range of conditions that occur across its range."

602	Produces viable seed	y
	Source(s)	**Notes**
	Lim, T.K. 2014. Edible Medicinal And Non-Medicinal Plants. Volume 8, Flowers. Springer, Dordrecht	"Capsules usually slightly inflated, oblong to ellipsoid or globose. Seeds many light to dark, globose or angular. Flowers are rich in nectar." … "The plant is propagated from seeds, corms or cormels."
	Hosking, J. R., Conn, B. J., Lepschi, B. J., & Barker, C. H. 2011. Plant species first recognised as naturalised or naturalising for New South Wales in 2004 and 2005. Cunningham, 12(1): 85-114	"Spread by seed and discarded bulbs. This species has been planted as an ornamental in many locations in N.S.W."

603	Hybridizes naturally	
	Source(s)	**Notes**
	Lim, T.K. 2014. Edible Medicinal And Non-Medicinal Plants. Volume 8, Flowers. Springer, Dordrecht	[Artificial hybrids possible. Unknown if natural hybrids occur] "It is a primary parental species of the large flowering modern Grandiflora hybrids. The species comprised diploid, tetraploid and hexaploid races often giving rise to tetraploid hybrids."

604	Self-compatible or apomictic	
	Source(s)	**Notes**

Qsn #	Question	Answer
	Kubitzki, K. (ed.). 1998. The Families and genera of vascular plants. Volume III. Flowering plants, Monocotyledons: Lilianae (except Orchidaceae). Springer-Verlag, Berlin, Heidelberg, New York	[Unknown, but Gladiolus dalenii belongs to Subfamily: Ixioideae, in which self-compatibility has been documented] "Outcrossing is the normal mode of reproduction. Most genera of Old World Iridoideae have a strong self-incompatibility system and anthers are, in addition, placed so that pollen does not come into contact with the stigmas." … "In Ixioideae a weaker self-compatibility system seems to be present and, in the absence of cross-pollination, autogamy often occurs with a lower seed production than for outcrossing." … "In Ixioideae style branches may recurve and contact the anthers in old flowers that have not been pollinated and selfing may then occur."
	Cantor, M., & Tolety, J. (2011). Gladiolus. In Wild Crop Relatives: Genomic and Breeding Resources (pp. 133-159). Springer, Berlin Heidelberg	[Unknown, but self-pollination possible within genus] "Producing new gladiolus by self-pollination or natural cross-pollination (by insects or wind), give useful and interesting variations of gladiolus characteristics."

605	Requires specialist pollinators	
	Source(s)	**Notes**
	Kubitzki, K. (ed.). 1998. The Families and genera of vascular plants. Volume III. Flowering plants, Monocotyledons: Lilianae (except Orchidaceae). Springer-Verlag, Berlin, Heidelberg, New York	"Bird pollination, mostly by sunbirds (Nectarinia spp.), has evolved in several genera of Ixioideae and is associated with red to orange flowers, a long perianth tube, often slender below and wide and cylindric above, and the production of ample quantities of nectar. Often, these species have particularly sturdy stems and flowers with short lower tepals and well-exserted anthers. Sunbird pollination is best developed in Gladiolus and Watsonia, where is has evolved independently in several lineages in southern and, in the case of Gladiolus, tropical Africa as well (often bird-pollinated species were segregated in separate genera, but these are no longer recognised)." [Gladiolus dalenii is in Subfamily: Ixioideae]
	Lim, T.K. 2014. Edible Medicinal And Non-Medicinal Plants. Volume 8, Flowers. Springer, Dordrecht	"Inflorescences are produced in tall terminal, on-sided spikes with up to 7 or more large, intensely scarlet orange to red with a bright yellow throat (Plate 1) or variously coloured yellow to greenish, often speckled brown to red, hooded flowers; bracts green to red-brown and clasping. Flowers large, 60–10 mm long. Perianth zygomorphic and bilabiate with a short tube 35–50 mm, narrow at base and widening towards the throat, tepals unequal the lower three forming a recurved lip and the upper largest and somewhat hoodlike. Stamens unilateral and arcuate. Style slender branching into near the anthers into three short branches with expanded, bilobed tips."
	Ecoman. 2013. Gladiolus dalenii. http://www.ecoman.co.za/green/green_docs/gladiolus_dalenii.html. [Accessed 11 Jun 2018]	"It is bird pollinated and here in Durban I often see White-bellied Sunbirds working over the flowering patch in a nearby garden."
	WRA Specialist. 2018. Personal Communication	Bird-pollinated. Unknown if bees, moths or other insects also effectively pollinate this species

606	Reproduction by vegetative fragmentation	y
	Source(s)	**Notes**

Qsn #	Question	Answer
	Cantor, M., & Tolety, J. (2011). Gladiolus. In Wild Crop Relatives: Genomic and Breeding Resources (pp. 133-159). Springer, Berlin Heidelberg	"Although a few species of Gladiolus have much reduced corms, they all have the capacity for annual regeneration from the corm. Many species also have the ability to increase their numbers by vegetative reproduction through the production of cormlets in various ways (Goldblatt and Manning 1998). It may thus be thought that annual regeneration and vegetative reproduction are sufficient for ensuring the continuing survival of the species."
	Ngalo, S. 2011. Gladiolus dalenii. PlantZAfrica. SANBI. http://pza.sanbi.org/gladiolus-dalenii. [Accessed 11 Jun 2018]	"It is an easy plant to grow, and can be cultivated from corms as well as seeds."
	Hosking, J. R., Conn, B. J., Lepschi, B. J., & Barker, C. H. 2011. Plant species first recognised as naturalised or naturalising for New South Wales in 2004 and 2005. Cunningham, 12(1): 85-114	"Spread by seed and discarded bulbs."

607	Minimum generative time (years)	
	Source(s)	**Notes**
	Ngalo, S. 2011. Gladiolus dalenii. PlantZAfrica. SANBI. http://pza.sanbi.org/gladiolus-dalenii. [Accessed 11 Jun 2018]	[Time to first flowering unspecified. Probably between 1-2 years] "Gladiolus dalenii is a deciduous evergreen perennial. It grows up to 2 m tall. Leaves erect, 20 mm wide, grey-green, in a loose fan. It produces five tall flower spikes with up to 7 large, intensely scarlet orange to red or variously coloured, hooded flowers with a bright yellow throat; bracts green to red-brown, clasping. Flowering December to February."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y
	Source(s)	**Notes**
	Kubitzki, K. (ed.). 1998. The Families and genera of vascular plants. Volume III. Flowering plants, Monocotyledons: Lilianae (except Orchidaceae). Springer-Verlag, Berlin, Heidelberg, New York	"The discoid seeds of some Moraea spp. and the circumferentially winged seeds of Gladiolus are dispersed by wind."
	Weber, E. 2017. Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	[Related species spread by mud attached to machinery] "Gladiolus undulates … spreads solely vegetatively by numerous bulbils and corms. These are carried by streams, by mud attaching to machinery and vehicles, and by soil movement."
	Hosking, J. R., Conn, B. J., Lepschi, B. J., & Barker, C. H. 2011. Plant species first recognised as naturalised or naturalising for New South Wales in 2004 and 2005. Cunningham, 12(1): 85-114	[Spread as garden waste] "Spread by seed and discarded bulbs."

702	Propagules dispersed intentionally by people	y
	Source(s)	**Notes**
	Lim, T.K. 2014. Edible Medicinal And Non-Medicinal Plants. Volume 8, Flowers. Springer, Dordrecht	"A strikingly ornamental plant, Gladiolus dalenii is widely cultivated, not only in its native Africa. A late-summer-flowering form from southern Africa is perhaps the best known in horticulture."

Qsn #	Question	Answer
	Hosking, J. R., Conn, B. J., Lepschi, B. J., & Barker, C. H. 2011. Plant species first recognised as naturalised or naturalising for New South Wales in 2004 and 2005. Cunningham, 12(1): 85-114	"Spread by seed and discarded bulbs. This species has been planted as an ornamental in many locations in N.S.W."

703	Propagules likely to disperse as a produce contaminant	
	Source(s)	**Notes**
	Weber, E. 2017. Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	[Unknown. Related species spread by soil movement. Could potentially become a contaminant of ornamentals cultivated in vicinity] "Gladiolus undulates … spreads solely vegetatively by numerous bulbils and corms. These are carried by streams, by mud attaching to machinery and vehicles, and by soil movement."

704	Propagules adapted to wind dispersal	y
	Source(s)	**Notes**
	Lim, T.K. 2014. Edible Medicinal And Non-Medicinal Plants. Volume 8, Flowers. Springer, Dordrecht	"Capsules usually slightly inflated, oblong to ellipsoid or globose. Seeds many light to dark, globose or angular."
	Kubitzki, K. (ed.). 1998. The Families and genera of vascular plants. Volume III. Flowering plants, Monocotyledons: Lilianae (except Orchidaceae). Springer-Verlag, Berlin, Heidelberg, New York	"The discoid seeds of some Moraea spp. and the circumferentially winged seeds of Gladiolus are dispersed by wind."
	Goldblatt, P. & Manning, J. C. 2008. The Iris Family: Natural History & Classification. Timber Press, Portland, OR	"Wind is a much more efficient means of seed dispersal, however, and numerous species and genera have fruits or seeds adapted for this mode of dispersal, particularly in semiarid southwestern Africa." … "Broad wings aid in the dispersal of Gladiolus seeds … by wind, a possible factor in the wide distribution of the genus which extends across Africa and Eurasia."

705	Propagules water dispersed	
	Source(s)	**Notes**
	Weber, E. 2017. Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	[Unknown, but possible. Related species spread by streams] "Gladiolus undulates … spreads solely vegetatively by numerous bulbils and corms. These are carried by streams, by mud attaching to machinery and vehicles, and by soil movement."

706	Propagules bird dispersed	n
	Source(s)	**Notes**
	Kubitzki, K. (ed.). 1998. The Families and genera of vascular plants. Volume III. Flowering plants, Monocotyledons: Lilianae (except Orchidaceae). Springer-Verlag, Berlin, Heidelberg, New York	"The discoid seeds of some Moraea spp. and the circumferentially winged seeds of Gladiolus are dispersed by wind."

707	Propagules dispersed by other animals (externally)	n
	Source(s)	**Notes**

Qsn #	Question	Answer
	Kubitzki, K. (ed.). 1998. The Families and genera of vascular plants. Volume III. Flowering plants, Monocotyledons: Lilianae (except Orchidaceae). Springer-Verlag, Berlin, Heidelberg, New York	"The discoid seeds of some Moraea spp. and the circumferentially winged seeds of Gladiolus are dispersed by wind."

708	Propagules survive passage through the gut	
	Source(s)	**Notes**
	Ngalo, S. 2011. Gladiolus dalenii. PlantZAfrica. SANBI. http://pza.sanbi.org/gladiolus-dalenii. [Accessed]	"The corms are eaten by bush pigs." [Unknown if viable corm fragments survive gut passage, or if seeds are accidentally consumed in the process]

801	Prolific seed production (>1000/m2)	
	Source(s)	**Notes**
	Lim, T.K. 2014. Edible Medicinal And Non-Medicinal Plants. Volume 8, Flowers. Springer, Dordrecht	[Densities unknown] "Capsules usually slightly inflated, oblong to ellipsoid or globose. Seeds many light to dark, globose or angular."

802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	**Notes**
	Royal Botanic Gardens Kew. (2018) Seed Information Database (SID). Version 7.1. Available from: http://data.kew.org/sid/. [Accessed 11 Jun 2018]	"Storage Behaviour: Orthodox Storage Conditions: 87 % viability following drying to mc's in equilibrium with 15 % RH and freezing for 45 days at -20C at RBG Kew, WP"
	WRA Specialist. 2018. Personal Communication	Seed longevity unknown. Plants may be able to regenerate from persistent corms

803	Well controlled by herbicides	y
	Source(s)	**Notes**
	Weber, E. 2017. Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Herbicide can be sprayed or the foliage painted, the best time is when plants are actively growing and before flowering begins (Muyr, 2001)." [Control methods for Gladiolus undulatus would likely also be effective if needed to control Gladiolus dalenii]

804	Tolerates, or benefits from, mutilation, cultivation, or fire	
	Source(s)	**Notes**
	Weber, E. 2017. Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Gladiolus undulatus … Plants can be dug out, best when soils arc moist. Corms and bulbils should be removed as for as possible." [Related species regenerates from corms unless completely removed]
	WRA Specialist. 2018. Personal Communication	Plants would likely resprout unless corms were dug up, much like other Gladiolus species

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	

Qsn #	Question	Answer
	Source(s)	**Notes**
	Frohlich, D.& Lau, A. 2014. New plant records for the Hawaiian Islands 2012–2013. Bishop Museum Occasional Papers 115: 7–17	[Unknown, but naturalized in the Hawaiian Islands with no reports of limiting factors] "Gladiolus dalenii, native to parts of Africa (Staples & Herbst 2005) and previously collected as naturalized on the islands of Maui and Hawai'i (Imada 2012), was found in a disturbed mesic, non-native forest in Schofield Barracks, growing among Citharexylum caudatum and non-native grasses, including Andropogon virginicus. over a hundred plants were found in the area."

Summary of Risk Traits:

High Risk / Undesirable Traits
• Broad climate suitability & elevation range
• Able to grow in tropical climates
• Naturalized on Oahu, Maui, & Hawaii (Hawaiian Islands), as well as Alabama, Louisiana, & Australia
• Other Gladiolus species are invasive weeds
• Geophyte
• Reproduces by seeds, corms & possibly bulbils
• Spread by wind-dispersed seeds & discarded bulbs, as well as by intentional planting
• Seeds able to be stored for extended periods; May form a persistent seed bank
• Limited biological and ecological information may reduce accuracy of risk prediction

Low Risk Traits
• Despite naturalization, no documented reports of negative impacts to date
• Unarmed (no spines, thorns, or burrs)
• Corms palatable to animals (may be consumed by pigs)
• Ornamental
• Prefers full sun (may limit ability to spread into shaded habitats)
• Herbicides may provide effective control