

<b>Taxon:</b> <i>Kalanchoe rotundifolia</i>	<b>Family:</b> Crassulaceae
<b>Common Name(s):</b> common kalanchoe nentabos plakkie	<b>Synonym(s):</b> <i>Crassula rotundifolia</i> Haw. <i>Kalanchoe integerrima</i> Lange

<b>Assessor:</b> No Assessor	<b>Status:</b> Assessor Approved	<b>End Date:</b> 29 Jun 2014
<b>WRA Score:</b> 10.0	<b>Designation:</b> H(HPWRA)	<b>Rating:</b> High Risk

**Keywords:** Succulent, Toxic, Leaf Propagated, Seed Propagated, 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)	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	n
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	?
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		
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	y
406	Host for recognized pests and pathogens		
407	Causes allergies or is otherwise toxic to humans		
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	y
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets	y=1, n=0	y
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally		
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	2
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)		
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)		
708	Propagules survive passage through the gut	y=1, n=-1	n
801	Prolific seed production (>1000/m <sup>2</sup> )		
802	Evidence that a persistent propagule bank is formed (>1 yr)		
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
	Court, D. 2000. Succulent Flora of Southern Africa. Revised Edition. A.A. Balkema, Rotterdam, Netherlands	No evidence

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. 2014. Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. 2014. 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, National Genetic Resources Program. 2014. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: <a href="http://www.ars-grin.gov/">http://www.ars-grin.gov/</a> . [Accessed 29 Jun 2014]	"Native: AFRICA Northeast Tropical Africa: Yemen - Socotra East Tropical Africa: Tanzania South Tropical Africa: Mozambique; Zimbabwe Southern Africa: Botswana; Lesotho; Namibia; South Africa - Cape Province [e.], Free State [w.], KwaZulu-Natal, Transvaal; Swaziland [e.]"

202	Quality of climate match data	High
	Source(s)	Notes
	USDA, ARS, National Genetic Resources Program. 2014. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: <a href="http://www.ars-grin.gov/">http://www.ars-grin.gov/</a> . [Accessed ]	

Qsn #	Question	Answer
203	<b>Broad climate suitability (environmental versatility)</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	MySeeds.Co. 2014. <i>Kalanchoe</i> Species Mix. <a href="http://www.myseeds.co/kalanchoe-species-mix-rare-fresh-seeds-succulent-leaves-can-form-entire-plant-various-shades-and-colors-including-inflorescence-orange-blooms/">http://www.myseeds.co/kalanchoe-species-mix-rare-fresh-seeds-succulent-leaves-can-form-entire-plant-various-shades-and-colors-including-inflorescence-orange-blooms/</a> . [Accessed 29 Jun 2014]	"Hardiness Zones: 9a, 9b, 10a, 10b, 11a, 11b" [General hardiness zones included for all species in mix, which includes <i>K. rotundifolia</i> ]
	Raadts, E. 1977. The genus <i>Kalanchoe</i> (Crassulaceae) in tropical East Africa. <i>Willdenowia</i> 8: 101-157	"Socotra, Mozambique, Rhodesia, South and South West Africa" ... "Habitat: Bushland;500 700m." [Narrow elevation range, and occurring primarily in tropical/subtropical climates]

204	<b>Native or naturalized in regions with tropical or subtropical climates</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	Court, D. 2000. <i>Succulent Flora of Southern Africa</i> . Revised Edition. A.A. Balkema, Rotterdam, Netherlands	"Extremely widespread; Namibia, Botswana, Transvaal, western Free State, KwaZulu-Natal, Swaziland, Zimbabwe, Mozambique, Tanzania and Socotra."

205	<b>Does the species have a history of repeated introductions outside its natural range?</b>	<b>?</b>
	<b>Source(s)</b>	<b>Notes</b>
	WRA Specialist. 2014. Personal Communication	Unknown. Available from commercial websites, but most are based within native range of South Africa

301	<b>Naturalized beyond native range</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	Starr, F. & Starr, K. 2014. Maui Early Detection Botanists, pers. comm. 25 June 2014	"We were surveying for ants along Haleakala Highway, by the building all by itself with Barns written on the side before Omaopio Rd. Came across a succulent on the steep rocky roadcut we're tentatively calling <i>Kalanchoe rotundifolia</i> . Presumably a New Naturalized Record for Hawaii. " [Voucher & publication to be verified]

302	<b>Garden/amenity/disturbance weed</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Randall, R.P. 2012. <i>A Global Compendium of Weeds</i> . 2nd Edition. Department of Agriculture and Food, Western Australia	[Listed as a cultivation escape and an agricultural weed] " <i>Kalanchoe rotundifolia</i> (Haw.) Haw. Crassulaceae Cultivated Toxic 1122-C, 121-AW"

303	<b>Agricultural/forestry/horticultural weed</b>	
	<b>Source(s)</b>	<b>Notes</b>

Qsn #	Question	Answer
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	[Listed as a cultivation escape and an agricultural weed, but unable to find specifics of weediness in agriculture. Possibly related to toxicity to livestock] "Kalanchoe rotundifolia (Haw.) Haw. Crassulaceae Cultivated Toxic 1122-C, 121-AW"

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

305	Congeneric weed	y
	Source(s)	Notes
	Herrera, I., Hernandez, M. J., Lampo, M., & Nassar, J. M. 2012. Plantlet recruitment is the key demographic transition in invasion by <i>Kalanchoe daigremontiana</i> . Population Ecology, 54(1): 225-237	" <i>Kalanchoe daigremontiana</i> is a noxious invasive plant in arid zones. Besides being toxic for domestic animals and wildlife, this species inhibits the growth of native plants."

401	Produces spines, thorns or burrs	n
	Source(s)	Notes
	Raadts, E. 1977. The genus <i>Kalanchoe</i> (Crassulaceae) in tropical East Africa. Willdenowia 8: 101-157	[No evidence] "Perennial, 0,2-1,2 m tall, more tender than the preceding species, pruinose. Leaf blade oblong, 2,5-4 cm long and 1,5-2,5 cm wide, acute to obtuse at the apex, cuneate at the base, narrowed into a subcylindric petiole 0,2-1 cm in length, not broadened at the base, slightly constricted at the point of attachment and easily detachable from the stem."

402	Allelopathic	
	Source(s)	Notes
	WRA Specialist. 2014. Personal Communication	Unknown

403	Parasitic	n
	Source(s)	Notes
	Raadts, E. 1977. The genus <i>Kalanchoe</i> (Crassulaceae) in tropical East Africa. Willdenowia 8: 101-157	"Perennial, 0,2-1,2 m tall, more tender than the preceding species, pruinose." [No evidence. Crassulaceae]

404	Unpalatable to grazing animals	n
	Source(s)	Notes

Qsn #	Question	Answer
	Botha, C.J. & Venter, E. 2002, Plants poisonous to livestock Southern Africa (CD-ROM). University of Pretoria, Faculty of Veterinary Science, Dept. of Paraclinical Sciences, Section Pharmacology and Toxicology, Pretoria, South Africa	[Presumably palatable, and consumption results in poisoning] "TOXIC PRINCIPLE: Cumulative neurotoxic bufadienolides" ... "SYSTEMS AFFECTED: Central nervous system." ... "CLINICAL SIGNS: • Krimpsiekte is basically a paretic syndrome. • Affected animals lag behind the flock. • When forced to move, they tire easily and lie down or stand trembling, typically with the feet together, the back arched and the head low. • The neck may be twisted and the head may dangle loosely as the animal walks. • The incidence of krimpsiekte is highest in goats, then in sheep."
	Tshabalala, T. 2008. The seasonal variation of diet of the African buffalo ( <i>Syncerus caffer</i> ) and grass characteristics in the Great Fish River Reserve, Eastern Cape. MSc Thesis. University of Fort Hare, Alice, South Africa	[Presumably palatable. <i>Kalanchoe rotundifolia</i> listed among browse species] "Appendix: Plant species List of common plant species found in Suikerbosrand Nature Reserve (Falls 1993)."

405	Toxic to animals	y
	Source(s)	Notes
	Operation Wildflower. 2014. <i>Kalanchoe rotundifolia</i> . <a href="http://www.operationwildflower.org.za/index.php/plant_records/succulents/203-kalanchoe-rotundifolia6">http://www.operationwildflower.org.za/index.php/plant_records/succulents/203-kalanchoe-rotundifolia6</a> . [Accessed 29 Jun 2014]	"It contains a toxic substance that causes sheep and cattle disease, called nenta or loco disease (krimpsiekte in Afrikaans)."
	Bizimana, N. 1994. Traditional Veterinary Practice in Africa. Deutsche Gesellschaft für Technische Zusammenarbeit, Eschborn, Germany	" <i>Kalanchoe rotundifolia</i> Harv.: The plant contains cotyledontoxin but too little to produce cotyledonosis. A great deal would have to be eaten to do so (W02)."
	Botha, C.J. & Venter, E. 2002, Plants poisonous to livestock Southern Africa (CD-ROM). University of Pretoria, Faculty of Veterinary Science, Dept. of Paraclinical Sciences, Section Pharmacology and Toxicology, Pretoria, South Africa	"TOXIC PRINCIPLE: Cumulative neurotoxic bufadienolides" ... "SYSTEMS AFFECTED: Central nervous system." ... "CLINICAL SIGNS: • Krimpsiekte is basically a paretic syndrome. • Affected animals lag behind the flock. • When forced to move, they tire easily and lie down or stand trembling, typically with the feet together, the back arched and the head low. • The neck may be twisted and the head may dangle loosely as the animal walks. • The incidence of krimpsiekte is highest in goats, then in sheep."
	Bullock, A. A. 1952. South African poisonous plants. Kew Bulletin, 7(1): 117-129	<i>Kalanchoe rotundifolia</i> included in list. No specifics provided

406	Host for recognized pests and pathogens	
	Source(s)	Notes
	Operation Wildflower. 2014. <i>Kalanchoe rotundifolia</i> . <a href="http://www.operationwildflower.org.za/index.php/plant_records/succulents/203-kalanchoe-rotundifolia6">http://www.operationwildflower.org.za/index.php/plant_records/succulents/203-kalanchoe-rotundifolia6</a> . [Accessed 29 Jun 2014]	"Pests and diseases - Not under much attack in its natural domain"

Qsn #	Question	Answer
	De Cleene, M., & De Ley, J. 1976. The host range of crown gall. The Botanical Review, 42(4), 389-466	[ <i>Kalanchoe rotundifolia</i> listed among susceptible host plants] ["Crown gall is a plant tumor disease caused by the specific action of the bacterium <i>Agrobacterium tumefaciens</i> . In the current literature its host range is not clearly defined or is thought to be restricted to the dicotyledonous class of the angiosperms. We reviewed the susceptibility of 1193 species belonging to 588 genera and 138 families; 643 are host plants belonging to 331 genera and 93 families. Our list seems to be so far the most extensive source of information on crown gall susceptibility of plants." ... "Crown gall is a plant tumor disease caused by the specific action of the bacterium <i>Agrobacterium tumefaciens</i> (Smith & Townsend, 1907) Conn. It is probably the most intensively studied plant tumor disease, not only because it has some economic importance (Barret, 1929; Hoerner, 1945; Dowson, 1957; Kerr, 1969; Lehocky, 1971; Robbs et al., 1971; Malenin, 1972, 1973) but also because of some resemblance to animal cancer (Smith E., 1916a, b; Stapp, 1927; Riker & Berge, 1935; Kupila, 1963)."

407	Causes allergies or is otherwise toxic to humans	
	Source(s)	Notes
	Botha, C.J. & Venter, E. 2002, Plants poisonous to livestock Southern Africa (CD-ROM). University of Pretoria, Faculty of Veterinary Science, Dept. of Paraclinical Sciences, Section Pharmacology and Toxicology, Pretoria, South Africa	[Presumably requires consumption to manifest toxic effects. Unlikely in humans, although small children could be affected if parts of plants were consumed] "Krimpsiekte is basically a parietic syndrome. <ul style="list-style-type: none"> <li>• Affected animals lag behind the flock.</li> <li>• When forced to move, they tire easily and lie down or stand trembling, typically with the feet together, the back arched and the head low.</li> <li>• The neck may be twisted and the head may dangle loosely as the animal walks.</li> <li>• The incidence of krimpsiekte is highest in goats, then in sheep."</li> </ul>

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	Notes
	Eggl, U. 2002. Illustrated handbook of succulent plants: Dicotyledons. Springer-Verlag, Berlin - Heidelberg - New York	"fleshy-succulent" [No evidence, and unlikely given succulent leaves]

409	Is a shade tolerant plant at some stage of its life cycle	y
	Source(s)	Notes
	Botha, C.J. & Venter, E. 2002, Plants poisonous to livestock Southern Africa (CD-ROM). University of Pretoria, Faculty of Veterinary Science, Dept. of Paraclinical Sciences, Section Pharmacology and Toxicology, Pretoria, South Africa	"DISTRIBUTION: • Grassland and bushveld. • To be found in the shade of trees and bushes, usually in sandy, limestone or brackish soil"
	Kumbula Indigenous Nursery. 2014. A database of Indigenous South African Flora - <i>Kalanchoe rotundiflora</i> . <a href="http://kumbulanursery.co.za/plants/kalanchoe-rotundiflora">http://kumbulanursery.co.za/plants/kalanchoe-rotundiflora</a> . [Accessed 29 Jun 2014]	[Tolerates shade, but may inhibit flowering] "often in colonies close to or in the shade of shrubs and in grasslands." ... "Plant <i>Kalanchoe rotundiflora</i> in light shady areas or in the shade of plants" ... "They will grow in almost any soil as long as it is well-drained. Too much water and shade will hinder flowering."

Qsn #	Question	Answer
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	Notes
	Kumbula Indigenous Nursery. 2014. A database of Indigenous South African Flora - <i>Kalanchoe rotundiflora</i> . <a href="http://kumbulanursery.co.za/plants/kalanchoe-rotundiflora">http://kumbulanursery.co.za/plants/kalanchoe-rotundiflora</a> . [Accessed 29 Jun 2014]	"They will grow in almost any soil as long as it is well-drained."

411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Raadts, E. 1977. The genus <i>Kalanchoe</i> (Crassulaceae) in tropical East Africa. <i>Willdenowia</i> 8: 101-157	"Perennial, 0,2-1,2 m tall, more tender than the preceding species, pruinose."

412	Forms dense thickets	y
	Source(s)	Notes
	JSTOR Global Plants. 2003. Entry for <i>Kalanchoe rotundifolia</i> [family CRASSULACEAE]. Entry from Flora of South Africa (2003) Author: Dr J.P. Roux. <a href="http://plants.jstor.org">plants.jstor.org</a>	"Usually found in shade or half-shade, often in dense stands under trees or shrubs in bushveld."

501	Aquatic	n
	Source(s)	Notes
	Raadts, E. 1977. The genus <i>Kalanchoe</i> (Crassulaceae) in tropical East Africa. <i>Willdenowia</i> 8: 101-157	"Habitat: Bushland;500-700m." [Terrestrial]

502	Grass	n
	Source(s)	Notes
	Raadts, E. 1977. The genus <i>Kalanchoe</i> (Crassulaceae) in tropical East Africa. <i>Willdenowia</i> 8: 101-157	Crassulaceae

503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	Raadts, E. 1977. The genus <i>Kalanchoe</i> (Crassulaceae) in tropical East Africa. <i>Willdenowia</i> 8: 101-157	Crassulaceae



Qsn #	Question	Answer
504	<b>Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Operation Wildflower. 2014. <i>Kalanchoe rotundifolia</i> . <a href="http://www.operationwildflower.org.za/index.php/plant_records/succulents/203-kalanchoe-rotundifolia6">http://www.operationwildflower.org.za/index.php/plant_records/succulents/203-kalanchoe-rotundifolia6</a> . [Accessed 29 Jun 2014]	"Description of roots - Rather short, fine roots"
	Raadts, E. 1977. The genus <i>Kalanchoe</i> (Crassulaceae) in tropical East Africa. <i>Willdenowia</i> 8: 101-157	"Perennial, 0,2-1,2 m tall, more tender than the preceding species, pruinose."

601	<b>Evidence of substantial reproductive failure in native habitat</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Court, D. 2000. <i>Succulent Flora of Southern Africa</i> . Revised Edition. A.A. Balkema, Rotterdam, Netherlands	[No evidence] "Extremely widespread; Namibia, Botswana, Transvaal, western Free State, KwaZulu-Natal, Swaziland, Zimbabwe, Mozambique, Tanzania and Socotra."

602	<b>Produces viable seed</b>	y
	<b>Source(s)</b>	<b>Notes</b>
	South African National Biodiversity Institute. 2001. <i>Kalanchoe rotundifolia</i> . <a href="http://www.plantzafrica.com/plantklm/kalanrotund.htm">http://www.plantzafrica.com/plantklm/kalanrotund.htm</a> . [Accessed 28 Jun 2014]	"This is an easy plant to propagate from both seed and cuttings. The seeds of these plants are very fine and must be collected as soon as they are ripe before they disperse. The best time to sow these seeds will be early spring in order to give them plenty of time to grow before late autumn. Sowing may be done either in seedling containers or directly into the garden."

603	<b>Hybridizes naturally</b>	
	<b>Source(s)</b>	<b>Notes</b>
	Raadts, E. 1977. The genus <i>Kalanchoe</i> (Crassulaceae) in tropical East Africa. <i>Willdenowia</i> 8: 101-157	[Unknown for <i>K. rotundifolia</i> . Hybridization recorded in genus] " <i>K. densiflora</i> ROLFE X <i>K. lanceolata</i> (FORSSKP.E) RS." ... "Note. The hybrid was found among <i>K. densiflora</i> and <i>K. lanceolata</i> on the same spot. It combines characters of the two species."

604	<b>Self-compatible or apomictic</b>	
	<b>Source(s)</b>	<b>Notes</b>
	Kubitzki, K., Bayer, C. 7 Stevens, P.F. 2007. The families and genera of vascular plants: Volume IX. Flowering Plants. Eudicots. Springer-Verlag, Berlin, Heidelberg, New York	[Family Description. Uncertain for <i>K. rotundifolia</i> ] "Crassulaceae appear to be usually self-incompatible but <i>Sedum</i> sect. <i>Gormania</i> shows self-compatibility in varying degrees (Denton 1979)."

605	<b>Requires specialist pollinators</b>	n
	<b>Source(s)</b>	<b>Notes</b>

Qsn #	Question	Answer
	Kumbula Indigenous Nursery. 2014. A database of Indigenous South African Flora - <i>Kalanchoe rotundiflora</i> . <a href="http://kumbulanursery.co.za/plants/kalanchoe-rotundiflora">http://kumbulanursery.co.za/plants/kalanchoe-rotundiflora</a> . [Accessed 29 Jun 2014]	"Attracts bees, butterflies and other insects"
	Operation Wildflower. 2014. <i>Kalanchoe rotundifolia</i> . <a href="http://www.operationwildflower.org.za/index.php/plant-records/succulents/203-kalanchoe-rotundifolia6">http://www.operationwildflower.org.za/index.php/plant-records/succulents/203-kalanchoe-rotundifolia6</a> . [Accessed 29 Jun 2014]	"The butterfly doing pollination duty is common in Gauteng during autumn."
	Raadts, E. 1977. The genus <i>Kalanchoe</i> (Crassulaceae) in tropical East Africa. <i>Willdenowia</i> 8: 101-157	[Red color may attract birds, but short-tubed corollas would not prevent access from more generalized pollinators] "Inflorescence up to 20 cm long and 15 cm wide. Pedicels 2-5 (-8) mm long, slightly broadened towards the flower. Calyx very small, lobes 1-2 mm long and c. 1 mm wide, 0,1-1 mm connate. Corolla red or orange-red, yellowish to greenish in the lower part of the tube; tube 7-10 mm long, twisted in the upper part in fading, lobes 4-5 mm long end 1,5-2 mm wide. Anthers with small apical glands, both whorls of nearly the same size, 0,5-0,7 mm long and 0,4-0,5 mm wide, included in the corolla tube. Pistil 5-6,5 mm long, ovaries 4-6 mm, style 0,5-1 mm long. Scales 1-2,5 mm long."

606	Reproduction by vegetative fragmentation	y
	Source(s)	Notes
	Stoudt, H. N. 1938. Gemmipary in <i>Kalanchoe rotundifolia</i> and other Crassulaceae. <i>American Journal of Botany</i> 25 (2): 106-110	"Detached leaves of <i>Kalanchoe rotundifolia</i> produce plantlets from residual meristems on the adaxial surface of the basal portion of the petiole. By the time the leaf is fully matured, the meristematic cushion has become differentiated into primordia of two leaves and a stem. This bud then remains dormant, and root primordia are initiated after the leaf is removed from the plant."
	South African National Biodiversity Institute. 2001. <i>Kalanchoe rotundifolia</i> . <a href="http://www.plantzafrica.com/plantklm/kalanrotund.htm">http://www.plantzafrica.com/plantklm/kalanrotund.htm</a> . [Accessed 29 Jun 2014]	"Each leaf is capable of producing a new plant when it drops to the ground."

607	Minimum generative time (years)	2
	Source(s)	Notes
	Raadts, E. 1977. The genus <i>Kalanchoe</i> (Crassulaceae) in tropical East Africa. <i>Willdenowia</i> 8: 101-157	"Perennial, 0,2-1,2 m tall, more tender than the preceding species, pruinose." [Probably 2+ years, although may be able to spread vegetatively with leaves at an earlier age]

Qsn #	Question	Answer
701	<b>Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)</b>	
	<b>Source(s)</b>	<b>Notes</b>
	South African National Biodiversity Institute. 2001. <i>Kalanchoe rotundifolia</i> . <a href="http://www.plantzafrica.com/plantklm/kalanrotund.htm">http://www.plantzafrica.com/plantklm/kalanrotund.htm</a> . [Accessed 29 Jun 2014]	[Unknown. Although seeds & leaves lack means of external attachment, either may be spread inadvertently through soil movement, and small seed size may aid in adherence to mud on shoes, tires or equipment] "The seeds of these plants are very fine and must be collected as soon as they are ripe before they disperse." ... "Each leaf is capable of producing a new plant when it drops to the ground."

702	<b>Propagules dispersed intentionally by people</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	MySeeds.Co. 2014. <i>Kalanchoe</i> Species Mix. <a href="http://www.myseeds.co/kalanchoe-species-mix-rare-fresh-seeds-succulent-leaves-can-form-entire-plant-various-shades-and-colors-including-inflorescence-orange-blooms/">http://www.myseeds.co/kalanchoe-species-mix-rare-fresh-seeds-succulent-leaves-can-form-entire-plant-various-shades-and-colors-including-inflorescence-orange-blooms/</a> . [Accessed 29 Jun 2014]	"These seeds are VERY VERY small, each pack of seed will contain more than advertised. But if you are uncomfortable working with VERY VERY small seeds please do NOT purchase this product." [ <i>K. rotundifolia</i> seeds included in commercial seed packets]

703	<b>Propagules likely to disperse as a produce contaminant</b>	
	<b>Source(s)</b>	<b>Notes</b>
	South African National Biodiversity Institute. 2001. <i>Kalanchoe rotundifolia</i> . <a href="http://www.plantzafrica.com/plantklm/kalanrotund.htm">http://www.plantzafrica.com/plantklm/kalanrotund.htm</a> . [Accessed 29 Jun 2014]	[Unknown. Small seed size could result in contaminated pots or soil of plants cultivated in vicinity] "The seeds of these plants are very fine and must be collected as soon as they are ripe before they disperse."

704	<b>Propagules adapted to wind dispersal</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	South African National Biodiversity Institute. 2001. <i>Kalanchoe rotundifolia</i> . <a href="http://www.plantzafrica.com/plantklm/kalanrotund.htm">http://www.plantzafrica.com/plantklm/kalanrotund.htm</a> . [Accessed 29 Jun 2014]	"The seeds of these plants are very fine and must be collected as soon as they are ripe before they disperse." [Small seeds presumably dispersed by wind or gravity, perhaps augmented by wind]
	Kubitzki, K., Bayer, C. 7 Stevens, P.F. 2007. The families and genera of vascular plants: Volume IX. Flowering Plants. Eudicots. Springer-Verlag, Berlin, Heidelberg, New York	[Family description for Crassulaceae] "Most seeds are dispersed over short distances as anemochorous seed rain around the mother plant (Parra et al. 1993). Anemochorous long-distance dispersal appears to be rare"
	Weatherall-Thomas, C.R. 2009. Seed Dynamics and Seedling Survival in Mainland Thicket of the Eastern Cape. MSc. Thesis. Nelson Mandela Metropolitan University, Port Elizabeth, South Africa	[ <i>Kalanchoe rotundifolia</i> dispersal mechanisms listed as autochory & anemochory] "Appendix 3 Mean (n = 4) Frequencies, Growth form (G) and dispersal mechanism (D) of individuals per plant species (m-2) in the germinable seed bank underneath the canopy (C), at the edge (E) and in openings (O) of all sites. See text for site codes. (Wo = woody, He = herb, S = succulent, Gr = graminoid, Cl = climber, Ge = geophyte. A = autochory, W = anemochory, Z = zoochory)"

705	<b>Propagules water dispersed</b>	
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	South African National Biodiversity Institute. 2001. <i>Kalanchoe rotundifolia</i> . <a href="http://www.plantzafrica.com/plantklm/kalanrotund.htm">http://www.plantzafrica.com/plantklm/kalanrotund.htm</a> . [Accessed 29 Jun 2014]	[Unknown. Small seeds or leaves might be secondarily dispersed by water] "The seeds of these plants are very fine and must be collected as soon as they are ripe before they disperse." ... "Each leaf is capable of producing a new plant when it drops to the ground."

706	Propagules bird dispersed	n
	<b>Source(s)</b>	<b>Notes</b>
	South African National Biodiversity Institute. 2001. <i>Kalanchoe rotundifolia</i> . <a href="http://www.plantzafrica.com/plantklm/kalanrotund.htm">http://www.plantzafrica.com/plantklm/kalanrotund.htm</a> . [Accessed 29 Jun 2014]	[Not fleshy-fruited. Presumably adapted for wind dispersal] "The seeds of these plants are very fine and must be collected as soon as they are ripe before they disperse."

707	Propagules dispersed by other animals (externally)	n
	<b>Source(s)</b>	<b>Notes</b>
	South African National Biodiversity Institute. 2001. <i>Kalanchoe rotundifolia</i> . <a href="http://www.plantzafrica.com/plantklm/kalanrotund.htm">http://www.plantzafrica.com/plantklm/kalanrotund.htm</a> . [Accessed 29 Jun 2014]	[Unknown. Small seeds could possibly be moved by mud stuck to animal feet or fur] "The seeds of these plants are very fine and must be collected as soon as they are ripe before they disperse."

708	Propagules survive passage through the gut	n
	<b>Source(s)</b>	<b>Notes</b>
	Weatherall-Thomas, C.R. 2009. Seed Dynamics and Seedling Survival in Mainland Thicket of the Eastern Cape. MSc. Thesis. Nelson Mandela Metropolitan University, Port Elizabeth, South Africa	[No evidence. <i>Kalanchoe rotundifolia</i> dispersal mechanisms listed as autochory & anemochory] "Appendix 3 Mean (n = 4) Frequencies, Growth form (G) and dispersal mechanism (D) of individuals per plant species (m-2) in the germinable seed bank underneath the canopy (C), at the edge (E) and in openings (O) of all sites. See text for site codes. (Wo = woody, He = herb, S = succulent, Gr = graminoid, Cl = climber, Ge = geophyte. A = autochory, W = anemochory, Z = zoochory)"

801	Prolific seed production (>1000/m <sup>2</sup> )	n
	<b>Source(s)</b>	<b>Notes</b>
	South African National Biodiversity Institute. 2001. <i>Kalanchoe rotundifolia</i> . <a href="http://www.plantzafrica.com/plantklm/kalanrotund.htm">http://www.plantzafrica.com/plantklm/kalanrotund.htm</a> . [Accessed ]	[Quantity unknown] "The seeds of these plants are very fine and must be collected as soon as they are ripe before they disperse."

802	Evidence that a persistent propagule bank is formed (>1 yr)	n
	<b>Source(s)</b>	<b>Notes</b>
	Royal Botanic Gardens Kew. 2008. Seed Information Database (SID). Version 7.1. <a href="http://data.kew.org/sid/">http://data.kew.org/sid/</a> . [Accessed 29 Jun 2014]	"Storage Behaviour: Orthodox Storage Conditions: 90 % viability following drying to mc's in equilibrium with 15 % RH and freezing for 59 days at -20C at RBG Kew, WP"

Qsn #	Question	Answer
	Jones, F. E., & Esler, K. J. 2004. Relationship between soil-stored seed banks and degradation in eastern Nama Karoo rangelands (South Africa). <i>Biodiversity &amp; Conservation</i> , 13 (11): 2027-2053	[ <i>Kalanchoe rotundifolia</i> collected in the soil seed bank. Longevity unspecified] "Table 4. Most abundant plant species germinated from samples removed from Tafelberg plains, slopes and plateau during October (Spring) and April (Autumn) sampling."

803	Well controlled by herbicides	
	Source(s)	Notes
	WRA Specialist. 2014. Personal Communication	Unknown. No information found on herbicide efficacy or chemical control of this species.

804	Tolerates, or benefits from, mutilation, cultivation, or fire	
	Source(s)	Notes
	South African National Biodiversity Institute. 2001. <i>Kalanchoe rotundifolia</i> . <a href="http://www.plantzafrica.com/plantklm/kalanrotund.htm">http://www.plantzafrica.com/plantklm/kalanrotund.htm</a> . [Accessed 29 Jun 2014]	[Could possibly grow from fragmented parts of plants and/or leaves if damaged by mutilation or cultivation] "Each leaf is capable of producing a new plant when it drops to the ground."

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	WRA Specialist. 2014. Personal Communication	Unknown. At least five other <i>Kalanchoe</i> species have naturalized in the Hawaiian Islands, with no apparent limiting factors preventing their establishment

**Summary of Risk Traits:**

## High Risk / Undesirable Traits

- Thrives in tropical climates
- Possibly naturalizing on Maui, Hawaiian Islands (confirmation needed)
- Other *Kalanchoe* species have become invasive
- Toxic to livestock
- Shade-tolerant
- Tolerates many soil types
- Forms dense stands
- Small seeds dispersed by wind and possibly other means
- Each leaf is capable of producing a new plant when it drops to the ground
- Limited ecological information makes accurate risk prediction difficult

## Low Risk Traits

- No confirmed reports of invasiveness elsewhere (possibly due to limited cultivation outside native range)
- Unarmed (no spines, thorns or burrs)