

Taxon: <i>Ceropegia woodii</i> Schltr.	Family: Apocynaceae
Common Name(s): chain of hearts hearts entangled rosary plant string of hearts sweetheart vine	Synonym(s): <i>Ceropegia barbertonensis</i> N.E.Br. <i>Ceropegia collaricorona</i> Werderm. <i>Ceropegia euryacme</i> Schltr. <i>Ceropegia hastata</i> N.E.Br. <i>Ceropegia leptocarpa</i> Schltr. <i>Ceropegia linearis</i> subsp. <i>woodii</i> <i>Ceropegia schoenlandii</i> N.E.Br.

Assessor: Chuck Chimera	Status: Assessor Approved	End Date: 1 Jul 2022
WRA Score: -2.0	Designation: L	Rating: Low Risk

Keywords: Succulent Climber, Shade-Tolerant, Tuberos, Specialized Pollination, 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	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	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		
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

Qsn #	Question	Answer Option	Answer
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
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	y
412	Forms dense thickets	y=1, n=0	n
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	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	y=-1, n=0	y
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 ²)		
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
	Albers, F. & Meve, U. (eds.). (2002). Illustrated Handbook of Succulent Plants: Asclepiadaceae. Springer Science & Business Media, Berlin - Heidelberg - New York	[Cultivated forms exist, but no evidence of domestication] "Presumably the most widely distributed taxon of the genus in cultivation and very popular among beginners (very decorative in hanging baskets, in greenhouses occasionally used as ground cover). The stem tubers are used as stocks for grafting difficult stem succulent stapeliads. There are ± white-variegated forms in cultivation as well as a form with pink foliage."

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. (2022). Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. (2022). 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, Agricultural Research Service, National Plant Germplasm System. (2022). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/ . [Accessed 1 Jul 2022]	"Native Africa EAST TROPICAL AFRICA: Kenya SOUTH TROPICAL AFRICA: Zimbabwe SOUTHERN AFRICA: Eswatini, South Africa [KwaZulu-Natal, Eastern Cape, Western Cape, Limpopo, Mpumalanga]"

202	Quality of climate match data	High
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2022). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/ . [Accessed 1 Jul 2022]	

203	Broad climate suitability (environmental versatility)	y
	Source(s)	Notes

Qsn #	Question	Answer
	Bester, S. P. (2019). <i>Ceropegia linearis</i> subsp. <i>woodii</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/ceropegia-linearis-subsp-woodii . [Accessed 1 Jul 2022]	[Elevation range >1000 m] "Plants are found growing naturally mostly on rocky ledges within forests from 100–1 180 m above sea level. The tubers are usually embedded in cracks with a thin layer of soil on these cliff edges. It may also be found in open or closed woodland, outcrops and ledges in forests and rarely in grassland. The soils are usually rich in humus, loam or sandy soils that may be rocky or gravelly. Plants are usually found in shaded places. The natural habitat is in frost-free areas with relative high rainfall (600–1 000 mm per annum), with average maximum temperature of about 26°C and average minimum temperature of 16°C."

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	Albers, F. & Meve, U. (eds.). (2002). <i>Illustrated Handbook of Succulent Plants: Asclepiadaceae</i> . Springer Science & Business Media, Berlin - Heidelberg - New York	"(Mem. Soc. Brot. 12: 118, 1957). T: RSA, KwaZulu-Natal (Wood 1317 [K]). – D: Kenya, Zimbabwe, RSA (Western Cape, Eastern Cape, KwaZulu- Natal), Swaziland. I: Bruyns (1985)."
	USDA, Agricultural Research Service, National Plant Germplasm System. (2022). <i>Germplasm Resources Information Network (GRIN-Taxonomy)</i> . National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/ . [Accessed 1 Jul 2022]	"Native Africa EAST TROPICAL AFRICA: Kenya SOUTH TROPICAL AFRICA: Zimbabwe SOUTHERN AFRICA: Eswatini, South Africa [KwaZulu-Natal, Eastern Cape, Western Cape, Limpopo, Mpumalanga]"
	Imada, C. (2019). <i>Hawaiian Naturalized Vascular Plants Checklist</i> (February 2019 update). Bishop Museum Technical Report 69. Bishop Museum, Honolulu, HI	No evidence

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	Notes
	Albers, F. & Meve, U. (eds.). (2002). <i>Illustrated Handbook of Succulent Plants: Asclepiadaceae</i> . Springer Science & Business Media, Berlin - Heidelberg - New York	"Presumably the most widely distributed taxon of the genus in cultivation and very popular among beginners (very decorative in hanging baskets, in greenhouses occasionally used as ground cover)."

301	Naturalized beyond native range	n
	Source(s)	Notes
	Randall, R.P. (2017). <i>A Global Compendium of Weeds</i> . 3rd Edition. Perth, Western Australia. R.P. Randall	In Chile, classified as "I - Invasive Species may have escaped from gardens, cultivation or both; source not specific but includes some crop and pasture species." However, a subsequent search of the cited reference found no evidence to support this designation
	Imada, C. (2019). <i>Hawaiian Naturalized Vascular Plants Checklist</i> (February 2019 update). Bishop Museum Technical Report 69. Bishop Museum, Honolulu, HI	No evidence

302	Garden/amenity/disturbance weed	n
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Qsn #	Question	Answer
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	In Chile, classified as "I - Invasive Species may have escaped from gardens, cultivation or both; source not specific but includes some crop and pasture species." However, a subsequent search of the cited reference found no evidence to support this designation

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	In Chile, classified as "I - Invasive Species may have escaped from gardens, cultivation or both; source not specific but includes some crop and pasture species." However, a subsequent search of the cited reference found no evidence to support this designation

304	Environmental weed	n
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	In Chile, classified as "I - Invasive Species may have escaped from gardens, cultivation or both; source not specific but includes some crop and pasture species." However, a subsequent search of the cited reference found no evidence to support this designation
	CABI. (2022). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	No evidence

305	Congeneric weed	n
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	<i>Ceropegia linearis</i> and <i>Ceropegia sandersonii</i> listed as weeds of unspecified, and unverified impacts

401	Produces spines, thorns or burrs	n
	Source(s)	Notes
	Albers, F. & Meve, U. (eds.). (2002). Illustrated Handbook of Succulent Plants: Asclepiadaceae. Springer Science & Business Media, Berlin - Heidelberg - New York	[<i>C. linearis</i> ssp. <i>woodii</i> . No evidence] "R tuber 2.5 - 5 (-10) cm \square , often irregular with age; stems at numerous nodes usually with globose stem tubers; L broadly cordate, ovate to lanceolate, 6 - 18 x 3 - 16 mm, succulent, often acuminate, upper face flat, marked with dark green or whitish-dark-green, lower face convex, pale green often suffused with red, petiole 3 - 10 mm; Cl 1.8 - 2.5 cm, pale green-white, whitish-rose, often striped with dark violet; Cl lobes dark purple, rarely greenish; Cl inflation globose, \pm 4 x 4 mm, inside (striped with) purple, merging \pm gradually into the Cl tube, tube 2 mm \square , widening to 3 mm \square towards the mouth, basally (striped with) purple, apically whitish, inside hairy; Cl lobes narrowly spatulate (in Kenya also broadly spatulate), at least basally folded back along the midrib, erect, 6 - 7 mm, forming an elongated cage with a blunt (rarely cone-shaped) tip, inside with purple Ha; Cn white, sessile or shortly stipitate, \pm 2.5 - 3 x 2 mm; Cl lobes with upper margin often setulose; Cs 2 - 2.5 mm."

Qsn #	Question	Answer
402	Allelopathic	
	Source(s)	Notes
	WRA Specialist. (2022). Personal Communication	Unknown. No evidence found

403	Parasitic	n
	Source(s)	Notes
	Bester, S. P. (2019). <i>Ceropegia linearis</i> subsp. <i>woodii</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/ceropegia-linearis-subsp-woodii . [Accessed 1 Jul 2022]	" <i>Ceropegia linearis</i> subsp. <i>woodii</i> is a perennial, evergreen, succulent climber or prostrate trailer, with slender, prostrate stems arising from tubers. Tuber with a hard, grey and woody base, usually wrinkled that grows up to 25–50 mm in diameter." [Apocynaceae. No evidence]

404	Unpalatable to grazing animals	n
	Source(s)	Notes
	Ourhouseplants.com. (2022). <i>Ceropegia Woodii</i> (String of Hearts / Rosary Vine). https://www.ourhouseplants.com/plants/string-of-hearts-ceropegia-woodii . [Accessed 1 Jul 2022]	"Another bonus is that they're safe to have around pets as they're non-toxic."
	Bester, S. P. (2019). <i>Ceropegia linearis</i> subsp. <i>woodii</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/ceropegia-linearis-subsp-woodii . [Accessed 1 Jul 2022]	"In the wild it is well-known that especially the tubers of <i>Brachystelma</i> and <i>Ceropegia</i> plants are not only consumed as survival food and for their water content by man, but also by wild animals like porcupine, baboons, and rodents and even insects. Stems and tubers may be eaten raw as a famine food, or to utilize the moisture derived from them."
	Jacobs, T. V. (2002). Underutilized Edible Plants from South Africa: a Perspective. Pp. 371-378 in <i>Managing Plant Genetic Diversity</i> . CABI Publishing, Wallingford	"Table 34.2. Plants that yield edible roots, tubers and corms" [Includes <i>Ceropegia woodii</i> Schltr.]

405	Toxic to animals	n
	Source(s)	Notes
	Ourhouseplants.com. (2022). <i>Ceropegia Woodii</i> (String of Hearts / Rosary Vine). https://www.ourhouseplants.com/plants/string-of-hearts-ceropegia-woodii . [Accessed 1 Jul 2022]	"Another bonus is that they're safe to have around pets as they're non-toxic."
	Bester, S. P. (2019). <i>Ceropegia linearis</i> subsp. <i>woodii</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/ceropegia-linearis-subsp-woodii . [Accessed 1 Jul 2022]	"In the wild it is well-known that especially the tubers of <i>Brachystelma</i> and <i>Ceropegia</i> plants are not only consumed as survival food and for their water content by man, but also by wild animals like porcupine, baboons, and rodents and even insects. Stems and tubers may be eaten raw as a famine food, or to utilize the moisture derived from them." [No evidence]

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

Qsn #	Question	Answer
	Epic Gardening. (2022). <i>Ceropegia Woodii: Grow A String Of Hearts</i> . https://www.epicgardening.com/ceropegia-woodii/ . [Accessed 1 Jul 2022]	"Pests & Diseases: Aphids and some scale insects, mostly mealybugs. Can get root rot."
	Ourhouseplants.com. (2022). <i>Ceropegia Woodii (String of Hearts / Rosary Vine)</i> . https://www.ourhouseplants.com/plants/string-of-hearts-ceropegia-woodii/ . [Accessed 1 Jul 2022]	"They grow fast, are fairly resistant to pests and diseases and will live happily in the same pot for several years without a single complaint."

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes
	Bester, S. P. (2019). <i>Ceropegia linearis</i> subsp. <i>woodii</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/ceropegia-linearis-subsp-woodii/ . [Accessed]	"In the wild it is well-known that especially the tubers of <i>Brachystelma</i> and <i>Ceropegia</i> plants are not only consumed as survival food and for their water content by man, but also by wild animals like porcupine, baboons, and rodents and even insects. Stems and tubers may be eaten raw as a famine food, or to utilize the moisture derived from them." [No evidence]
	Quattrocchi, U. (2012). <i>CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology</i> . CRC Press, Boca Raton, FL	No evidence

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	Notes
	Bester, S. P. (2019). <i>Ceropegia linearis</i> subsp. <i>woodii</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/ceropegia-linearis-subsp-woodii/ . [Accessed 1 Jul 2022]	[No evidence and unlikely. A succulent plant of shaded habitats with relative high rainfall] "Plants are found growing naturally mostly on rocky ledges within forests from 100–1 180 m above sea level. The tubers are usually embedded in cracks with a thin layer of soil on these cliff edges. It may also be found in open or closed woodland, outcrops and ledges in forests and rarely in grassland. The soils are usually rich in humus, loam or sandy soils that may be rocky or gravelly. Plants are usually found in shaded places. The natural habitat is in frost-free areas with relative high rainfall(600–1 000 mm per annum), with average maximum temperature of about 26°C and average minimum temperature of 16°C. "

409	Is a shade tolerant plant at some stage of its life cycle	y
	Source(s)	Notes
	Bester, S. P. (2019). <i>Ceropegia linearis</i> subsp. <i>woodii</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/ceropegia-linearis-subsp-woodii/ . [Accessed 1 Jul 2022]	"Plants are usually found in shaded places. The natural habitat is in frost-free areas with relative high rainfall(600–1 000 mm per annum), with average maximum temperature of about 26°C and average minimum temperature of 16°C."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	n
	Source(s)	Notes

Qsn #	Question	Answer
	Bester, S. P. (2019). <i>Ceropegia linearis</i> subsp. <i>woodii</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/ceropegia-linearis-subsp-woodii . [Accessed 1 Jul 2022]	"Soil type: Sandy, Loam" ... "Plants are found growing naturally mostly on rocky ledges within forests from 100–1 180 m above sea level. The tubers are usually embedded in cracks with a thin layer of soil on these cliff edges. It may also be found in open or closed woodland, outcrops and ledges in forests and rarely in grassland. The soils are usually rich in humus, loam or sandy soils that may be rocky or gravelly."

411	Climbing or smothering growth habit	y
	Source(s)	Notes
	Bester, S. P. (2019). <i>Ceropegia linearis</i> subsp. <i>woodii</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/ceropegia-linearis-subsp-woodii . [Accessed 1 Jul 2022]	" <i>Ceropegia linearis</i> subsp. <i>woodii</i> is a perennial, evergreen, succulent climber or prostrate trailer, with slender, prostrate stems arising from tubers. Tuber with a hard, grey and woody base, usually wrinkled that grows up to 25–50 mm in diameter."

412	Forms dense thickets	n
	Source(s)	Notes
	Bester, S. P. (2019). <i>Ceropegia linearis</i> subsp. <i>woodii</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/ceropegia-linearis-subsp-woodii . [Accessed 1 Jul 2022]	"Plants are found growing naturally mostly on rocky ledges within forests from 100–1 180 m above sea level. The tubers are usually embedded in cracks with a thin layer of soil on these cliff edges. It may also be found in open or closed woodland, outcrops and ledges in forests and rarely in grassland." [No evidence]

501	Aquatic	n
	Source(s)	Notes
	Smith, G. F. & Crouch, N. R. (2009). <i>Guide to Succulents of Southern Africa</i> . Struik Nature, Cape Town	[Terrestrial] "Occurs naturally on cliff edges within forest situations, its small tubers embedded in soil banks or on rocky ledges."

502	Grass	n
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2022). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/ . [Accessed 1 Jul 2022]	Family: Apocynaceae Subfamily: Asclepiadoideae Tribe: Ceropegieae Subtribe: Stapeliinae

503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2022). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/ . [Accessed 1 Jul 2022]	Family: Apocynaceae Subfamily: Asclepiadoideae Tribe: Ceropegieae Subtribe: Stapeliinae

Qsn #	Question	Answer
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y
	Source(s)	Notes
	Bester, S. P. (2019). <i>Ceropegia linearis</i> subsp. <i>woodii</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/ceropegia-linearis-subsp-woodii . [Accessed 1 Jul 2022]	" <i>Ceropegia linearis</i> subsp. <i>woodii</i> is a perennial, evergreen, succulent climber or prostrate trailer, with slender, prostrate stems arising from tubers. Tuber with a hard, grey and woody base, usually wrinkled that grows up to 25–50 mm in diameter."
601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	Bester, S. P. (2019). <i>Ceropegia linearis</i> subsp. <i>woodii</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/ceropegia-linearis-subsp-woodii . [Accessed]	"The current conservation status is Least Concern (LC) (Foden & Potter 2005). This taxon was not selected in any one of four screening processes for highlighting potential taxa of conservation concern for detailed assessment and was hence given an automated status of Least Concern. The Threatened Species Programme is currently systematically completing full assessments for all taxa with an automated status."
602	Produces viable seed	y
	Source(s)	Notes
	Bester, S. P. (2019). <i>Ceropegia linearis</i> subsp. <i>woodii</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/ceropegia-linearis-subsp-woodii . [Accessed 1 Jul 2022]	"Plants may be propagated easily from seed, if obtainable. Sow seed in spring in a seedling soil mix and cover with a few millimeters of fine sand. Keep moist, and seeds will germinate in about 1–2 weeks."
603	Hybridizes naturally	
	Source(s)	Notes
	Collenette, S. (1999). The <i>ceropegias</i> of Saudi Arabia. <i>British Cactus & Succulent Journal</i> , 17(4), 181–187	[Unknown. Hybrids suspected in genus] "Some putative hybrids are mainly to be found further east along the mountain, with a north-east aspect and at 1,525m. Here there are populations of the variety <i>abbreviata</i> and the smaller-flowered (5.5cm), possible hybrid (Figs. 18-19); the flowers have untwisted lobes and bear a large keel, though one plant did have longer, slightly twisted lobes. Another putative hybrid, now destroyed by clearance of the hillside, also had flowers 5.5cm long and possibly had <i>C. superba</i> as one parent because of the shape of the mouth of the flowers, and this species grew nearby"
604	Self-compatible or apomictic	
	Source(s)	Notes
	Karuppusamy, S., & Pullaiah, T. (2009). Pollination system and ex situ fruit set in <i>Ceropegia juncea</i> Wight (Apocynaceae)—An endemic species of India. <i>Academic Journal of Plant Sciences</i> 2(4): 242-245	"Most of the <i>Ceropegia</i> species such as <i>C. cumingiana</i> [7], <i>C. nilotica</i> [8] and <i>C. elegans</i> [9] which are self-incompatible." [Unknown for <i>C. woodii</i>]

Qsn #	Question	Answer
605	Requires specialist pollinators	y
	<p data-bbox="183 296 818 331">Source(s)</p> <p data-bbox="183 743 764 806">Heiduk, A. et al. (2017). Floral scent and pollinators of <i>Ceropegia</i> trap flowers. <i>Flora</i>, 232, 169-182</p>	<p data-bbox="826 296 1570 331">Notes</p> <p data-bbox="826 344 1570 1211">"Ceropegia L. (Apocynaceae, Asclepiadoideae) comprises more than 200 species, all characterized by complex pitfall flowers. The deceptive flowers are myiophilous and pollinated predominantly by small flies from different families. It has been suggested that floral scent cues, that mimic food sources or oviposition sites, play an important role for attraction of target fly pollinators, and, together with morphological flower traits, explain the high functional specialization in terms of pollination by specific taxa. However, apart from two <i>Ceropegia</i> species, the floral scent composition and the mimicry strategies in this genus are unexplored. We tested for associations between floral scent and insect visitor and pollinator assemblages of 14 <i>Ceropegia</i> species. We also used nrDNA and chloroplast DNA markers to calculate a Maximum Likelihood tree and test for phylogenetic signal in scent chemistry and flower visitors/pollinators. The observed pollinators belonged to eight fly families, at least 18 genera, and 33 morphospecies, but each <i>Ceropegia</i> species was typically associated with only one or two pollinating fly families or genera. We detected a total of 317 floral volatiles, including aliphatic and aromatic components, terpenes, and various unknowns. Both flower visitor and pollinator patterns did not show an overall association with floral scent chemistry. There was phylogenetic signal in flower visiting fly families and fly pollinator assemblages, but not in flower visiting fly morphospecies and overall scent chemistry. We discuss that despite the not existing correlation between pollinator and scent patterns the highly specific pollination system in <i>Ceropegia</i> will be explained mainly by floral scent chemistry."</p>

Qsn #	Question	Answer
	<p>Bester, S. P. (2019). <i>Ceropegia linearis</i> subsp. <i>woodii</i>. PlantZAfrica. SANBI. http://pza.sanbi.org/ceropegia-linearis-subsp-woodii. [Accessed 1 Jul 2022]</p>	<p>"The pollination of the tubular flowers has most probably developed because of pollination pressure by the wide range of insects within the Diptera (flies). Almost all <i>Ceropegia</i> in the strict sense have specialized trap-flowers with internal structures to temporarily imprison the possible pollinator for some time. After successful pollination, seeds develop in horn-shaped fruits that are characteristic of the milkweed family, called follicles. A follicle is a pod that arises from a single carpel that splits on the inside along a single suture. The follicles are usually paired, but may be solitary due to abortion of one of the carpels. Each bursts open by a single longitudinal slit and contain stacks of flat seeds. Each seed has a coma of hairs on one side and as soon as the follicle bursts open, these hairs start to spread because of the change in moisture in the air, in their immediate vicinity. This causes the fibers of the coma to spread out and form a parachute-like structure attached to an individual seed. The coma is sensitive to the slightest air movement and the lightest breeze will carry the seed off for dispersal. The possible pollinators (mostly small flies), are attracted by the scent given off by the flowers and the potential pollinator will enter the flowers through the openings at the top of the flower ('windows'). On the inside of the tube there are long hairs, usually facing downwards into the tube. This is responsible for a one-way direction movement of the pollinator down to the inflation at the bottom of the tube. The insect is thus prevented from escaping until the hairs wither, and the fly can then escape, hopefully with pollinia (a mass of pollen grains that are transferred as a group) attached to its body, to be transferred to the next flower the fly visits. "</p>

606	Reproduction by vegetative fragmentation	y
	Source(s)	Notes
	<p>Zona, S., & Howard, C. C. (2021). Aerial vegetative diaspores of angiosperms: Terminology, organography, and dispersal. <i>Flora</i>, 151989</p>	<p>"<i>Ceropegia linearis</i> ssp. <i>woodii</i> (syn. <i>C. woodii</i> Schltr.) is a trailing, succulent lithophyte that is widely grown as an ornamental conservatory subject or houseplant. It produces tubercles along its nodes. The dispersal mode of the tubercles has not been studied but is likely gravity"</p>
	<p>Morales Sánchez, C. (2020). Origen, historia natural y usos de las plantas introducidas en Costa Rica. <i>UNED Research Journal</i> 12(2): e3098</p>	<p>"<i>Ceropegia woodii</i> Schltr. (collar de corazones), de Sudáfrica, es un bejuco herbáceo, rastrero o colgante, con atractivas hojas pequeñas, opuestas, cordadas en la base, con lámina verde grisácea o gris, con manchas verdes, o verde con venas grises, y flores tubulares alboróseas o rosadas. Esta especie se reproduce vegetativamente con ramas y bulbillos." [Translation: <i>Ceropegia woodii</i> Schltr. (necklace of hearts), from South Africa, is a creeping or hanging herbaceous vine with attractive small, opposite leaves, cordate at the base, with grayish-green or gray lamina, with green spots, or green with gray veins, and tubular flowers white or pink. This species reproduces vegetatively with branches and bulbils.]</p>
	<p>Bester, S. P. (2019). <i>Ceropegia linearis</i> subsp. <i>woodii</i>. PlantZAfrica. SANBI. http://pza.sanbi.org/ceropegia-linearis-subsp-woodii. [Accessed 1 Jul 2022]</p>	<p>"Plants are easily grown from seed, stem cuttings or aerial tubers produced along the stems."</p>

607	Minimum generative time (years)	>3
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Qsn #	Question	Answer
	Source(s)	Notes
	Edith's Houseplants. (2022). <i>Ceropegia Woodii</i> - String of hearts. https://www.ediths.co.uk/products/ceropegia-woodii-string-of-hearts-rosary-vine . [Accessed 1 Jul 2022]	"ime to maturity: 5 years +"

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	Notes
	Bester, S. P. (2019). <i>Ceropegia linearis</i> subsp. <i>woodii</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/ceropegia-linearis-subsp-woodii . [Accessed 1 Jul 2022]	"Each seed has a coma of hairs on one side and as soon as the follicle bursts open, these hairs start to spread because of the change in moisture in the air, in their immediate vicinity. This causes the fibers of the coma to spread out and form a parachute-like structure attached to an individual seed. The coma is sensitive to the slightest air movement and the lightest breeze will carry the seed off for dispersal." [Coma could aid in attachment, but no evidence that this has occurred]

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Albers, F. & Meve, U. (eds.). (2002). <i>Illustrated Handbook of Succulent Plants: Asclepiadaceae</i> . Springer Science & Business Media, Berlin - Heidelberg - New York	"Presumably the most widely distributed taxon of the genus in cultivation and very popular among beginners (very decorative in hanging baskets, in greenhouses occasionally used as ground cover). The stem tubers are used as stocks for grafting difficult stem succulent stapeliads. There are ± white-variegated forms in cultivation as well as a form with pink foliage. Vernacular name: "Chain of Hearts"."
	Vermeulen, N. & Rosenfeld, R. (1998). <i>Encyclopedia of House Plants</i> . 2nd Print. Rebo Productions, Lisse, Netherlands	"The best known species is <i>Ceropegia woodii</i> (string of hearts, rosary vine). The shoots form a tuber in the soil are thin and thread-like and hang down over the edge of the pot. They produce small, green and silver marbled leaves and eventually also the characteristically shaped flowers. These are pink with aubergine-coloured hairy lobes joined together at the tips to form a cage. Hang the plant in a very light place and only protect it from the hottest summer sun."

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes
	Bester, S. P. (2019). <i>Ceropegia linearis</i> subsp. <i>woodii</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/ceropegia-linearis-subsp-woodii . [Accessed 1 Jul 2022]	[No evidence. Wind-dispersed] "Each seed has a coma of hairs on one side and as soon as the follicle bursts open, these hairs start to spread because of the change in moisture in the air, in their immediate vicinity. This causes the fibers of the coma to spread out and form a parachute-like structure attached to an individual seed. The coma is sensitive to the slightest air movement and the lightest breeze will carry the seed off for dispersal."

704	Propagules adapted to wind dispersal	y
	Source(s)	Notes

Qsn #	Question	Answer
	Bester, S. P. (2019). <i>Ceropegia linearis</i> subsp. <i>woodii</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/ceropegia-linearis-subsp-woodii . [Accessed 1 Jul 2022]	"Each seed has a coma of hairs on one side and as soon as the follicle bursts open, these hairs start to spread because of the change in moisture in the air, in their immediate vicinity. This causes the fibers of the coma to spread out and form a parachute-like structure attached to an individual seed. The coma is sensitive to the slightest air movement and the lightest breeze will carry the seed off for dispersal."

705	Propagules water dispersed	n
	Source(s)	Notes
	Bester, S. P. (2019). <i>Ceropegia linearis</i> subsp. <i>woodii</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/ceropegia-linearis-subsp-woodii . [Accessed 1 Jul 2022]	[No evidence. Wind-dispersed] "Each seed has a coma of hairs on one side and as soon as the follicle bursts open, these hairs start to spread because of the change in moisture in the air, in their immediate vicinity. This causes the fibers of the coma to spread out and form a parachute-like structure attached to an individual seed. The coma is sensitive to the slightest air movement and the lightest breeze will carry the seed off for dispersal."

706	Propagules bird dispersed	n
	Source(s)	Notes
	Bester, S. P. (2019). <i>Ceropegia linearis</i> subsp. <i>woodii</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/ceropegia-linearis-subsp-woodii . [Accessed 1 Jul 2022]	[No evidence. Wind-dispersed] "Each seed has a coma of hairs on one side and as soon as the follicle bursts open, these hairs start to spread because of the change in moisture in the air, in their immediate vicinity. This causes the fibers of the coma to spread out and form a parachute-like structure attached to an individual seed. The coma is sensitive to the slightest air movement and the lightest breeze will carry the seed off for dispersal."

707	Propagules dispersed by other animals (externally)	n
	Source(s)	Notes
	Bester, S. P. (2019). <i>Ceropegia linearis</i> subsp. <i>woodii</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/ceropegia-linearis-subsp-woodii . [Accessed 1 Jul 2022]	[No evidence. Wind-dispersed] "Each seed has a coma of hairs on one side and as soon as the follicle bursts open, these hairs start to spread because of the change in moisture in the air, in their immediate vicinity. This causes the fibers of the coma to spread out and form a parachute-like structure attached to an individual seed. The coma is sensitive to the slightest air movement and the lightest breeze will carry the seed off for dispersal." [Coma could allow for attachment to hair, but there is no evidence that this has occurred]

Qsn #	Question	Answer
708	Propagules survive passage through the gut	n
	Source(s)	Notes
	Bester, S. P. (2019). <i>Ceropegia linearis</i> subsp. <i>woodii</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/ceropegia-linearis-subsp-woodii . [Accessed 1 Jul 2022]	[No evidence. Wind-dispersed] "Each seed has a coma of hairs on one side and as soon as the follicle bursts open, these hairs start to spread because of the change in moisture in the air, in their immediate vicinity. This causes the fibers of the coma to spread out and form a parachute-like structure attached to an individual seed. The coma is sensitive to the slightest air movement and the lightest breeze will carry the seed off for dispersal."

801	Prolific seed production (>1000/m ²)	
	Source(s)	Notes
	Bester, S. P. (2019). <i>Ceropegia linearis</i> subsp. <i>woodii</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/ceropegia-linearis-subsp-woodii . [Accessed 1 Jul 2022]	"After successful pollination, seeds develop in horn-shaped fruits that are characteristic of the milkweed family, called follicles. A follicle is a pod that arises from a single carpel that splits on the inside along a single suture. The follicles are usually paired but may be solitary due to abortion of one of the carpels. Each bursts open by a single longitudinal slit and contain stacks of flat seeds." [Densities unknown]

802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	Notes
	WRA Specialist. (2022). Personal Communication	Unknown

803	Well controlled by herbicides	
	Source(s)	Notes
	WRA Specialist. (2022). 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
	Epic Gardening. (2022). <i>Ceropegia Woodii</i> : Grow A String Of Hearts. https://www.epicgardening.com/ceropegia-woodii/ . [Accessed 1 Jul 2022]	"Pruning is not strictly necessary for this plant. In fact, its only real purpose is aesthetic. If you're aiming for a specific length of vine growth, you can trim excess with sterile shears. These cuttings can be used to propagate a new plant if you wish."

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	WRA Specialist. (2022). Personal Communication	Unknown

Summary of Risk Traits:

High Risk / Undesirable Traits

- Broad elevation range (>1000 m) in tropical climates
- Grows and could potentially spread in regions with tropical climates
- Shade tolerant
- Climbing, and potentially smothering, growth habit
- Can regenerate from tuberous roots
- Reproduces by seeds and vegetatively by stem cuttings or aerial tubers produced along the stems
- Seeds dispersed by wind and through intentional cultivation

Low Risk Traits

- No confirmed reports of naturalization or invasiveness, but more commonly cultivated indoors as an ornamental
- Unarmed (no spines, thorns, or burrs)
- Stems and tubers edible to animals and humans
- Non-toxic
- Specialized pollinator requirements may limit seed set and reduce risk of long distance, accidental dispersal