

**Taxon:** *Vernonanthura polyanthes* (Spreng.) A.J.Vega & Dematt. **Family:** Asteraceae

**Common Name(s):** assa peixe  
assa peixe branco

**Synonym(s):** *Cacalia compacta* (Gardner) Kuntze  
*Cacalia polyanthes* (Spreng.) Kuntze  
*Eupatorium polyanthes* Sprengel  
*Vernonia compacta* Gardner  
*Vernonia polyanthes* (Spreng.)

**Assessor:** Chuck Chimera

**Status:** Assessor Approved

**End Date:** 27 May 2021

**WRA Score:** 14.0

**Designation:** H(HPWRA)

**Rating:** High Risk

**Keywords:** Tropical Tree, Disturbance-Adapted, Shade Tolerant, Dense Stands, 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	?
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)	y
303	Agricultural/forestry/horticultural weed	n=0, y = 2*multiplier (see Appendix 2)	y
304	Environmental weed		
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		
405	Toxic to animals	y=1, n=0	n
406	Host for recognized pests and pathogens		

Qsn #	Question	Answer Option	Answer
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	y
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)		
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		
607	Minimum generative time (years)		
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	y=1, n=-1	n
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	y=1, n=-1	n
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	y=1, n=-1	y
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)		

**Supporting Data:**

Qsn #	Question	Answer
101	Is the species highly domesticated?	n
	Source(s)	Notes
	Vega, A. J., & Dematteis, M. (2010). The transfer of Vernonia perangusta to the genus Vernonanthura (Vernonieae, Asteraceae) and the correct name for Vernonanthura phosphorica. Phytotaxa, 8(1), 46-50	[No evidence of domestication] "Two of these species are the subject of this paper. Vernonia polyanthes (Spreng.) Lessing (1931: 651) and V. perangusta. The first is a relatively common species widely distributed in Brazil, and was considered a later name for Chrysocoma phosphorica Vellozo (1825: 325), renamed Vernonanthura phosphorica (Vell.) Robinson (1992: 73). Chrysocoma phosphorica(Vellozo 1825), is apparently an earlier name of Eupatorium polyanthes Sprengel (1826: 414). However, Carauta (1973) reported the effective publication date for Vellozo species described in the Florae fluminesis 1829. Therefore, the name Eupatorium polyanthes takes priority over Chrysocoma phosphorica and consequently, a new combination is required to accommodate this taxon in Vernonanthura."

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. (2021). Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. (2021). 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
	Hyde, M.A. et al. (2021). Flora of Zimbabwe: Species information: Vernonanthura polyanthes. <a href="https://www.zimbabweflora.co.zw">https://www.zimbabweflora.co.zw</a> . [Accessed 24 May 2021]	"Native to Brazil. Now an invasive weed at least in the border areas of Zimbabwe and Mozambique, possibly elsewhere."
	Vega, A. J., & Dematteis, M. (2010). The transfer of Vernonia perangusta to the genus Vernonanthura (Vernonieae, Asteraceae) and the correct name for Vernonanthura phosphorica. Phytotaxa, 8(1), 46-50	"relatively common species widely distributed in Brazil"

Qsn #	Question	Answer
202	Quality of climate match data	High
	Source(s)	Notes
	Hyde, M.A. et al. (2021). Flora of Zimbabwe: Species information: <i>Vernonanthura polyanthes</i> . <a href="https://www.zimbabweflora.co.zw">https://www.zimbabweflora.co.zw</a> . [Accessed 24 May 2021]	

203	Broad climate suitability (environmental versatility)	y
	Source(s)	Notes
	Sukhorukov, A. P. et al. (2017). Chorological and taxonomic notes on African plants, 2. <i>Botany Letters</i> , 164(2), 135-153	[Elevation range in tropics exceeds 1000 m, demonstrating environmental versatility] "It is common in disturbed areas, along roadsides, in secondary vegetation, pine plantations, dry forest and riparian forest margins at elevations ranging from 345 to 1710 m a.s.l."

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	Hobdy, R. (2021). Biological Consultant. pers. comm. 17 May	"Doreen and I were driving down Kokomo Road to Haiku about a week and a half ago when we spotted an unusual tree with white flowers along a fence line. On the way back up the hill we stopped and I made a small collection. I had never seen anything like this before. I went back the next day to get more material and spent some time documenting all of its characteristics. Then I started sleuthing through Asteraceae literature to see if I could identify it. I got some good leads and was able to pin it down (no small feat in a family with nearly 30,000 species). When I thought I had the genus I went on line and was able to get it to species. When I brought up images it was a perfect match. When I saw what an invasive species it had become in Mozambique and later in Zimbabwe I started to get worried. I got Forest and Kim on it and they were able to quickly assess it with their access to pictometry technology followed by some ground truthing. What amazes me is how we could have missed something that has spread over a thousand acres so far. This is somewhat understandable when we realize that it has spread this far in only about 15 years. The Africa experience documented how it went from its introduction to being declared a dominant invasive regional species in only 25 years. Scary! The imagery showed that a few plants have already spread west of Maliko Gulch. It will soon be moving across central Maui. It looks like <i>Senecio</i> all over again but is ten times larger."
	Hyde, M.A. et al. (2021). Flora of Zimbabwe: Species information: <i>Vernonanthura polyanthes</i> . <a href="https://www.zimbabweflora.co.zw">https://www.zimbabweflora.co.zw</a> . [Accessed 24 May 2021]	"Native to Brazil. Now an invasive weed at least in the border areas of Zimbabwe and Mozambique, possibly elsewhere."

Qsn #	Question	Answer
	Starr, F. & Starr, K. (2021). Maui Early Detection Botanists, pers. comm. 17 May	[East Maui] "Distribution - Widespread from Maliko Gulch to Kaupakalua Gulch, 600-1,000 ft. elevation. There is much more on the ground than we are able to see in aerial images, and it's likely even further widespread than we are aware of. After we thought we had it all delimited, we did a Starr Environmental job for EMI / Mahi Pono at Kaupakalua Reservoir, and found more, well outside the area we thought it was restricted to. Attached is a map. The polygon of known distribution is about 1,000 acres of varying density. Oldest Site - Ohia Gulch was the oldest site we were able to find. It had mature trees in 2008, which is as far back as the imagery goes. The densest site today, an abandoned pineapple field next to Maliko Gulch, was still actively farmed and had no trace of this tree in 2008."

205	Does the species have a history of repeated introductions outside its natural range?	?
	Source(s)	Notes
	Sukhorukov, A. P. et al. (2017). Chorological and taxonomic notes on African plants, 2. Botany Letters, 164(2), 135-153	"This new record of <i>V. polyanthes</i> in Zimbabwe is to date the only record of the species established outside its native range. No existing herbarium specimens of <i>V. polyanthes</i> collected in Zimbabwe or neighbouring countries could be traced, although Hyde et al. (2016, sub <i>Vernonanthura phosphorica</i> ) reported the introduction of the species in Mozambique in the 1990s to enhance honey production, as is the case in Brazil where <i>V. polyanthes</i> is a well-known honey plant pollinated by honey bees (Lorenzi 2000)."
	Hobdy, R. (2021). Biological Consultant. pers. comm. 17 May	Detected as naturalized on East Maui.

301	Naturalized beyond native range	y
	Source(s)	Notes
	Hyde, M.A. et al. (2021). Flora of Mozambique: Cultivated Plants: Species information: <i>Vernonanthura polyanthes</i> . <a href="https://www.mozambiqueflora.com/">https://www.mozambiqueflora.com/</a> . [Accessed 24 May 2021]	"Native to Brazil. Now an invasive weed at least in the border areas of Zimbabwe and Mozambique, possibly elsewhere."
	Hyde, M.A. et al. (2021). Flora of Zimbabwe: Species information: <i>Vernonanthura polyanthes</i> . <a href="https://www.zimbabweflora.co.zw/">https://www.zimbabweflora.co.zw.</a> [Accessed 24 May 2021]	"Native to Brazil. Now an invasive weed at least in the border areas of Zimbabwe and Mozambique, possibly elsewhere."
	Sukhorukov, A. P. et al. (2017). Chorological and taxonomic notes on African plants, 2. Botany Letters, 164(2), 135-153	" <i>Vernonanthura polyanthes</i> (Figure 10) is a shrub indigenous to Bolivia and Brazil (Vega and Dematteis 2010). This new record of <i>V. polyanthes</i> in Zimbabwe is to date the only record of the species established outside its native range. No existing herbarium specimens of <i>V. polyanthes</i> collected in Zimbabwe or neighbouring countries could be traced, although Hyde et al. (2016, sub <i>Vernonanthura phosphorica</i> ) reported the introduction of the species in Mozambique in the 1990s to enhance honey production, as is the case in Brazil where <i>V. polyanthes</i> is a well-known honey plant pollinated by honey bees (Lorenzi 2000)."

Qsn #	Question	Answer
	Starr, F. & Starr, K. (2021). Maui Early Detection Botanists, pers. comm. 17 May	[East Maui] "Distribution - Widespread from Maliko Gulch to Kaupakalua Gulch, 600-1,000 ft. elevation. There is much more on the ground than we are able to see in aerial images, and it's likely even further widespread than we are aware of. After we thought we had it all delimited, we did a Starr Environmental job for EMI / Mahi Pono at Kaupakalua Reservoir, and found more, well outside the area we thought it was restricted to. Attached is a map. The polygon of known distribution is about 1,000 acres of varying density."

302	Garden/amenity/disturbance weed	y
	Source(s)	Notes
	Hyde, M.A. et al. (2021). Flora of Zimbabwe: Species information: <i>Vernonanthura polyanthes</i> . <a href="https://www.zimbabweflora.co.zw">https://www.zimbabweflora.co.zw</a> . [Accessed 24 May 2021]	[Invades disturbed areas] "This species appears to have been introduced as a nectar plant for bees, possibly in the early 1990's in areas around Sussundenga, Mozambique. It has since become a serious invader of disturbed areas at lower altitudes around parts of the border mountains of Zimbabwe and Mozambique, such as lower Vumba and areas around Chimanimani. Since the early years of this century it has also started to appear at higher altitudes, eg in the Vumba Mountains, although so far less abundantly."
	Timberlake, J. R., Darbyshire, I., Cheek, M., Banze, A., Fijamo, V., Massunde, J., Chipanga, H., & Muassinar, D. (2016) Plant conservation in communities on the Chimanimani footslopes. Darwin Initiative Award 2380: Balancing Conservation and Livelihoods in the Chimanimani Forest Belt, Mozambique. Royal Botanic Gardens, Kew	[Primarily a disturbance weed that impacts agriculture in its native range, may interfere with agroforestry, and could impact natural, or degraded, native ecosystems] "It has become common, abundant or even dominant in disturbed sites, in secondary vegetation, along roadsides and on forest margins across the Chimanimani area. The species can be found even in shaded disturbed forest; unlike many invasives, it does not require much sunlight to establish."

303	Agricultural/forestry/horticultural weed	y
	Source(s)	Notes
	Krenchinski, F. H., Albrecht, A. J. P., Albrecht, L. P., Cesco, V. J. S., Rodrigues, D. M., & Filho, R. V. (2015). Application rates and herbicide in weed control in pasture. <i>Revista Brasileira de Herbicidas</i> , 14(4), 271-279	[Controlled as a pasture invader and weed] "Among the species commonly found in pastures, assa-peixe ( <i>Vernonia polyanthes</i> Less) and creeping beggarweed or Spanish clover/tick-trefoil ( <i>Desmodium incanum</i> DC) are worth mentioning. According to Lorenzi (2008), assa-peixe is a plant that most infests and undermines Brazilian pastures. This is due to greater resilience when mowed or burned, due to being 1.0 to 3.0 meters tall and the seeds high reproductive and dispersive capacity."
	Rassini, J. B., & Coelho, R. R. (1994). Controle químico de assa-peixe ( <i>Vernonia polyanthes</i> ) em pastagens. <i>Revista Sociedade Brasileira de Zootecnia</i> , 23(6): 871-876	[Controlled as a pasture weed] "A study was carried at the Centro de Pesquisa de Pecuária do Sudeste (CPPSE), EMBRAPA, São Carlos, SP, Brazil, between February/92 to January/93 to evaluate the efficiency of three dosage and application modality of glyphosate herbicide on pasture weed <i>Vernonia polyanthes</i> : in stump after cutting at 8, 6 and 4%; in ring of stern at 20, 15 and 10%; and in foliar pulverization at 4, 3 and 2%. The control was the 2,4 D + picloran at 4 % in stump, at 10% in ring of stern, and at 2% in foliar pulverization. Glyphosate herbicide was efficient, only when applied on aerial part in foliar pulverization at 4 and 3%, and did not differ of the control in this application modality. The 2,4 D + picloran controlled the weed in all dosage and application modality."

Qsn #	Question	Answer
	Sukhorukov, A. P. et al. (2017). Chorological and taxonomic notes on African plants, 2. Botany Letters, 164(2), 135-153	[Dominant understory plant in pine plantations. May impact harvesting and replanting] "It is common in disturbed areas, along roadsides, in secondary vegetation, pine plantations, dry forest and riparian forest margins at elevations ranging from 345 to 1710 m a.s.l. It has been recorded as a dominant understory species in disturbed indigenous forests and commercial pine plantations."
	Lorenzi, H. (1991). Plantas Daninhas do Brasil: Terrestres, Aquáticas, Parasitas, Tóxicase Medicinais. 2nd ed. Plantarum Press, Nova Odessa, Brazil	[Impacts pastures within native range] "e uma das plantas daninhas mais frequentes e mais temidas das nossas pastagens. Geralmente ocorre em grandes infestacoes que chegam a anular a capacidade de lotacao. " [Translation from Portugues - "and one of the most frequent and most feared weeds in our pastures. Generally occurs in large infestations that even cancel the capacity of stocking."]
	Tuffi Santos, L. D., Cardoso Filho, O., Santos Júnior, A., Sant'Anna-Santos, B. F., Felix, R. C., & Leite, F. P. (2013). Floristic and structural variation of weeds in eucalyptus plantations as influenced by relief and time of year. Planta Daninha, 31(3), 491-499	[Invades Eucalyptus plantations] "The species Commelina benghalensis, Spermacoce latifolia, Digitaria insularis, Mikania cordifolia, Vernonia polyanthes, Tibouchina moricandiana and Arrabidaea florida are considered of difficult management in forested areas and have importance in the eucalyptus plantations investigated."

304	Environmental weed	
	Source(s)	Notes
	Hyde, M.A. et al. (2021). Flora of Zimbabwe: Species information: <i>Vernonanthura polyanthes</i> . <a href="https://www.zimbabweflora.co.zw">https://www.zimbabweflora.co.zw</a> . [Accessed 26 May 2021]	[Potential environmental weed. Spreading into higher elevation, presumably more intact natural ecosystems, although impacts have not been documented here or in other published literature reviewed for this assessment] "This species appears to have been introduced as a nectar plant for bees, possibly in the early 1990's in areas around Sussundenga, Mozambique. It has since become a serious invader of disturbed areas at lower altitudes around parts of the border mountains of Zimbabwe and Mozambique, such as lower Vumba and areas around Chimanimani. Since the early years of this century it has also started to appear at higher altitudes, eg in the Vumba Mountains, although so far less abundantly."
	Timberlake, J. R., Darbyshire, I., Cheek, M., Banze, A., Fijamo, V., Massunde, J., Chipanga, H., & Muassinar, D. (2016) Plant conservation in communities on the Chimanimani footslopes. Darwin Initiative Award 2380: Balancing Conservation and Livelihoods in the Chimanimani Forest Belt, Mozambique. Royal Botanic Gardens, Kew	[Potential to impact forest regeneration] "However, from a conservation viewpoint this is a dangerous alien invasive plant as it inhibits or supresses regeneration of damaged or cleared forest. Also, because it ignites and burns readily fires become more widespread and common as there is a greater fuel load. With frequent burning, the humus in the forest soils is lost and the soils are subsequently less able to support forest species."
	Sukhorukov, A. P. et al. (2017). Chorological and taxonomic notes on African plants, 2. Botany Letters, 164(2), 135-153	[Potentially] "It has been recorded as a dominant understory species in disturbed indigenous forests and commercial pine plantations. We estimated the target distribution of <i>V. polyanthes</i> in Zimbabwe through correlating observed occurrences of the species to environmental covariates, i.e., bioclimatic variables (Hijmans et al. 2005) and aspect (Figure 11). Considering the weedy status of <i>V. polyanthes</i> in its native range (Randall 2012), its invasiveness in Zimbabwe (present investigation) and its easy dispersal by wind (Ishara and Maimoni-Rodella 2011), the species is likely to become invasive in other African countries."

Qsn #	Question	Answer
305	Congeneric weed	y
	Source(s)	Notes
	Nishimuta, H. A., Rossi, A. A. B., Yamashita, O. M., Pena, G. F., Santos, P. H. A. D., Giustina, L. D., & Rossi, F. S. (2019). Leaf and root allelopathic potential of the <i>Vernonanthura brasiliiana</i> . <i>Planta Daninha</i> 37: e019208452	[ <i>Vernonanthura brasiliiana</i> ] "The Brazilian native weed assa-peixe ( <i>Vernonanthura brasiliiana</i> ) is considered one of the main invasive plant species of pasture areas in the Amazon. It is thus necessary to know their biology and their behavior in the environment, and to enhance the development of management strategies, minimizing the use of herbicides. The objective of this study was to test the allelopathic effect on the germination and growth of the bioindicator species <i>Lactuca sativa</i> from leaf and root extracts obtained from fresh and dry <i>V. brasiliiana</i> . The experiment consisted of six treatments with concentrations of 0, 12.5, 25, 50, 100, and 200 mg mL <sup>-1</sup> , using four replicates per treatment. The evaluated parameters were: germination percentage, first count, germination speed index, and shoot and root length. The aqueous extract of fresh <i>V. brasiliiana</i> roots caused an allelopathic effect on all evaluated parameters, while the dry root extract only affected the germination speed index. Root growth inhibition and growth stimulation of lettuce seedlings were verified when submitted to dry and fresh root extracts. Extracts of <i>V. brasiliiana</i> caused an allelopathic effect on the species <i>Lactuca sativa</i> L., where the aqueous extracts of dry leaves and fresh roots were the most influential."
	De Egea, J., Mereles, F., del Carmen Pena-Chocarro, M., & Céspedes, G. (2016). Checklist for the crop weeds of Paraguay. <i>PhytoKeys</i> , 73:13–92	[ <i>Vernonanthura tweedieana</i> listed as a crop weed, but impacts have not been described] "Paraguay, a country whose economy is based mainly on agriculture and livestock for export, has experienced a major expansion in mechanized crops during the last few decades. Despite being heavily dependent on agriculture, Paraguay has very limited research on crop weeds, in spite of these having a high economic impact on production. This work aims to update and enhance the knowledgebase on the most common weeds affecting productive fields throughout the different ecoregions of Paraguay. We present here the first checklist of crop weeds for the country, which includes a total of 256 taxa (189 species, 10 subspecies, 54 varieties and 3 forms), with the most species-rich families being Poaceae and Asteraceae followed by Malvaceae, Amaranthaceae, Fabaceae and Solanaceae. The list includes three new records for the country. Synonyms, distribution details within Paraguay, habit and a voucher specimen are provided for each taxon."
	Randall, R.P. (2017). <i>A Global Compendium of Weeds</i> . 3rd Edition. Perth, Western Australia. R.P. Randall	Several species of <i>Vernonia</i> , the genus in which <i>Vernonanthura polyanthes</i> was previously classified, are listed as naturalized and/or weedy.

401	Produces spines, thorns or burrs	n
	Source(s)	Notes



Qsn #	Question	Answer
	Vega, A. J., & Dematteis, M. (2010). The transfer of <i>Vernonia perangusta</i> to the genus <i>Vernonanthura</i> (Vernonieae, Asteraceae) and the correct name for <i>Vernonanthura phosphorica</i> . <i>Phytotaxa</i> , 8(1), 46-50	[No evidence] "Erect shrub up to 3 m tall. Stems striate, tomentose. Leaves petiolate, petioles 0.5–1.5 mm long. Leaf blades lanceolate, 5–15 cm long by 1–3 cm wide, margin entire, acute at apex, attenuate basally, laxly pilose above, tomentose beneath. Capitula sessile or subsessile, on seriate-cymose branches, grouped in a paniculiform synflorescence. Involucre campanulate, 4–5 mm high. Phyllaries in 4–6 series, mucronate, pilose or rarely glabrous, inner phyllaries lanceolate, outer ones ovate. Florets white. Corollas 5–5.5 mm long, lobes lanceolate, 1.5–2 mm long. Anthers 2–3 mm long. Styles 6–7 mm long, branches linear, 2 mm long. Cypselas ribbed, covered with single hairs and glandular papillae. Pappus uniseriate, 4–5 mm long."

402	Allelopathic	
	Source(s)	Notes
	Souza Filho, A. P. S., & Alves, S. M. (2000). Allelopathic potential of pasture weeds: effects on forage legumes. <i>PGRSA Quarterly</i> , 28(4), 146-156	[Potentially. Extracts evaluated, but other species identified as more allelopathic] "Aqueous extracts from aerial parts and seeds of the pasture weeds <i>Desmodium adscendens</i> (desmodio), <i>Sida rhombifolia</i> (guanxuma) and <i>Vernonia polyanthes</i> (assapeixe) were prepared in a 10% concentration to identify the allelopathic potential of these plants on forage legumes <i>Leucaena leucocephala</i> (leucaena), <i>Stylosanthes guianensis</i> cv. Mineirao (Mineirao) and <i>Calopogonium mucunoides</i> (calopogonio), and also to verify if pH and ionic concentration of extracts can affect the results of allelopathy bioassays. Each aqueous extract was analyzed for pH, conductivity and osmotic potential. The effects of the osmotic potential on the results were determined. The results showed that pH and ionic concentration had no affect. Allelopathic potential activity had variation in function of the donor and recipient species specificity and also in function of the organs of the donor species used in the extract preparation. <i>D. adscendens</i> (desmodio) and <i>S. rhombifolia</i> (guanxuma) were the species that increased reduction of seeds germination and radicle elongation, respectively. The aerial organs of donor species were the principal source of water-soluble compounds with potential allelopathic effects. <i>L. leucocephala</i> was the forage legume that showed more potential for use in the establishment of a grass-legume pasture of a more stable kind when considering the allelopathic potential of the weeds <i>D. adscendens</i> , <i>S. rhombifolia</i> and <i>V. polyanthes</i> ."

403	Parasitic	n
	Source(s)	Notes
	Vega, A. J., & Dematteis, M. (2010). The transfer of <i>Vernonia perangusta</i> to the genus <i>Vernonanthura</i> (Vernonieae, Asteraceae) and the correct name for <i>Vernonanthura phosphorica</i> . <i>Phytotaxa</i> , 8(1), 46-50	"Erect shrub up to 3 m tall." [Asteraceae. No evidence]

404	Unpalatable to grazing animals	

Qsn #	Question	Answer
	Source(s)	Notes
	Krenchinski, F. H., Albrecht, A. J. P., Albrecht, L. P., Cesco, V. J. S., Rodrigues, D. M., & Filho, R. V. (2015). Application rates and herbicide in weed control in pasture. <i>Revista Brasileira de Herbicidas</i> , 14(4), 271-279	[Controlled as an undesirable pasture weed, suggesting palatability may be low relatively to other plants] "Among the species commonly found in pastures, assa-peixe ( <i>Vernonia polyanthes</i> Less) and creeping beggarweed or Spanish clover/tick-trefoil ( <i>Desmodium incanum</i> DC) are worth mentioning. According to Lorenzi (2008), assa-peixe is a plant that most infests and undermines Brazilian pastures. This is due to greater resilience when mowed or burned, due to being 1.0 to 3.0 meters tall and the seeds high reproductive and dispersive capacity."

405	Toxic to animals	n
	Source(s)	Notes
	Almeida, L. M., et al. (2021). Cytotoxic effect of <i>Vernonanthura polyanthes</i> leaves aqueous extracts. <i>Brazilian Journal of Biology</i> , 81(3), 575-583	[No evidence. Used medicinally. Unknown if consumption or exposure at higher levels could result in accidental poisoning] "Vernonanthura polyanthes, popularly known as assa-peixe, is a medicinal plant that has been widely used by Brazilian Cerrado population for treatment of diseases without a detailed evaluation of their effectiveness, toxicity, and proper dosage. Thus, more studies investigating the safety of V. polyanthes aqueous extract before the use are needed. The purpose of this study was to evaluate the toxicity, cytotoxicity and genotoxicity of V. polyanthes leaves aqueous extract using the <i>Artemia salina</i> and <i>Allium cepa</i> assays. For the A. salina assay, three groups of 10 larvae were exposed to V. polyanthes leaves aqueous extract at the concentrations of 5, 10, 20, 40, and 80 mg/ml. For the A. cepa assay, 5 onion bulbs were exposed to V. polyanthes leaves aqueous extract at 10, 20, and 40 mg/ml, and then submitted to macroscopic and microscopic analysis. As result it was identified a toxicity and cytotoxicity of V. polyanthes dependent on the extract concentration. The A. salina assay suggests that the concentration of 24 mg/ml of the V. polyanthes extract is able to kill 50% of naupllis; while the A. cepa assay suggests that V. polyanthes leaves aqueous extract is toxic at concentrations higher than 20 mg/ml; however the cytotoxic effect in A. cepa root cells was observed at 40 mg/ml of the extract. It is important to say that the V. polyanthes leaves aqueous extract concentration commonly used in popular medicine is 20 mg/ml. Thus, the popular concentration used is very close to toxicity limit in A. salina model (24 mg/ml) and is the concentration which showed toxic effect in A. cepa root cells (20 mg/ml). No genotoxic activity of V. polyanthes leaves aqueous extract was observed in the conditions used in this study. Because of the antiproliferative action and no genotoxic activity, V. polyanthes leaves aqueous extract may present compounds with potential use for human medicine. However more detailed studies need to be performed to confirm this potential."
	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

Qsn #	Question	Answer
406	Host for recognized pests and pathogens	
	Source(s)	Notes
	Oliveira, E. F. D., Santos, P. R. R. D., & Santos, G. R. D. (2018). Seeds of weeds as an alternative host of phytopathogens. <i>Arquivos do Instituto Biológico</i> , 85: 1-7	[In Brazil, seeds may carry fungi that can affect important agricultural crops] "ABSTRACT: Weeds compete with agricultural crops for water, light, nutrients and space, besides having an extensive seed bank. However, another aspect to be considered relates to few studies pointing out weeds as hosts of phytopathogenic fungi. Many fungi, the main cause of diseases in plants, are known to use seeds as an efficient means of survival and dispersal. The objective of this work was to evaluate the health of weed seeds and the pathogenicity of fungi associated to plants of agricultural importance. The seeds were collected manually in Cerrado areas located in the municipality of Gurupi, Tocantins, Brazil. The blotter test method was used to evaluate seed health. The incidence of fungi was evaluated through an individual analysis of seeds using a stereoscopic and an optical microscope. The pathogenicity of fungi from weed seeds was evaluated by inoculation in plants of agronomic interest and, when pathogenic, we inoculated them in the host plant of the fungus. Weed seeds have been identified in fungi of the genus <i>Alternaria</i> , <i>Aspergillus</i> , <i>Bipolaris</i> , <i>Cladosporium</i> , <i>Curvularia</i> , <i>Fusarium</i> , <i>Nigrospora</i> , <i>Papularia</i> , <i>Rhizopus</i> and <i>Pythium</i> . The seeds of <i>Acanthospermum australe</i> , <i>Bidens pilosa</i> , <i>Cenchrus echinatus</i> , <i>Digitaria horizontalis</i> , <i>Echinochloa crus-galli</i> , <i>Eleusine indica</i> , <i>Ipomoea</i> sp., <i>Pennisetum setosum</i> , <i>Sida rhombifolia</i> , <i>Spermacoce latifolia</i> , <i>Tridax procumbens</i> and <i>Vernonia polyanthes</i> carry and disseminate fungi that, once inoculated, cause infection in plants of agricultural importance, such as <i>Oryza sativa</i> , <i>Phaseolus vulgaris</i> , <i>Vigna unguiculata</i> , <i>Zea mays</i> and <i>Glycine max</i> ."

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes
	Baron, D., da Silva Graciano, D., de Oliveira Portella, R., Mantoan, L. P. B., de Almeida, L. F. R., & Boaro, C. S. F. (2015). The ecophysiological performance of <i>Vernonia polyanthes</i> Less (Asteraceae) in conserved and degraded forests in the Brazilian Cerrado. <i>Acta Physiologiae Plantarum</i> , 37(1), 1702	[No evidence. Medicinal uses] " <i>Vernonia polyanthes</i> Less. (Asteraceae), is a pioneer plant (Nascimento et al. 1999), rich in trichomes and essential oils with biological activities, such as antimicrobial and insecticidal, that are used in popular Brazilian medicine to treat the flu, coughs, bronchitis, bruises, intestinal problems, uterine infections, kidney problems, ulcers and fevers (Correia et al. 2004; Barbastefano et al. 2007; Isarangkool Na Ayutthaya et al. 2011)."

Qsn #	Question	Answer
	Almeida, L. M., et al. (2021). Cytotoxic effect of <i>Vernonanthura polyanthes</i> leaves aqueous extracts. <i>Brazilian Journal of Biology</i> , 81(3), 575-583	[No evidence. Used medicinally. Unknown if consumption or exposure at higher levels could result in accidental poisoning] "Vernonanthura polyanthes, popularly known as assa-peixe, is a medicinal plant that has been widely used by Brazilian Cerrado population for treatment of diseases without a detailed evaluation of their effectiveness, toxicity, and proper dosage. Thus, more studies investigating the safety of V. polyanthes aqueous extract before the use are needed. The purpose of this study was to evaluate the toxicity, cytotoxicity and genotoxicity of V. polyanthes leaves aqueous extract using the <i>Artemia salina</i> and <i>Allium cepa</i> assays. For the A. salina assay, three groups of 10 larvae were exposed to V. polyanthes leaves aqueous extract at the concentrations of 5, 10, 20, 40, and 80 mg/ml. For the A. cepa assay, 5 onion bulbs were exposed to V. polyanthes leaves aqueous extract at 10, 20, and 40 mg/ml, and then submitted to macroscopic and microscopic analysis. As result it was identified a toxicity and cytotoxicity of V. polyanthes dependent on the extract concentration. The A. salina assay suggests that the concentration of 24 mg/ml of the V. polyanthes extract is able to kill 50% of naupllis; while the A. cepa assay suggests that V. polyanthes leaves aqueous extract is toxic at concentrations higher than 20 mg/ml; however the cytotoxic effect in A. cepa root cells was observed at 40 mg/ml of the extract. It is important to say that the V. polyanthes leaves aqueous extract concentration commonly used in popular medicine is 20 mg/ml. Thus, the popular concentration used is very close to toxicity limit in A. salina model (24 mg/ml) and is the concentration which showed toxic effect in A. cepa root cells (20 mg/ml). No genotoxic activity of V. polyanthes leaves aqueous extract was observed in the conditions used in this study. Because of the antiproliferative action and no genotoxic activity, V. polyanthes leaves aqueous extract may present compounds with potential use for human medicine. However more detailed studies need to be performed to confirm this potential."
	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	y
	Source(s)	Notes
	Timberlake, J. R., Darbyshire, I., Cheek, M., Banze, A., Fijamo, V., Massunde, J., Chipanga, H., & Muassinar, D. (2016) Plant conservation in communities on the Chimanimani footslopes. Darwin Initiative Award 2380: Balancing Conservation and Livelihoods in the Chimanimani Forest Belt, Mozambique. Royal Botanic Gardens, Kew	"Of particular conservation concern is the invasive shrub or small tree, <i>Vernonanthura phosphorica</i> . This Brazilian species, introduced as a bee fodder, rapidly invades cleared areas, particularly those that were previously forest, often forming extensive tall stands that inhibit forest regeneration. As it is both readily flammable and regenerates rapidly after fire, infested areas tend to burn more frequently, further interfering with forest regeneration."

409	Is a shade tolerant plant at some stage of its life cycle	y
-----	---	---

Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Timberlake, J. R., Darbyshire, I., Cheek, M., Banze, A., Fijamo, V., Massunde, J., Chipanga, H., & Muassinar, D. (2016) Plant conservation in communities on the Chimanimani footslopes. Darwin Initiative Award 2380: Balancing Conservation and Livelihoods in the Chimanimani Forest Belt, Mozambique. Royal Botanic Gardens, Kew	"The species can be found even in shaded disturbed forest; unlike many invasives, it does not require much sunlight to establish."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	
	<b>Source(s)</b>	<b>Notes</b>
	Tuffi Santos, L. D., Cardoso Filho, O., Santos Júnior, A., Sant'Anna-Santos, B. F., Felix, R. C., & Leite, F. P. (2013). Floristic and structural variation of weeds in eucalyptus plantations as influenced by relief and time of year. <i>Planta Daninha</i> , 31(3), 491-499	"Probably, the high density and frequency of this species are established based on its affinity for the soil composition in the area of occurrence. <i>V. polyanthes</i> multiplies easily in soils of high fertility (Alzugaray & Alzugaray, 1984)."
	Timberlake, J. R., Darbyshire, I., Cheek, M., Banze, A., Fijamo, V., Massunde, J., Chipanga, H., & Muassinar, D. (2016) Plant conservation in communities on the Chimanimani footslopes. Darwin Initiative Award 2380: Balancing Conservation and Livelihoods in the Chimanimani Forest Belt, Mozambique. Royal Botanic Gardens, Kew	[Ability to establish may be limited by soil type] "The species can be found even in shaded disturbed forest; unlike many invasives, it does not require much sunlight to establish. However, it does not seem to invade miombo and similar woodlands, presumably because of the different soils."

411	Climbing or smothering growth habit	n
	<b>Source(s)</b>	<b>Notes</b>
	Vega, A. J., & Dematteis, M. (2010). The transfer of <i>Vernonia perangusta</i> to the genus <i>Vernonanthura</i> (Vernonieae, Asteraceae) and the correct name for <i>Vernonanthura phosphorica</i> . <i>Phytotaxa</i> , 8(1), 46-50	"Erect shrub up to 3 m tall."

412	Forms dense thickets	y
	<b>Source(s)</b>	<b>Notes</b>
	Timberlake, J. et al. (2020). Mountains of the Mist: A first plant checklist for the Bvumba Mountains, Manica Highlands (Zimbabwe-Mozambique). <i>PhytoKeys</i> , 145: 93-129	"A more recent challenge is <i>Vernonanthura polyanthes</i> – locally called 'Beebush' – which has become rampant since it spread into the Bvumba and Chimanimani areas after its introduction from Brazil to Mozambique (Timberlake et al. 2016b). It spreads rapidly into disturbed and burnt areas that were under wattle, blackwood or eucalyptus (S. Childes. pers. obs.). Clark et al. (2019) postulate that Cyclone Idai (March 2019) might have encouraged the spread of this wind-dispersed species even further afield, although it had earlier also been encountered on the Ribáuè mountains in northern Mozambique (I. Darbyshire, pers. comm. 2017)."
	Sukhorukov, A. P. et al. (2017). Chorological and taxonomic notes on African plants, 2. <i>Botany Letters</i> , 164(2), 135-153	"It has been recorded as a dominant understory species in disturbed indigenous forests and commercial pine plantations."

Qsn #	Question	Answer
	Timberlake, J. R., Darbyshire, I., Cheek, M., Banze, A., Fijamo, V., Massunde, J., Chipanga, H., & Muassinar, D. (2016) Plant conservation in communities on the Chimanimani footslopes. Darwin Initiative Award 2380: Balancing Conservation and Livelihoods in the Chimanimani Forest Belt, Mozambique. Royal Botanic Gardens, Kew	"Of particular conservation concern is the invasive shrub or small tree, <i>Vernonanthura phosphorica</i> . This Brazilian species, introduced as a bee fodder, rapidly invades cleared areas, particularly those that were previously forest, often forming extensive tall stands that inhibit forest regeneration. As it is both readily flammable and regenerates rapidly after fire, infested areas tend to burn more frequently, further interfering with forest regeneration." ... "Burning of vegetation, so widespread across the area, seems to actively encourage both its growth and dispersal. Mono-dominant stands covering many hectares are commonly seen on hill slopes."

501	Aquatic	n
	Source(s)	Notes
	Sukhorukov, A. P. et al. (2017). Chorological and taxonomic notes on African plants, 2. Botany Letters, 164(2), 135-153	[Terrestrial] "It is common in disturbed areas, along roadsides, in secondary vegetation, pine plantations, dry forest and riparian forest margins at elevations ranging from 345 to 1710 m a.s.l. It has been recorded as a dominant understory species in disturbed indigenous forests and commercial pine plantations."

502	Grass	n
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2021). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a> . [Accessed 25 May 2021]	Family: Asteraceae (alt. Compositae) Subfamily: Cichorioideae Tribe: Vernonieae Subtribe: Vernoniinae

503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2021). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a> . [Accessed 25 May 2021]	Family: Asteraceae (alt. Compositae) Subfamily: Cichorioideae Tribe: Vernonieae Subtribe: Vernoniinae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Hyde, M.A. et al. (2021). Flora of Zimbabwe: Species information: <i>Vernonanthura polyanthes</i> . <a href="https://www.zimbabweflora.co.zw/">https://www.zimbabweflora.co.zw/</a> . [Accessed 25 May 2021]	"Shrub or small tree, up to c. 4 m tall."

601	Evidence of substantial reproductive failure in native habitat	n

Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Vega, A. J., & Dematteis, M. (2010). The transfer of <i>Vernonia perangusta</i> to the genus <i>Vernonanthura</i> (Vernonieae, Asteraceae) and the correct name for <i>Vernonanthura phosphorica</i> . <i>Phytotaxa</i> , 8(1), 46-50	"a relatively common species widely distributed in Brazil"

602	Produces viable seed	Y
	<b>Source(s)</b>	<b>Notes</b>
	Sukhorukov, A. P. et al. (2017). Chorological and taxonomic notes on African plants, 2. <i>Botany Letters</i> , 164(2), 135-153	"In Zimbabwe, <i>V. polyanthes</i> blooms from June to August, and then produces copious wind-dispersed fruits."
	Lorenzi, H. (1991). <i>Plantas Daninhas do Brasil: Terrestres, Aquáticas, Parasitas, Tóxicase Medicinais</i> . 2nd ed. Plantarum Press, Nova Odessa, Brazil	[Translated from Portuguese - "propagates through seeds"] "propaga-se por sementes"

603	Hybridizes naturally	
	<b>Source(s)</b>	<b>Notes</b>
	de Oliveira Vanessa, M., Forni-Martins, E. R., & Semir, J. (2007). Cytotaxonomic studies in six species of <i>Vernonia</i> (Asteraceae: Vernonieae). <i>Caryologia</i> , 60(1-2), 37-47	[Possibly Yes] "Of the three populations of <i>V. polyanthes</i> studied here, population 2 from Mogi Guacu (2n=34) was probably a hybrid of <i>V. polyanthes</i> with <i>V. rubriramea</i> since it showed morphometric characteristics of these two species (Semir, personal communication). According to Sttuts (1988), hybridization is common in <i>Vernonia</i> and many hybrid species occupy perturbed environments. Hybrids have been observed between <i>V. marginata</i> and <i>V. baldwini</i> ssp interior, as well as between <i>V. fasciculata</i> and <i>V. baldwini</i> ssp interior, <i>V. gigantea</i> , <i>V. arkansa</i> and <i>V. missurica</i> (Jones 1972)."

604	Self-compatible or apomictic	
	<b>Source(s)</b>	<b>Notes</b>
	Vega, A. J., & Dematteis, M. (2010). The transfer of <i>Vernonia perangusta</i> to the genus <i>Vernonanthura</i> (Vernonieae, Asteraceae) and the correct name for <i>Vernonanthura phosphorica</i> . <i>Phytotaxa</i> , 8(1), 46-50	[Unknown] "Capitula sessile or subsessile, on seriate-cymose branches, grouped in a paniculiform synflorescence. Involucre campanulate, 4–5 mm high. Phyllaries in 4–6 series, mucronate, pilose or rarely glabrous, inner phyllaries lanceolate, outer ones ovate. Florets white. Corollas 5–5.5 mm long, lobes lanceolate, 1.5–2 mm long. Anthers 2–3 mm long. Styles 6–7 mm long, branches linear, 2 mm long. Cypselas ribbed, covered with single hairs and glandular papillae. Pappus uniseriate, 4–5 mm long."

605	Requires specialist pollinators	n
	<b>Source(s)</b>	<b>Notes</b>
	Sukhorukov, A. P. et al. (2017). Chorological and taxonomic notes on African plants, 2. <i>Botany Letters</i> , 164(2), 135-153	"Hyde et al. (2016, sub <i>Vernonanthura phosphorica</i> ) reported the introduction of the species in Mozambique in the 1990s to enhance honey production, as is the case in Brazil where <i>V. polyanthes</i> is a well-known honey plant pollinated by honey bees (Lorenzi 2000)."

606	Reproduction by vegetative fragmentation	

Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Sukhorukov, A. P. et al. (2017). Chorological and taxonomic notes on African plants, 2. Botany Letters, 164(2), 135-153	[No information on vegetative spread] "In Zimbabwe, <i>V. polyanthes</i> blooms from June to August, and then produces copious wind-dispersed fruits."
	Lorenzi, H. (1991). Plantas Daninhas do Brasil: Terrestres, Aquáticas, Parasitas, Tóxicase Medicinais. 2nd ed. Plantarum Press, Nova Odessa, Brazil	[Translated from Portuguese - "propagates through seeds"] "propaga-se por sementes" [No indication of vegetative spread]

607	Minimum generative time (years)	
	<b>Source(s)</b>	<b>Notes</b>
	Timberlake, J. R., Darbyshire, I., Cheek, M., Banze, A., Fijamo, V., Massunde, J., Chipanga, H., & Muassinar, D. (2016) Plant conservation in communities on the Chimanimani footslopes. Darwin Initiative Award 2380: Balancing Conservation and Livelihoods in the Chimanimani Forest Belt, Mozambique. Royal Botanic Gardens, Kew	"Growth is very rapid, and dispersal is by the copious number of small plumose seeds distributed by wind." [Rapid growth, but time to maturity unspecified]

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	
	<b>Source(s)</b>	<b>Notes</b>
	Gomes, J. A. D. O., Bonfim, F. P., Teixeira, D. A., & Martins, E. R. (2019). Phenology of <i>Vernonia polyanthes</i> Less. in native population. <i>Idesia (Arica)</i> , 37(4), 41-46	"Fruit dehiscence occurs when the climate is conducive to dispersion of the anemochorous propagules (Schaik et al., 1993). In Cerrado vegetation, woody plants disperse their seeds during the dry season, which seem to germinate readily, whereas the seeds of species with dormancy are disseminated predominantly in the rainy season (Oliveira, 2008)."
	Timberlake, J. R., Darbyshire, I., Cheek, M., Banze, A., Fijamo, V., Massunde, J., Chipanga, H., & Muassinar, D. (2016) Plant conservation in communities on the Chimanimani footslopes. Darwin Initiative Award 2380: Balancing Conservation and Livelihoods in the Chimanimani Forest Belt, Mozambique. Royal Botanic Gardens, Kew	[Unknown. Established along roadsides, probably because of similarity to disturbed habitats. However, wind-dispersed seeds may be secondarily dispersed by attachment to vehicles, other equipment, or footwear] "It has become common, abundant or even dominant in disturbed sites, in secondary vegetation, along roadsides and on forest margins across the Chimanimani area."

702	Propagules dispersed intentionally by people	Y
	<b>Source(s)</b>	<b>Notes</b>
	Hyde, M.A. et al. (2021). Flora of Zimbabwe: Species information: <i>Vernonanthura polyanthes</i> . <a href="https://www.zimbabweflora.co.zw">https://www.zimbabweflora.co.zw</a> . [Accessed 26 May 2021]	"This species appears to have been introduced as a nectar plant for bees, possibly in the early 1990's in areas around Sussundenga, Mozambique." [Intentionally introduced to Africa, and also present in the Hawaiian Islands, although time and reasons for introduction unknown as of the completion of this assessment]



Qsn #	Question	Answer
703	<b>Propagules likely to disperse as a produce contaminant</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Sukhorukov, A. P. et al. (2017). Chorological and taxonomic notes on African plants, 2. Botany Letters, 164(2), 135-153	"In Zimbabwe, <i>V. polyanthes</i> blooms from June to August, and then produces copious wind-dispersed fruits." [No evidence. Unlikely. A wind-dispersed tree]
704	<b>Propagules adapted to wind dispersal</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	Sukhorukov, A. P. et al. (2017). Chorological and taxonomic notes on African plants, 2. Botany Letters, 164(2), 135-153	"In Zimbabwe, <i>V. polyanthes</i> blooms from June to August, and then produces copious wind-dispersed fruits."
705	<b>Propagules water dispersed</b>	
	<b>Source(s)</b>	<b>Notes</b>
	Sukhorukov, A. P. et al. (2017). Chorological and taxonomic notes on African plants, 2. Botany Letters, 164(2), 135-153	[Wind-dispersed seeds probably secondarily dispersed by water when occurring in riparian areas] "It is common in disturbed areas, along roadsides, in secondary vegetation, pine plantations, dry forest and riparian forest margins at elevations ranging from 345 to 1710 m a.s.l."
706	<b>Propagules bird dispersed</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Sukhorukov, A. P. et al. (2017). Chorological and taxonomic notes on African plants, 2. Botany Letters, 164(2), 135-153	"In Zimbabwe, <i>V. polyanthes</i> blooms from June to August, and then produces copious wind-dispersed fruits."
707	<b>Propagules dispersed by other animals (externally)</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Sukhorukov, A. P. et al. (2017). Chorological and taxonomic notes on African plants, 2. Botany Letters, 164(2), 135-153	"In Zimbabwe, <i>V. polyanthes</i> blooms from June to August, and then produces copious wind-dispersed fruits." [Possible, but unlikely]
708	<b>Propagules survive passage through the gut</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Sukhorukov, A. P. et al. (2017). Chorological and taxonomic notes on African plants, 2. Botany Letters, 164(2), 135-153	"In Zimbabwe, <i>V. polyanthes</i> blooms from June to August, and then produces copious wind-dispersed fruits." [Wind-dispersed seeds unlikely to be consumed or remain viable if ingested]
801	<b>Prolific seed production (&gt;1000/m<sup>2</sup>)</b>	
	<b>Source(s)</b>	<b>Notes</b>

Qsn #	Question	Answer
	Bertoncini, A. P., & Rodrigues, R. R. (2008). Forest restoration in an indigenous land considering a forest remnant influence (Avaí, São Paulo State, Brazil). <i>Forest Ecology and Management</i> , 255(3-4), 513-521	[High densities produced, but not in excess of 1000/m <sup>2</sup> ] "A total of 241,802 seeds belonging to 39 species were surveyed in the pasture land for 18 months. That figure represented 13,433.45 seeds/m <sup>2</sup> . The African exotic grasses <i>R. repens</i> and <i>U. brizantha</i> (Poaceae) were the most abundant species, followed by <i>Vernonia polyanthes</i> (Asteraceae) and <i>Sida</i> sp. (Malvaceae). These species represented 95% of the seed rain altogether." [Table 1. Density of seeds, seedlings and regenerating individuals in pasture areas at the Arariba' indigenous land. <i>Vernonia polyanthes</i> - Seed rain (seeds/m <sup>2</sup> ) = 706.06]
	Timberlake, J. R., Darbyshire, I., Cheek, M., Banze, A., Fijamo, V., Massunde, J., Chipanga, H., & Muassinar, D. (2016) Plant conservation in communities on the Chimanimani footslopes. Darwin Initiative Award 2380: Balancing Conservation and Livelihoods in the Chimanimani Forest Belt, Mozambique. Royal Botanic Gardens, Kew	[Possibly. Densities unspecified] "Growth is very rapid, and dispersal is by the copious number of small plumose seeds distributed by wind."
	Lorenzi, H. (1991). <i>Plantas Daninhas do Brasil: Terrestres, Aquáticas, Parasitas, Tóxicase Medicinais</i> . 2nd ed. Plantarum Press, Nova Odessa, Brazil	[Produces large numbers of seeds. Quantities unspecified] "Floresce durante os meses de janeiro a abril, produzindo grandes quantidades de sementes facilmente carregadas pelo vento." [Translated from Portuguese: "It blooms during the months of January to April, producing large quantities of seeds easily carried by the wind."]

802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	Notes
	Royal Botanic Gardens Kew. (2021) Seed Information Database (SID). Version 7.1. <a href="http://data.kew.org/sid/">http://data.kew.org/sid/</a> . [Accessed 26 May 2021]	"Storage Behaviour: No data available for species or genus. Of 3190 known taxa of family COMPOSITAE, 97.96% Orthodox(p/?), 2.04% Uncertain"
	Braga, A. J. T., Borges, E. E. D. L., & Martins, S. V. (2016). Seed bank in two sites of semideciduous seasonal forest in Viçosa, Minas Gerais. <i>Revista Árvore</i> , 40(3), 415-425	<i>Vernonia polyanthes</i> (Synonym of <i>Vernonanthura polyanthes</i> ) germinated from the seed bank collected at the end of the rainy season. Longevity of the seeds in the seed bank unspecified

803	Well controlled by herbicides	y
	Source(s)	Notes
	Rassini, J. B., & Coelho, R. R. (1994). Controle químico de assa-peixe ( <i>Vernonia polyanthes</i> ) em pastagens. <i>Revista Sociedade Brasileira de Zootecnia</i> , 23(6): 871-876	[Effectivel controlled with herbicides] "A study was carried at the Centro de Pesquisa de Pecuária do Sudeste (CPPSE), EMBRAPA, São Carlos, SP, Brazil, between February/92 to January/93 to evaluate the efficiency of three dosage and application modality of glyphosate herbicide on pasture weed <i>Vernonia polyanthes</i> : in stump after cutting at 8, 6 and 4%; in ring of stern at 20, 15 and 10%; and in foliar pulverization at 4, 3 and 2%. The control was the 2,4 D + picloran at 4 % in stump, at 10% in ring of stern, and at 2% in foliar pulverization. Glyphosate herbicide was efficient, only when applied on aerial part in foliar pulverization at 4 and 3%, and did not differ of the control in this application modality. The 2,4 D + picloran controlled the weed in all dosage and application modality."

Qsn #	Question	Answer
	Krenchinski, F. H., Albrecht, A. J. P., Albrecht, L. P., Cesco, V. J. S., Rodrigues, D. M., & Filho, R. V. (2015). Application rates and herbicide in weed control in pasture. <i>Revista Brasileira de Herbicidas</i> , 14(4), 271-279	[Some herbicides provide effective control] "Pastures formed with <i>Cynodonn lemfuensis</i> Vanderyst are excellent alternatives for feeding livestock. The competition from weeds can cause damage to pasture, and <i>Vernonia polyanthes</i> and <i>Desmodium incanum</i> are among the main competing species. The objective of this study was to evaluate the efficacy of different herbicides to control <i>Vernonia polyanthes</i> and <i>Desmodium incanum</i> , applied in high and low spray mix volumes. The experiment was established in an area formed for over 10 years by African stargrass ( <i>Cynodonn lemfuensis</i> ). The experimental design was a randomized block in a 2x7 factorial arrangement with two spray mix volumes of 50 and 200 L ha <sup>-1</sup> and seven herbicides. Variables phytotoxicity on grass <i>Cynodonn lemfuensis</i> at 3, 7, 14, 21 and 28 days after application (DAA) and control of weed plants <i>Vernonia polyanthes</i> and <i>Desmodium incanum</i> at 7, 14, 21 and 28 DAA were evaluated. There were no high levels of phytotoxicity in the pasture. The treatments that provided the best controls of <i>Vernonia polyanthes</i> and <i>Desmodium incanum</i> were fluroxypyr-meptyl + triclopyr, 2,4 D + aminopyralid and 2,4 D + picloram. Spray mix volumes provided no significant differences in the evaluation of control after 28 DAA for herbicides, but were higher for some treatments at 7, 14 and 21 DAA. Thus, the lowest volume of spray mix (50 L ha <sup>-1</sup> ) becomes a viable alternative in the control of these species in the pasture."

804	Tolerates, or benefits from, mutilation, cultivation, or fire	y
	Source(s)	Notes
	Timberlake, J. R., Darbyshire, I., Cheek, M., Banze, A., Fijamo, V., Massunde, J., Chipanga, H., & Muassinar, D. (2016) Plant conservation in communities on the Chimanimani footslopes. Darwin Initiative Award 2380: Balancing Conservation and Livelihoods in the Chimanimani Forest Belt, Mozambique. Royal Botanic Gardens, Kew	[Fire promotes establishment, and may be ineffective in killing adult trees] "Burning of vegetation, so widespread across the area, seems to actively encourage both its growth and dispersal. Mono-dominant stands covering many hectares are commonly seen on hill slopes."
	Lorenzi, H. (1991). <i>Plantas Daninhas do Brasil: Terrestres, Aquáticas, Parasitas, Tóxicase Medicinais</i> . 2nd ed. Plantarum Press, Nova Odessa, Brazil	[Resprouts after cutting and frost damage] "E uma planta muito rustica e com grande capacidade de recuperacao quando cortada ou queimada pela geada." [Translated from Portuguese: "It is a very rustic plant with great recovery capacity when cut or burned by frost."]

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	WRA Specialist. (2021). Personal Communication	Unknown. Detected on East Maui in May 2021 and abundant over 1000 acres. Biotic factors do not currently appear to be limiting or impacting this tree's ability to reproduce and spread.

**Summary of Risk Traits:**

High Risk / Undesirable Traits

- Elevation range exceeds 1000 m, demonstrating environmental versatility
- Thrives, and capable of spreading, in regions with tropical climates
- Naturalized in Zimbabwe and Mozambique, and detected in East Maui, Hawaii (May 2021) over a 1000-acre area
- A disturbance adapted weed with detrimental effects on pasture productivity, tree plantations, and potentially natural areas
- Other species are reported to be invasive
- Potentially allelopathic
- Seeds in native range reported to be host of pathogenic fungi that impact plants of agricultural importance
- Flammable, and reported to increase fire risk in Mozambique
- Shade-tolerant (able to establish in shady, disturbed forest)
- Forms dense thickets
- May hybridize with other species in genus
- Reproduces by prolific, wind-dispersed seeds
- Reported to grow rapidly (but time to maturity unspecified)
- Reported to tolerate and recover after cutting, frost, and fire

Low Risk Traits

- Unarmed (no spines, thorns, or burrs)
- Not reported to be toxic (used medicinally)
- Valued by beekeepers as a honey source pollinated by honey bees
- Herbicides reported to provide effective control