Keywords: High Risk, Naturalized, Invasive, Smothering Herb, Edible, Annual

***Family:*** ***Tropaeolaceae***

***Taxon:*** ***Tropaeolum majus***

***Synonym:*** *Cardamindum majus (L.) Moench*
*Trophaeum majus (L.) Kuntze*

***Common Name:*** garden nasturtium
Indian cress
nasturtium

**Questionaire :** current 20090513 **Assessor:** Assessor **Designation:** H(HPWRA)
**Status:** Assessor Approved **Data Entry Person:** Assessor **WRA Score 10**

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| **101** | **Is the species highly domesticated?** | **y=-3, n=0** | **n** |
| **102** | **Has the species become naturalized where grown?** | **y=1, n=-1** | |
| **103** | **Does the species have weedy races?** | **y=1, n=-1** | |
| **201** | **Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"** | **(0-low; 1-intermediate; 2-high) (See Appendix 2)** | **Intermediate** |
| **202** | **Quality of climate match data** | **(0-low; 1-intermediate; 2-high) (See Appendix 2)** | **High** |
| **203** | **Broad climate suitability (environmental versatility)** | **y=1, n=0** | **y** |
| **204** | **Native or naturalized in regions with tropical or subtropical climates** | **y=1, n=0** | **y** |
| **205** | **Does the species have a history of repeated introductions outside its natural range?** | **y=-2, ?=-1, n=0** | **y** |
| **301** | **Naturalized beyond native range** | **y = 1*multiplier (see Appendix 2), n= question 205** | **y** |
| **302** | **Garden/amenity/disturbance weed** | **n=0, y = 1*multiplier (see Appendix 2)** | |
| **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)** | **y** |
| **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** | **y=1, n=0** | |
| **403** | **Parasitic** | **y=1, n=0** | **n** |
| **404** | **Unpalatable to grazing animals** | **y=1, n=-1** | **n** |
| **405** | **Toxic to animals** | **y=1, n=0** | **n** |
| **406** | **Host for recognized pests and pathogens** | **y=1, n=0** | **n** |
| **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** | **y** |

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| **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** | **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** | **y=1, n=-1** | |
| **604** | **Self-compatible or apomictic** | **y=1, n=-1** | |
| **605** | **Requires specialist pollinators** | **y=-1, n=0** | **n** |
| **606** | **Reproduction by vegetative fragmentation** | **y=1, n=-1** | **y** |
| **607** | **Minimum generative time (years)** | **1 year = 1, 2 or 3 years = 0, 4+ years = -1** | **1** |
| **701** | **Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)** | **y=1, n=-1** | **y** |
| **702** | **Propagules dispersed intentionally by people** | **y=1, n=-1** | **y** |
| **703** | **Propagules likely to disperse as a produce contaminant** | **y=1, n=-1** | **n** |
| **704** | **Propagules adapted to wind dispersal** | **y=1, n=-1** | **n** |
| **705** | **Propagules water dispersed** | **y=1, n=-1** | **y** |
| **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** | |
| **801** | **Prolific seed production (>1000/m2)** | **y=1, n=-1** | |
| **802** | **Evidence that a persistent propagule bank is formed (>1 yr)** | **y=1, n=-1** | |
| **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)** | **y=-1, n=1** | |

**Designation:** H(HPWRA) **WRA Score** **10**

**Supporting Data:**

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| 101 | 2000. Whistler, W.A.. Tropical Ornamentals: A Guide. Timber Press, Portland, OR | [Is the species highly domesticated? No] "Many of the numerous cultivars identified with this species are actually hybrids between T. majus and one or tow other species of the genus." |
| 102 | 2013. WRA Specialist. Personal Communication. | NA |
| 103 | 2013. WRA Specialist. Personal Communication. | NA |
| 201 | 2005. Staples, G.W./Herbst, D.R.. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI | [Species suited to tropical or subtropical climate(s) 1-intermediate] "Originating from cool mountainous climates, they excel at higher elevations in the Islands or, during winter months, near sea level." [Suited to higher elevation environments in the tropics] |
| 202 | 2005. Staples, G.W./Herbst, D.R.. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI | [Quality of climate match data 2-High] |
| 203 | 2013. Plants for a Future Database. Tropaeolum majus. http://www.pfaf.org/user/plant.aspx?LatinName=Tropaeolum+majus [Accessed 07 June 2013] | [Broad climate suitability (environmental versatility)? Yes] "Coastal and disturbed areas from sea level to 3000 metres." |
| 203 | 2013. Tropicos.org. Tropicos [Online Database]. Missouri Botanical Garden, http://www.tropicos.org/ | [Broad climate suitability (environmental versatility)? Yes] Collected from 100m to 3800 m elevation, and from 36°43'30"S to 35°17'11"N latitudes and many areas in between |
| 204 | 1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI. | [Native or naturalized in regions with tropical or subtropical climates? Yes] "in Hawai'i, often cultivated and now naturalized in mesic, disturbed areas, 850 1,350 m, at least on Kauai, Molokai, Maui and Hawaii." |
| 205 | 2010. Flora of North America Editorial Committee. Flora of North America: North of Mexico, Volume 7. Magnoliophyta: Salicaceae to Brassicaceae. Oxford University Press, Oxford, UK | [Does the species have a history of repeated introductions outside its natural range? Yes] "introduced also in Europe, Asia, Africa, Australia." |
| 301 | 1971. Wiggins, I.L./Porter, D.M./Anderson, E.F.. Flora of the Galápagos Islands. Stanford University Press, Stanford, CA | [Naturalized beyond native range? Yes] "Tropaeolum majus is widely cultivated and frequently naturalized." |
| 301 | 1987. Esler, A.E.. The naturalisation of plants in urban Auckland, New Zealand 3. Catalogue of naturalised species. New Zealand Journal of Botany. 25(4): 539-558. | [Naturalized beyond native range? Yes] "Period of naturalisation - 1883" |
| 301 | 1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI. | [Naturalized beyond native range? Yes] "in Hawai'i, often cultivated and now naturalized in mesic, disturbed areas, 850-1,350 m, at least on Kauai, Molokai, Maui and Hawaii." |
| 301 | 2005. Staples, G.W./Herbst, D.R.. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI | [Naturalized beyond native range? Yes] "Nasturtium has been in Hawai'i at least since the 1800s, when Dr. William Hillebrand first reported it to have run wild in Kula, Maui. Since then it has become naturalized on most of the larger islands in moist, disturbed sites." |
| 301 | 2010. Flora of North America Editorial Committee. Flora of North America: North of Mexico, Volume 7. Magnoliophyta: Salicaceae to Brassicaceae. Oxford University Press, Oxford, UK | [Naturalized beyond native range? Yes] "Tropaeolum majus is frequently cultivated and often escapes; thoroughly naturalized and an invasive in coastal California, it occurs as a waif elsewhere." |
| 302 | 2013. Weedbusters. Tropaeolum majus. http://weedbusters.co.nz/weed_info/detail.asp?WeedID=80 [Accessed 06 June 2013] | [Garden/amenity/disturbance weed? A disturbance adapted weed that threatens natural areas] "Which habitats is it likely to invade? Disturbed sites especially adjacent to gardens and dumps, Shrubland, herbfield, wetland, and streamsides." |
| 303 | 2013. WRA Specialist. Personal Communication. | [Agricultural/forestry/horticultural weed? No] A disturbance adapted plant controlled in natural areas of Hawaii [see 3.04] |

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| 304 | 1992. Tunison, J.T./Zimmer, N.G.. Success in controlling local alien plants in Hawaii Volcanoes National Park in: Alien plant invasions in native ecosystems of Hawaii: management & research. Coop. Nat. Park Res. Studies Unit, Univ. of Hawaii, Honolulu, HI | [Environmental weed? Yes] "Alien plant management at Hawai`i Volcanoes National Park emphasizes control of localized alien plant species on a parkwide basis and control of widespread alien species in Special Ecological Areas. The purpose of the localized alien plant control program is to prevent the spread of potentially disruptive normative species while populations are still manageable. The program has intensified in the last five years, with control efforts currently directed at 41 species. Some of the more significant target species are black wattle (Acacia mearnsii), castor bean (Ricinus communis), nasturtium (Trapaeolum majus),…" … "Table 1. Characteristics of localized alien plant species currently managed in Hawai`i Volcanoes National Park." [Tropaeolum majus - Reason for Controlling = Monospecific stands in montane seasonal] |
| 304 | 2008. Benitez, D.M./Belfield, T./Loh, R./Pratt, L./Christie, A.D.. Inventory of Vascular Plants of the Kahuku Addition, Hawaii Volcanoes National Park. Technical Report 157. Pacific Cooperative Studies Unit, Honolulu, HI | [Environmental weed? Yes] "At Kahuku, nasturtium covered an area of 200 m2 on lawns and forest edges immediately south of the Kahuku ranch house at 670 m elevation. These plants were subsequently treated by the PIEPMT in Spring 2006. No additional plants were detected in Kahuku. Nasturtium is a vine with round leaves and showy yellow red flowers; it is native to montane regions of Mexico to Central Chile. In Hawai'i, plants are naturalized in mesic, disturbed areas on Kaua`i, Moloka'i, Maui, and Hawai'i between 850 and 1,350 m elevation. In the original section of HAVO, nasturtium occurs in mesic forests and pastures between 1,200 and 1,300 m elevation on Mauna Loa, where the species has been managed to prevent its spread since 1979." [Controlled to prevent its spread into natural areas] |
| 304 | 2009. De Nascimento, L./Delgado, J.D./Méndez, J./Otto, R./Arteaga, M./Fernández-Palacios, J.M.. Honeybees and Pollen as Indicators of Alien Plant Species in Two Native Forest Ecosystems of an Oceanic Island (La Palma, Canary Islands). Open Forest Science | [Environmental weed? Possibly Yes] "Attending to ecosystems, A. adenophora, A. cyanophylla and T. majus have been since long considered invasive alien species of natural and potential areas of laurel forest [43]." |
| 304 | 2013. Weedbusters. Tropaeolum majus. http://weedbusters.co.nz/weed_info/detail.asp?WeedID=80 [Accessed 06 June 2013] | [Environmental weed? Yes] "Quick maturing, produces many viable seeds, smothering habit and rapid growth." … "What damage does it do? Smothers low-growing habitats and prevents the establishment of native plant seedlings." |
| 305 | 2006. Harman, H.M.. Prospects for biological control of Chilean flame creeper Tropaeolum speciosum (Tropaeolaceae). Landcare Research Contract Report LC0607/013. Landcare Research, New Zealand | [-Congeneric weed? Yes] "Chilean flame creeper is an invasive weed of increasing concern to regional authorities in the southernmost parts of New Zealand. The plant is a vigorous climber that smothers shrubs and trees, reducing light levels, and preventing regeneration of desirable species." [Tropaeolum speciosum] |
| 401 | 1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI. | [Produces spines, thorns or burrs? No] "Glabrous, somewhat succulent annual or short-lived perennial herbs; stems usually climbing. Leaves peltate, orbicular or more or less angled, 4-15 cm wide, ca. 9-nerved, lower surface papillose, margins entire to undulate, petioles 10-30 cm long or sometimes more." |
| 402 | 2012. Formagio, A.S.N./Masetto, T.E./Vieira, M.D.C./Zárate, N.A.H./Costa, W.F.D./Trevizan, L.N.F./Sarragiotto, M.H.. Allelopathy potential of Tropaeolum majus L on picão-preto seeds germination and initial seedling growth. Ciência Rural. 42(1): 83-89. | [Allelopathic? Possibly Yes] "This research aimed to evaluate the metanolic extracts allelopathic potential from leaves, flowers and roots of capuchinha (Tropaeolum majus L.) on picão preto seeds…" … "The capuchinha leaves showed allelopathic potential on picão-preto seeds germination, hypocotyl and seedlings primary root length." [Possibly Yes. Unknown from field conditions] |
| 403 | 1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI. | [Parasitic? No] "Glabrous, somewhat succulent annual or short-lived perennial herbs;" [Tropaeolaceae] |
| 404 | 2008. Bloem, E./Berk, A./Haneklaus, S./Selmar, D./Schnug, E.. Influence of Tropaeolum majus supplements on growth and antimicrobial capacity of glucotropaeolin in piglets. Landbauforschung Volkenrode. 58(3): 203-210. | [Unpalatable to grazing animals? No] "Tropaeolum majus L. is a herb with antimicrobial activity in humans, caused by the degradation product benzyl-isothiocyanate derived from enzymatic cleavage of glucotropaeolin. Piglets were fed diets with a graded supplementation of Tropaeolum majus for five weeks." |
| 404 | 2013. Weedbusters. Tropaeolum majus. http://weedbusters.co.nz/weed_info/detail.asp?WeedID=80 [Accessed 06 June 2013] | [Unpalatable to grazing animals? No] "Soil movement, dumped vegetation, scrambling stems and possibly birds and browsing mammals." |
| 405 | 2008. Bloem, E./Berk, A./Haneklaus, S./Selmar, D./Schnug, E.. Influence of Tropaeolum majus supplements on growth and antimicrobial capacity of glucotropaeolin in piglets. Landbauforschung Volkenrode. 58(3): 203-210. | [Toxic to animals? No] "Supplementation of the feed with Tropaeolum majus had no effect on growth performance of piglets." |
| 406 | 1994. Stephens, J.M.. Nasturtium, Garden — Tropaeolum majus L.. University of Florida, IFAS, Gainesville FL http://edis.ifas.ufl.edu. | [Host for recognized pests and pathogens? No] "There are few pests to bother the plants." |

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| 406 | 2013. Floridata. Tropaeolum majus. http://www.floridata.com/ref/t/trop_maj.cfm [Accessed 7 June 2013] | [Host for recognized pests and pathogens?] "Nasturtiums are attacked by aphids, and organic gardeners like to plant lots of them all around the vegetable patch to serve as aphid "lures."" |
| 407 | 1986. Fuller, T.C./McClintock, E.M.. Poisonous plants of California: Issue 53 of California natural history guides. University of California Press, Berkeley and Los Angeles, CA | [Causes allergies or is otherwise toxic to humans? No] "Young leaves are used in salads; flower buds and seeds are used for their peppery taste. These parts contain a benzyl mustard oil, benzylisothiocyanate, that is different from the isothiocyanates discussed under the Brassicaceae. Benzylisothiocyanate is formed in the plant as a glycoside, glucotropaeolin, and has an antibiotic activity against several kinds of bacteria." |
| 407 | 2013. Floridata. Tropaeolum majus. http://www.floridata.com/ref/t/trop_maj.cfm [Accessed 7 June 2013] | [Causes allergies or is otherwise toxic to humans? No evidence] "Features - Nasturtiums are very easy to grow and the seeds are large and easy for children to handle. They are pretty, fairly long-lasting flowers and the young gardener will be proud to make an arrangement of cut flowers or add them to the family's salad plate." |
| 408 | 2011. Richardson, F.J./Richardson, R.G./Shepherd, R.C.H.. Weeds of the South-East: An Identification Guide for Australia. Second Edition. RG and FJ Richardson, Victoria, Australia | [Creates a fire hazard in natural ecosystems? No] "…a trailing or clambering, semi-succulent annual herb with water sap…" [No evidence, and unlikely to burn with succulent stems and watery sap] |
| 409 | 2008. San Diego Chapter of the American Society of the Landscape Architects and San Diego Chapter of the California Native Plant Society. San Diego County invasive ornamental plant guide. http://www.asla-sandiego.org/Download/PG_08_mod.pdf | [Is a shade tolerant plant at some stage of its life cycle? Yes] "This species spreads easily on shady, north facing slopes, primarily in coastal and riparian areas. Once established on north-facing slopes or in wet shady areas, it will directly compete with native plants and dominate the landscape." … "Once established in natural areas it continues to persist by re-seeding itself. 1 It grows easily from seed with little sunlight or water." |
| 409 | 2013. Plants for a Future Database. Tropaeolum majus. http://www.pfaf.org/user/plant.aspx?LatinName=Tropaeolum+majus [Accessed 07 June 2013] | [Is a shade tolerant plant at some stage of its life cycle? Partial shade] "It cannot grow in the shade." … "Tolerates most soils[202], though it prefers a rich light well-drained soil in full sun or partial shade[14, 15, 37]." |
| 410 | 2013. Plants for a Future Database. Tropaeolum majus. http://www.pfaf.org/user/plant.aspx?LatinName=Tropaeolum+majus [Accessed 07 June 2013] | [Tolerates a wide range of soil conditions ? Yes] "Tolerates most soils[202], though it prefers a rich light well-drained soil in full sun or partial shade[14, 15, 37]. More and lusher leaves are produced when the plant is growing in a rich soil, though less flowers are produced[238]. When grown in a soil of low fertility the leaves are smaller and less lush, though more flowers are produced[200, K] The plant will also succeed in very poor soils[202]. It dislikes drought[37]." |
| 411 | 1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI. | [Climbing or smothering growth habit? Yes] "Glabrous, somewhat succulent annual or short-lived perennial herbs; stems usually climbing." |
| 411 | 2013. Weedbusters. Tropaeolum majus. http://weedbusters.co.nz/weed_info/detail.asp?WedID=80 [Accessed 06 June 2013] | [Climbing or smothering growth habit? Yes] "Quick maturing, produces many viable seeds, smothering habit and rapid growth." … "What damage does it do? Smothers low-growing habitats and prevents the establishment of native plant seedlings." |
| 412 | 2013. Weedbusters. Tropaeolum majus. http://weedbusters.co.nz/weed_info/detail.asp?WedID=80 [Accessed 06 June 2013] | [Forms dense thickets? No. Smothering habit] "What damage does it do? Smothers low growing habitats and prevents the establishment of native plant seedlings." |
| 501 | 1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI. | [Aquatic? No] "often cultivated and now naturalized in mesic, disturbed areas, 850 1,350 m" |
| 502 | 1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI. | [Grass? No] "Tropaeolaceae" |
| 503 | 1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI. | [Nitrogen fixing woody plant? No] "Tropaeolaceae" |
| 504 | 1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI. | [Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)? No] "Glabrous, somewhat succulent annual or short-lived perennial herbs; stems usually climbing." |
| 601 | 2013. WRA Specialist. Personal Communication. | [Evidence of substantial reproductive failure in native habitat? No] No evidence, although possibly of hybrid origin, and not existing in natural, wild condition |
| 602 | 2000. Whistler, W.A.. Tropical Ornamentals: A Guide. Timber Press, Portland, OR | [Produces viable seed? Yes] "Propagate by seeds." |

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| 603 | 2005. Staples, G.W./Herbst, D.R.. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI | [Hybridizes naturally? Unknown] "The cultivated nasturtium has long been presumed to be of hybrid origin; its suspected parents include T. minus Linnaeus and T. peltophorum Bentham." |
| 604 | 1940. East, E.M.. The distribution of self-sterility in the flowering plants. Proceedings of the American Philosophical Society. 82: 449-518. | [Self-compatible or apomictic? Probably Yes] "Little is known of the Tropaeolaceae. The stocks of the Nasturtium, Tropaeolum majus L., are protandrous and generally self-fertile. I found one strain that was nearly homogamous and seemed to be self-sterile, though the pollen was good; but my observations were not extensive enough to enable me to be certain about the point" |
| 605 | 2007. Goulson, D./Cruise, J.L./Sparrow, K.R./Harris, A.J./Park, K.J./Tinsley, M.C./Gilburn, A.S.. Choosing rewarding flowers; perceptual limitations and innate preferences influence decision making in bumblebees and honeybees. Behavioral Ecology and Socio | [Requires specialist pollinators? No] "In this study, we examine discrimination by foraging bees among flowers of nasturtium, Tropaeolum majus. Bee visitors included carpenter bees, Xylocopa violacea, which were primary nectar robbers; honeybees, Apis mellifera, which either acted as secondary nectar robbers or gathered pollen legitimately and bumblebees, Bombus hortorum, which were the only bees able to gather nectar legitimately." |
| 606 | 1988. Esler, A.E.. The naturalisation of plants in urban Auckland, New Zealand 5. Success of the alien species. New Zealand Journal of Botany. 26(4): 565-584. | [Reproduction by vegetative fragmentation? No] "Table 1. Success attribute ratings on a 0-3 scale for Class 1 species with fast, medium, and slow population growth." [Tropaeolum majus - Cloning ability = 0] |
| 606 | 2013. Weedbusters. Tropaeolum majus. http://weedbusters.co.nz/weed_info/detail.asp?WeedID=80 [Accessed 06 June 2013] | [Reproduction by vegetative fragmentation? No, but resprouts] "How does it spread? Soil movement, dumped vegetation, scrambling stems and possibly birds and browsing mammals." … "What can I do to stop it coming back? Succulent stems and capsules resprout readily. Check for resprouting stems, follow up 6 monthly. Replant sites densely to lower the light levels." |
| 607 | 2013. Weedbusters. Tropaeolum majus. http://weedbusters.co.nz/weed_info/detail.asp?WeedID=80 [Accessed 06 June 2013] | [Minimum generative time (years)? 1] "Scrambling or trailing, hairless, aromatic, annual or short-lived perennial, occasionally climbing to 2 m high…" … "Quick maturing, produces many viable seeds, smothering habit and rapid growth…" |
| 701 | 2007. Williams, P.A./Hayes, L.M.. Emerging weed issues for the West Coast Regional Council and their prospects for biocontrol. Landcare Research Contract Report: LC0607/109. Landcare Research, New Zealand | [Propagules likely to be dispersed unintentionally ? Yes] "Fairly common in roadside scrub and garden dumping areas." |
| 701 | 2012. Rusterholz, H.-P./Wirz, D./Baur, B.. Garden waste deposits as a source for non-native plants in mixed deciduous forests. Applied Vegetation Science. 15: 329–337. | [Propagules likely to be dispersed unintentionally ? Yes] "In our study, garden waste disposal sites and control sites differed in species composition of the above-ground vegetation. In contrast to other studies (e.g. Gilbert & Lechowicz 2005; Kulmatiski 2006), we recorded a high proportion of annual species including Impatiens glandulifera, Impatiens parviflora, Tropaeolum majus and Euphorbia lathyris in the disposal sites." |
| 701 | 2013. Weedbusters. Tropaeolum majus. http://weedbusters.co.nz/weed_info/detail.asp?WeedID=80 [Accessed 06 June 2013] | [Propagules likely to be dispersed unintentionally Yes] "How does it spread? Soil movement, dumped vegetation, scrambling stems and possibly birds and browsing mammals. Common sources include roadsides, tips, gardens." |
| 702 | 2000. Whistler, W.A.. Tropical Ornamentals: A Guide. Timber Press, Portland, OR | [Propagules dispersed intentionally by people? Yes] "It is cultivated for its attractive, colorful flowers, the leaves are edible, and the seeds are sometimes used as a spice." |
| 703 | 2010. Flora of North America Editorial Committee. Flora of North America: North of Mexico, Volume 7. Magnoliophyta: Salicaceae to Brassicaceae. Oxford University Press, Oxford, UK | [Propagules likely to disperse as a produce contaminant? No] "Fruits oblate, 1.5-2 cm diam. Seeds 5-8 mm diam." [No evidence, and fruits and seeds are relatively large and conspicuous] |
| 704 | 2009. Chambert, S./James, C.S.. Sorting of seeds by hydrochory. River Research and Applications. 25: 48–61. | [Propagules adapted to wind dispersal? No] "...heavy, round Nasturtium seeds can roll down the slope relatively easily." [Seeds also buoyant, and dispersed by water] |
| 705 | 1988. Beckett, E.. Wild Flowers of Majorca, Minorca and Ibiza: With Keys to the Flora of the Balearic Islands. A.A. Balkema, Rotterdam, Netherlands | [Propagules water dispersed? Yes] "…it is widely naturalized on the banks of streams and other moist places here." |
| 705 | 2009. Chambert, S./James, C.S.. Sorting of seeds by hydrochory. River Research and Applications. 25: 48–61. | [Propagules water dispersed? Yes] "Table I. Physical characteristics and settling velocities of the seeds tested" [Tropaeolum majus = Buoyant] |
| 706 | 1988. Esler, A.E.. The naturalisation of plants in urban Auckland, New Zealand 5. Success of the alien species. New Zealand Journal of Botany. 26(4): 565-584. | [Propagules bird dispersed? No] "Seeds without structures aiding ready dispersal are a feature of Acanthus mollis, Chasmanthe floribunda, Conium maculatum, Cyperus congestus, Lepidium bonariensis, Paspalum distichum, Plectranthus ciliatus, Polygonum capitatum, Ranunculus muricatus, Sparaxis bulbif era, Teline monspessulana, Tropaeolum majus, and Viola odorata." |

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| 707 | 1988. Esler, A.E.. The naturalisation of plants in urban Auckland, New Zealand 5. Success of the alien species. New Zealand Journal of Botany. 26(4): 565-584. | [Propagules dispersed by other animals (externally)? No] "Seeds without structures aiding ready dispersal are a feature of Acanthus mollis, Chasmanthe floribunda, Conium maculatum, Cyperus congestus, Lepidium bonariensis, Paspalum distichum, Plectranthus ciliatus, Polygonum capitatum, Ranunculus muricatus, Sparaxis bulbif era, Teline monspessulana, Tropaeolum majus, and Viola odorata." |
| 708 | 2013. Weedbusters. Tropaeolum majus. http://weedbusters.co.nz/weed_info/detail.asp?WedID=80 [Accessed 06 June 2013] | [Propagules survive passage through the gut? Unknown] "How does it spread? Soil movement, dumped vegetation, scrambling stems and possibly birds and browsing mammals." [Seeds may be consumed by animals browsing on foliage or flowers] |
| 801 | 2013. Weedbusters. Tropaeolum majus. http://weedbusters.co.nz/weed_info/detail.asp?WedID=80 [Accessed 06 June 2013] | [Prolific seed production (>1000/m2)? Unknown] "Solitary or clustered tubular scarlet orange or yellow flowers (4 cm diameter) with 5 irregular petals are produced from October to May, followed by succulent, green, 3-sided seed capsules (10-14 mm long) with caper-like seeds. Why is it weedy? Quick maturing, produces many viable seeds, smothering habit and rapid growth." |
| 802 | 2008. Royal Botanic Gardens Kew. Seed Information Database (SID). Version 7.1. http://data.kew.org/sid/ | [Evidence that a persistent propagule bank is formed (>1 yr)? Possibly Yes] "Storage Behaviour: Orthodox Storage Conditions: 61% germination following 10 years storage in laboratory conditions (Harrington, 1972); seeds not damaged from exposure to liquid nitrogen (Stanwood & Bass, 1981); initial germination 86% with seeds at 8.2% mc, 85% germination after 30 days storage in liquid nitrogen (Stanwood & Roos, 1979); seeds maintained for 3 years in commercial storage conditions (Priestley, 1986)" |
| 803 | 2013. Weedbusters. Tropaeolum majus. http://weedbusters.co.nz/weed_info/detail.asp?WedID=80 [Accessed 06 June 2013] | [Well controlled by herbicides? Presumably Yes] "What can I do to get rid of it? Easy to control. 1. Pull up all vegetation (all year round). Dispose of at a refuse transfer station or burn or bury deeply. 2. Spray (spring-summer): glyphosate (10ml/L + penetrant)." |
| 804 | 2013. Weedbusters. Tropaeolum majus. http://weedbusters.co.nz/weed_info/detail.asp?WedID=80 [Accessed 06 June 2013] | [Tolerates, or benefits from, mutilation, cultivation, or fire? Yes] "What can I do to stop it coming back? Succulent stems and capsules resprout readily. Check for resprouting stems, follow up 6 monthly. Replant sites densely to lower the light levels." |
| 805 | 2002. Froude, V.. Biological control options for invasive weeds of New Zealand protected areas. Science for Conservation 199. Department of Conservation, Wellington, New Zealand | [Effective natural enemies present locally (e.g. introduced biocontrol agents)? Unknown for Hawaii] "Tropaeolum majus - International and New Zealand Biocontrol Projects (Number, Location and Stage = None known] |

**Summary of Risk Traits**

**High Risk / Undesirable Traits**

- Naturalized in Hawaiian Islands and several other locations
- Thrives in higher elevation tropical climates
- Controlled in Hawaii and other locations because of threats to natural environment
- Other Tropaeolum also have become invasive
- Shade tolerant
- Tolerates many soil conditions (and potentially able to exploit many different habitat types)
- Smothering habit
- Reaches maturity in under 1 year
- Spread by garden waste, water dispersed seeds, gravity and intentionally be people
- Will resprout from cut stems

**Low Risk / Desirable Traits**

- Edible leaves, flower buds and seeds
- Non-toxic
- Landscaping and ornamental value
- May be effectively controlled with herbicides