Key Words: High Risk, Widely Naturalized, Agricultural Weed, Tropical Vine, Seed Contaminant

Family: ***Convolvulaceae***

Taxon: ***Ipomoea triloba***

Synonym: *Ipomoea krugii Urb.*

Common Name: little bell
three-lobed morning-glory

Questionaire : current 20090513 **Assessor:** Chuck Chimera **Designation:** H(HPWRA)
Status: Assessor Approved **Data Entry Person:** Chuck Chimera **WRA Score 15**

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)**	**High**
202	**Quality of climate match data**	**(0-low; 1-intermediate; 2-high) (See Appendix 2)**	**High**
203	**Broad climate suitability (environmental versatility)**	**y=1, n=0**	**n**
204	**Native or naturalized in regions with tropical or subtropical climates**	**y=1, n=0**	**y**
205	**Does the species have a history of repeated introductions outside its natural range?**	**y=-2, ?=-1, n=0**	**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)**	**y**
304	**Environmental weed**	**n=0, y = 2*multiplier (see Appendix 2)**	
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**	**n**
403	**Parasitic**	**y=1, n=0**	**n**
404	**Unpalatable to grazing animals**	**y=1, n=-1**	
405	**Toxic to animals**	**y=1, n=0**	**y**
406	**Host for recognized pests and pathogens**	**y=1, n=0**	
407	**Causes allergies or is otherwise toxic to humans**	**y=1, n=0**	**y**
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**	
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**	**y**
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**	**y**
605	**Requires specialist pollinators**	**y=-1, n=0**	**n**
606	**Reproduction by vegetative fragmentation**	**y=1, n=-1**	**n**
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**	
702	**Propagules dispersed intentionally by people**	**y=1, n=-1**	
703	**Propagules likely to disperse as a produce contaminant**	**y=1, n=-1**	**y**
704	**Propagules adapted to wind dispersal**	**y=1, n=-1**	**n**
705	**Propagules water dispersed**	**y=1, n=-1**	
706	**Propagules bird dispersed**	**y=1, n=-1**	**n**
707	**Propagules dispersed by other animals (externally)**	**y=1, n=-1**	
708	**Propagules survive passage through the gut**	**y=1, n=-1**	**y**
801	**Prolific seed production (>1000/m2)**	**y=1, n=-1**	**n**
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**	
805	**Effective natural enemies present locally (e.g. introduced biocontrol agents)**	**y=-1, n=1**	**n**

Designation: H(HPWRA) **WRA Score** **15**

Supporting Data:

101	1997. Holm, L.G./Doll, J./Holm, E./Pancho, J.V./Herberger, J.P.. World weeds: natural histories and distribution. John Wiley and Sons, Inc., New York, NY	[Is the species highly domesticated? No evidence]
102	2012. WRA Specialist. Personal Communication.	NA
103	2012. WRA Specialist. Personal Communication.	NA
201	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.	[Species suited to tropical or subtropical climate(s) 2-High] "Native to the West Indies…"
202	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.	[Quality of climate match data 2-High]
203	1997. Holm, L.G./Doll, J./Holm, E./Pancho, J.V./Herberger, J.P.. World weeds: natural histories and distribution. John Wiley and Sons, Inc., New York, NY	[Broad climate suitability (environmental versatility)? No] "It may have been native to tropical America but is now widespread in the tropical regions of the world." … "It is found from sea level to 750 m altitude"
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] "Native to the West Indies…"
204	2012. USDA ARS National Genetic Resources Program. Germplasm Resources Information Network - (GRIN). http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl	[Native or naturalized in regions with tropical or subtropical climates? Yes] "widely naturalized in tropics"
205	2012. WRA Specialist. Personal Communication.	[Does the species have a history of repeated introductions outside its natural range? Yes] Widely introduced and naturalized throughout the tropics
301	1995. Wu, Z.Y./Raven, P.H. (eds.). Flora of China Vol. 16 (Gentianaceae through Boraginaceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	[Naturalized beyond native range? Yes] "Roadsides or fields; 0–800 m. Anhui, Guangdong, S Shaanxi, Taiwan, Zhejiang [Indonesia, Japan (Ryukyu Islands), Malaysia, New Guinea, Philippines, Sri Lanka, Thailand, Vietnam; North America (native to the West Indies), Pacific Islands, now a circumtropical weed]"
301	1998. Agyakwa, C.W./Akobundu, I.O.. A handbook of West African weeds. International Institute of Tropical Agriculture, Ibadan, Nigeria	[Naturalized beyond native range? Yes] "A common weed of cultivation, roadsides and homesteads. Probably introduced as an ornamental but has now become a widespread weed."
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] "naturalized in low elevation, dry to mesic, disturbed sites"
301	2007. Oppenheimer, H.L.. New plant records from Moloka'i, Lāna'i, Maui, and Hawai'i for 2006. Bishop Museum Occasional Papers. 96: 17-34.	[Naturalized beyond native range? Yes] "Another commonly naturalized morning glory in Hawai'i, little bell was previously documented from the islands of Midway Atoll, Kaua'i, O'ahu, Moloka'i, Maui, and Hawai'I (Wagner et al. 1999: 560; Oppenheimer & Bartlett 2002: 6; Oppenheimer 2006 : 11). It is a true morning glory, with flowers closing by mid-day. In addition to the collection cited here, it was also observed growing on fences and in hedges near Lāna'i City."
301	2010. CSIRO. Australian Tropical Rainforest Plants Edition 6 - Ipomoea triloba. http://keys.trin.org.au/key-server/data/0e0f0504-0103-430d-8004-060d07080d04/media/Html/taxon/Ipomoea_triloba.htm [Accessed 23 Oct 2012]	[Naturalized beyond native range? Yes] "An introduced species originally from tropical America, now a pantropic weed. Naturalized in NT, CYP, NEQ and southwards as far as south eastern Queensland. Altitudinal range from near sea level to 250 m."
301	2012. USDA ARS National Genetic Resources Program. Germplasm Resources Information Network - (GRIN). http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl	[Naturalized beyond native range? Yes] "widely naturalized in tropics"
302	1975. Henty, E.E./Pritchard, G.H.. Weeds of New Guinea and their control. 2nd edition. Department of Forests, Division of Botany, Lae, Papua New Guinea	[Garden/amenity/disturbance weed? A disturbance weed with negative impacts on agriculture] "a weed of roadsides, hedges and gardens; common in a few coastal areas"

302	1997. Holm, L.G./Doll, J./Holm, E./Pancho, J.V./Herberger, J.P.. World weeds: natural histories and distribution. John Wiley and Sons, Inc., New York, NY	[Garden/amenity/disturbance weed? A disturbance weed with negative impacts on agriculture]
303	1997. Holm, L.G./Doll, J./Holm, E./Pancho, J.V./Herberger, J.P.. World weeds: natural histories and distribution. John Wiley and Sons, Inc., New York, NY	[Agricultural/forestry/horticultural weed? Yes] "This twining, fast-growing herbaceous plant is troublesome in a very large number of man's crops." … "It is found in upland cultivated crops, grasslands, waysides and waste places, and because of its creeping, twining habit , may overwhelm other vegetation in farmer's fields and in natural areas. It is found from sea level to 750 m altitude" … "I. triloba behaves as a weed on all of the continents and it troubles man in more than 40 of his crops. It is a weed in more than 40 countries and it is interesting that almost all of these countries are within 15^{o} C isotherms north and south of the equator."
303	2007. DiTomaso, J.. Weeds of California and Other Western States, Volume 2. UCANR Publications, Oakland, CA	[Agricultural/forestry/horticultural weed? Yes] "Threelobe morning glory is a noxious weed of crop fields in many tropical and subtropical regions of the world. It is state-listed as a noxious weed in Arizona (restricted), Florida, and North Carolina (class A)."
303	2009. Martin, R./Chanthy, P.. Weeds of Upland Crops in Cambodia. ACIAR Monograph No. 141. Australian Centre for International Agricultural Research (ACIAR), Canberra	[Agricultural/forestry/horticultural weed? Yes] "It can grow over other vegetation in farmers' fields and has the capacity to smother crops. It has been recorded as a weed in maize, peanuts, upland rice and sugarcane."
303	2012. Chauhan, B.S./Abugho, S.B.. Threelobe Morningglory (Ipomoea triloba) Germination and Response to Herbicides. Weed Science. 60(2): 199-204.	[Agricultural/forestry/horticultural weed? Yes] "This species is reported as a weed of 40 crops in more than 40 countries. Threelobe morningglory is a troublesome weed of upland rice, corn (Zea mays L.), peanut (Arachis hypogaea L.), sugarcane (Saccharum officinarum L.), sorghum [Sorghum bicolor (L.) Moench], soybean [Glycine max (L.) Merr.], coffee (Coffea spp.), and banana (Musa spp.). This weed has been reported to occur in rice in Bangladesh, India, Indonesia, the Philippines, and Sri Lanka (Moody 1989). In the Philippines, it is one of the main weeds in upland rice and its seedlings may emerge before rice seedlings and smother the crop if left uncontrolled (Holm et al. 1997)."
304	2012. Queensland Government. Weeds of Australia - Pink convolvulus - Ipomoea triloba. http://keyserver.lucidcentral.org/weeds/data/03030800-0b07-490a-8d04-0605030c0f01/media/Html/Ipomoea_triloba.htm [Accessed 23 Oct 2012]	[Environmental weed? Potentially. Primarily a weed of disturbed places and agriculture] "Pink convolvulus (Ipomoea triloba) is regarded as an environmental weed in the Northern Territory and northern Queensland, and as an emerging or potential environmental weed in the northern parts of Western Australia. Because of its creeping and twining habit, it may overwhelm other vegetation in natural areas and is a potentially serious weed of the tropical regions of Australia. This species grows in various habitats from open, sunny hillsides to riparian areas and relatively dense forests."
305	2003. Weber, E.. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	[Congeneric weed? Yes] "Ipomoea cairica … invasive because its trailing and climbing stems can completely smother native shrubs and trees, impeding their growth and preventing their regeneration." [Ipomoea aquatica and I. indica also regarded as invasive by this book]
401	1997. Holm, L.G./Doll, J./Holm, E./Pancho, J.V./Herberger, J.P.. World weeds: natural histories and distribution. John Wiley and Sons, Inc., New York, NY	[Produces spines, thorns or burrs? No] "An annual herb with twining stems, 1 to 3 m long, glabrous except the inflorescence; stems somewhat angled, about 3 mm thick, milky; leaves broadly ovate to orbicular in outline, entire, coarsely dentate to more or less deeply 3-lobed, center lobe may be pointed, base broadly cordate, 4 to 11 cm long, often nearly as wide; petiole slender, 3 to 10 cm, glabrous or sometimes minutely tuberculate"
402	1992. Kim, S.Y.. Allelopathic activity and isolation of a toxic compound in sorghum (Sorghum vulgare Pers.). PhD Dissertation. Philippines Univ., Los Banos	[Allelopathic? No evidence. I. triloba is evaluated as the target of allelopathic effects by other plants in this and other studies] "The allelopathic activity of sorghum plants was species specific, and depended on source and concentration. Germination, and shoot and root length of all test species were inhibited by the different concentrations of the stem extract. Among the crop species, radish showed the most inhibition, followed by wheat and rice. Maize was the least sensitive species. Of the weed species, Ipomoea triloba was most inhibited followed by Echinochloa colona and Rottboellia cochinchinensis. The water extracts of leaves, stems, and roots significantly inhibited germination and seedling growth in E. colona and radish. The stem extract gave the greatest inhibitory effect on E. colona and radish. In the greenhouse trial, sorghum stem residue placed on the soil surface as mulch significantly inhibited seedling growth in E. colona and radish, but not that in rice. Sequential partitioning of the stem extract against a series of solvents with increasing polarity separated the most active compound in the ethyl ether fraction. Further separation of the ethyl ether fraction at different pH (pH 2-11) compound showed that the phytotoxic compounds were acid. The most from the stem extract was isolated by rapid chromatography (TLC) and high pressure liquid chromatography (HPLC). "

403	1997. Holm, L.G./Doll, J./Holm, E./Pancho, J.V./Herberger, J.P.. World weeds: natural histories and distribution. John Wiley and Sons, Inc., New York, NY	[Parasitic? No evidence]
404	2012. WRA Specialist. Personal Communication.	[Unpalatable to grazing animals? Unknown]
405	2007. DiTomaso, J.. Weeds of California and Other Western States, Volume 2. UCANR Publications, Oakland, CA	[Toxic to animals? Yes] "Like Japanese and tall morning glory, seeds of three-lobe morning glory contain alkaloids that are toxic to humans and animals when ingested."
406	2007. Kaur, R./Brito, J.A./Rich, J.R.. Host suitability of selected weed species to five Meloidogyne species.. Nematropica. 37(1): 107-120.	[Host for recognized pests and pathogens? Potential host of nematodes] "Weeds enable plant-parasitic nematodes to survive in the presence or absence of a crop, providing a source of nematode inoculum for the following season. Host suitability studies of 22 weed species commonly found in Florida, USA to five root knot nematode species (Meloidogyne arenaria race 1, M. floridensis , M. incognita race 4, M. javanica race 1, and M. mayaguensis) were conducted under greenhouse conditions. Root-galling, egg mass indices and eggs per g of root were recorded at plant harvest. Reproduction factor (Rf = final population/initial population) was calculated to determine the host status for each plant species. Nine weed species (Abutilon theophrasti , Amaranthus retroflexus , A. Spinosus , Cnidoscolus stimulosus , Cucumis anguria , Dichondra repens , Ipomoea triloba , Leonotis nepetaefolia , and Phytolacca americana) were good hosts (Rf ≥ 1) to the five root-knot nematode species evaluated, with average gall indices ranging from 4.2-8.0, and egg mass indices ranging from 2.8-5.0."
407	2007. DiTomaso, J.. Weeds of California and Other Western States, Volume 2. UCANR Publications, Oakland, CA	[Causes allergies or is otherwise toxic to humans? Yes, but only if seeds are ingested] "Like Japanese and tall morning glory, seeds of three-lobe morning glory contain alkaloids that are toxic to humans and animals when ingested."
408	1997. Holm, L.G./Doll, J./Holm, E./Pancho, J.V./Herberger, J.P.. World weeds: natural histories and distribution. John Wiley and Sons, Inc., New York, NY	[Creates a fire hazard in natural ecosystems? No evidence. Not listed among detrimental impacts]
409	1971. Wiggins, I.L./Porter, D.M.. Flora of the Galapágos Islands. Stanford University Press, Stanford, CA	[Is a shade tolerant plant at some stage of its life cycle? Yes] "In various habitats from open, sunny hillsides to relatively dense forest in partial sun or deep shade"
410	2007. DiTomaso, J.. Weeds of California and Other Western States, Volume 2. UCANR Publications, Oakland, CA	Tolerates a wide range of soil conditions ? Probably yes and suggested by widespread distribution] "Threelobe morning glory is a noxious weed of crop fields in many tropical and subtropical regions of the world. It is state-listed as a noxious weed in Arizona (restricted), Florida, and North Carolina (class A)."
410	2012. Dave's Gardern. PlantFiles: Three lobe Morning Glory, Little Bell Morning Glory - Ipomoea triloba. http://davesgarden.com/guides/pf/go/31837/ [Accessed 23 Oct 2012]	[Tolerates a wide range of soil conditions?] "Soil pH requirements: 6.1 to 6.5 (mildly acidic) 6.6 to 7.5 (neutral) 7.6 to 7.8 (mildly alkaline)"
411	1995. Wu, Z.Y./Raven, P.H. (eds.). Flora of China Vol. 16 (Gentianaceae through Boraginaceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	[Climbing or smothering growth habit? Yes] "Herbs annual. Stems twining or prostrate, glabrous or nodes sparsely pubescent."
412	1997. Holm, L.G./Doll, J./Holm, E./Pancho, J.V./Herberger, J.P.. World weeds: natural histories and distribution. John Wiley and Sons, Inc., New York, NY	[Forms dense thickets? Not listed among impacts]
412	2007. DiTomaso, J.. Weeds of California and Other Western States, Volume 2. UCANR Publications, Oakland, CA	[Forms dense thickets? Not listed among impacts]
501	1997. Holm, L.G./Doll, J./Holm, E./Pancho, J.V./Herberger, J.P.. World weeds: natural histories and distribution. John Wiley and Sons, Inc., New York, NY	[Aquatic? No] "It is found from sea level to 750 m altitude"
502	2012. USDA ARS National Genetic Resources Program. Germplasm Resources Information Network - (GRIN). http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl	[Grass? No] Convolvulaceae
503	2012. USDA ARS National Genetic Resources Program. Germplasm Resources Information Network - (GRIN). http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl	[Nitrogen fixing woody plant? No] Convolvulaceae

504	1997. Holm, L.G./Doll, J./Holm, E./Pancho, J.V./Herberger, J.P.. World weeds: natural histories and distribution. John Wiley and Sons, Inc., New York, NY	[Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)? No] "An annual herb with twining stems, 1 to 3 m long, glabrous except the inflorescence; stems somewhat angled, about 3 mm thick, milky; leaves broadly ovate to orbicular in outline, entire, coarsely dentate to more or less deeply 3-lobed, center lobe may be pointed, base broadly cordate, 4 to 11 cm long, often nearly as wide; petiole slender, 3 to 10 cm, glabrous or sometimes minutely tuberculate"
601	1997. Holm, L.G./Doll, J./Holm, E./Pancho, J.V./Herberger, J.P.. World weeds: natural histories and distribution. John Wiley and Sons, Inc., New York, NY	[Evidence of substantial reproductive failure in native habitat? No evidence]
602	1997. Holm, L.G./Doll, J./Holm, E./Pancho, J.V./Herberger, J.P.. World weeds: natural histories and distribution. John Wiley and Sons, Inc., New York, NY	[Produces viable seed? Yes] "It reproduces by seed, is self-fertile, and can reproduce about 180 seeds/plant."
603	1965. Jones, A./Deonier, M.T.. Interspecific Crosses Among Ipomoea lacunosa, I. ramoni, I. trichocarpa, and I. triloba. Botanical Gazette. 126(3): 226-232.	[Hybridizes naturally? Possibly] "Chromosome-pairing at metaphase I in pollen mother cells of interspecific hybrids among Ipomoea lacunosa L., I. racrnoni Choisy, I. tricliocarpa Ell.. and I. triloba L. was as good as that of the parental species, indicating a common genome for all four species."
604	1997. Holm, L.G./Doll, J./Holm, E./Pancho, J.V./Herberger, J.P.. World weeds: natural histories and distribution. John Wiley and Sons, Inc., New York, NY	[Self-compatible or apomictic? Yes] "It reproduces by seed, is self-fertile, and can reproduce about 180 seeds/plant."
605	1970. Schlising, R.A.. Sequence and Timing of Bee Foraging in Flowers of Ipomoea and Aniseia (Convolulaceae). Ecology. 51(6): 1061-1067.	[Requires specialist pollinators? No] "Flowers of Ipomoea triloba, I. setifera, I. battatas, and Aniseia martinicensis growing in three areas of disturbed vegetation in Costa Rica were visited by a large number of foraging insects during the dry season months of February and March 1967. The commonest foragers collecting pollen or nectar, or both, were bees in the families Anthophoridae, Apidae, Colletidae, and Halictidae. The species of bees varied with the locality and with the species of plant, but an ordered and predictable sequence in groups of foragers was seen throughout the few hours in the morning that the flowers remained open. Each species of bee had a foraging period for a definite portion of the morning, and the peak activity was often at a different time for each species of bee, usually in mid-or late morning. The average time of an individual bee visit to a flower varied also, and the longest individual visits were early in the morning in at least four genera. The average number of insect visits to 106 flowers was about 20, but ranged from 1 to 142. These flowers seemed morphologically well suited for cross pollination, and the bees foraging in them doubtless served as effective pollen vectors." … "One of the species in this study, Ipomoea triloba, is reported to be self fertile (Jones 1968), and thus cross-pollination would not be necessary for seed set."
606	1997. Holm, L.G./Doll, J./Holm, E./Pancho, J.V./Herberger, J.P.. World weeds: natural histories and distribution. John Wiley and Sons, Inc., New York, NY	[Reproduction by vegetative fragmentation? No evidence] "It reproduces by seed, is self-fertile, and can reproduce about 180 seeds/plant."
607	1997. Holm, L.G./Doll, J./Holm, E./Pancho, J.V./Herberger, J.P.. World weeds: natural histories and distribution. John Wiley and Sons, Inc., New York, NY	[Minimum generative time (years)? 1] "An annual herb with twining stems, 1 to 3 m long"
701	2012. Chauhan, B.S./Abugho, S.B.. Threelobe Morningglory (Ipomoea triloba) Germination and Response to Herbicides. Weed Science. 60(2): 199-204.	[Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)? Probably Yes] "In addition to occurrence in crop fields, it is found in grasslands, waste places, and roadsides."
702	2012. WRA Specialist. Personal Communication.	[Propagules dispersed intentionally by people? Mostly a weed of cultivated crops, and probably now spread inadvertently]

703	1993. Elliot, P./Fujisaka, S./Dapusala, A./Jayson, E.. Farmers' upland rice seed management practices & resulting weed seed contamination. 24th Ann. Scientific Mtg of the Pest Mgt Council of the Philippines. May 1993. Int. Rice Research Inst., Los Banos,	[Propagules likely to disperse as a produce contaminant? Yes] "At the onset of the 1992 wet season, 54 randomly selected upland rice farmers in several adjoining municipalities of Bukidnon and 37 in Claveria, Misamis Oriental [Philippines], were interviewed regarding their seed selection and weed control practices, worst weeds, and perceptions regarding the origin and spread of the same weeds. Most of the farmers in Bukidnon (69%) and Claveria (24%) hand weeded their upland rice crop twice. Similarly, the majority perceived that weeds were introduced into their farms through land preparation equipment, animals, birds, wind and water. Twenty and 22 weed species belonging to 9 families were identified in farmers' seed stocks in Bukidnon and Claveria, respectively. Seventy percent of the seed samples collected from Bukidnon and 83% of those from Claveria were contaminated with weeds. Major weed contaminants in Bukidnon were Rottboelia cochinchinensis (Lour.) W.D. Clayton (in 59% of the total number of samples, a mean of 68 seeds per contaminated sample), Digitaria setigera Roth ex Roem, and Schult. (in 18% of the total number of samples, a mean of 14 seeds per contaminated sample) and Ipomoea triloba L. (in 16% of the total number of samples, a mean of 4 seeds per contaminated sample). In Claveria, major weed contaminants were R. cochinchinensis (in 72% of the total number of samples, a mean of 82 seeds per contaminated sample), Pennisetum polystachyon (L.) Schult (in 28% of the total number of samples, a mean of 11 seeds per contaminated sample). R. cochinchinensis was considered the worst weed in upland rice by 91% of the respondents in Bukidnon and 89% in Claveria."
704	1995. Wu, Z.Y./Raven, P.H. (eds.). Flora of China Vol. 16 (Gentianaceae through Boraginaceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	[Propagules adapted to wind dispersal? No. Possibly blown short distances, but not adapted specifically for wind dispersal] "Capsule ± globular, 5–6 mm, bristly pubescent, apiculate, 2-loculed, 4-valved. Seeds dark brown, ca. 3.5 mm, glabrous. 2n = 30."
704	2006. Ogunwenmo, K.O.. Variation in fruit and seed morphology, germination and seedling behaviour of some taxa of Ipomoea L. (Convolvulaceae). Feddes Repertorium. 117(3–4): 207-216.	[Propagules adapted to wind dispersal? No] "Structural modifications for fruit and seed dispersal aided mechanisms were not pronounced hence, dispersal was largely localized. More applicable were the well developed twining, creeping, trailing and climbing habits of the shoot extended dispersal." [Growth of vines and responsible for localized dispersal of seeds]
705	2010. CSIRO. Australian Tropical Rainforest Plants Edition 6 - Ipomoea triloba. http://keys.trin.org.au/key-server/data/0e0f0504-0103-430d-8004-060d07080d04/media/Html/taxon/Ipomoea_triloba.htm [Accessed 23 Oct 2012]	[Propagules water dispersed? Probably Yes] "Usually grows in riparian situations in open forest areas but also found along roads in rain forest."
705	2012. Queensland Government. Weeds of Australia - Pink convolvulus - Ipomoea triloba. http://keyserver.lucidcentral.org/weeds/data/03030800-0b07-490a-8d04-0605030c0f01/media/Html/Ipomoea_triloba.htm [Accessed 23 Oct 2012]	[Propagules water dispersed? Probably Yes] "In Western Australia, it is currently restricted to the banks of billabongs and in floodplain vegetation at a few sites in the Kimberley region. However, it is a recent introduction to Western Australia and is thought to pose a significant threat to this area."
706	1995. Wu, Z.Y./Raven, P.H. (eds.). Flora of China Vol. 16 (Gentianaceae through Boraginaceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	[Propagules bird dispersed? No] "Capsule ± globular, 5–6 mm, bristly pubescent, apiculate, 2-loculed, 4-valved. Seeds dark brown, ca. 3.5 mm, glabrous. 2n = 30." [Not fleshy-fruited]
707	1982. Clark, D.A.. Foraging Behavior of a Vertebrate Omnivore (Rattus Rattus): Meal Structure, Sampling, and Diet Breadth. Ecology. 63(3): 763-772.	[Propagules dispersed by other animals (externally)? Possibly, if seed eating rodents cache seeds for later consumption] "Diet selection by the omnivorous black rat (Rattus rattus) was examined by detailed analysis of stomach contents of individuals from seven wild populations in the Galapagos Islands." … "87% ate arthropods and Ipomoea triloba seeds…"
708	2012. Blake, S./Wikelski, M./Cabrera, F./Guezou, A./Silva, M./Sadeghayobi, E./Yackulic, C.B./Jaramillo, P.. Seed dispersal by Galapagos tortoises. Journal of Biogeography. 39: 1961-1972.	[Propagules survive passage through the gut? Yes] "Table 1 Summary data indicating the frequency of occurrence of intact seeds in dung piles of tortoises (Chelonoidis nigra) found in farmland and in the Galapagos National Park on the island of Santa Cruz." [Ipomoea triloba seeds passed intact through tortoises]
801	1997. Holm, L.G./Doll, J./Holm, E./Pancho, J.V./Herberger, J.P.. World weeds: natural histories and distribution. John Wiley and Sons, Inc., New York, NY	[Prolific seed production (>1000/m2)? No] "It reproduces by seed, is self-fertile, and can reproduce about 180 seeds/plant."

802	2006. Ogunwenmo, K.O.. Variation in fruit and seed morphology, germination and seedling behaviour of some taxa of Ipomoea L. (Convolvulaceae). Feddes Repertorium. 117(3–4): 207-216.	[Evidence that a persistent propagule bank is formed (>1 yr)? Possibly No] "Seed germination varied among the taxa of Ipomoea in soil. Whereas, some taxa observed a period of dormancy ranging from three to over six months in soil [I. pileata ROXB. subsp. uniflora UGBOR. & OGUNW., I. cairica (L.) SWEET var. cairica, I. pes-caprae (L.) R.BR. subsp. brasiliensis (L.) OOSTSTR. and I. carnea JACQ. subsp. fistulosa (MART. ex CHOISY) D.F.AUSTIN], others did not [I. triloba L.…."
802	2012. Chauhan, B.S./Abugho, S.B.. Threelobe Morningglory (Ipomoea triloba) Germination and Response to Herbicides. Weed Science. 60(2): 199-204.	[Evidence that a persistent propagule bank is formed (>1 yr)? Unknown] "To avoid the reinfestation, it is clearly necessary to understand the longevity of the threelobe morningglory seeds in the soil seed bank."
803	2012. Chauhan, B.S./Abugho, S.B.. Threelobe Morningglory (Ipomoea triloba) Germination and Response to Herbicides. Weed Science. 60(2): 199-204.	[Well controlled by herbicides? Yes] "The herbicide 2,4-D at 400 g ai ha21 provided excellent control of threelobe morningglory when applied at the four-leaf (100%) and six-leaf (97%) stages. However, at the eight-leaf stage, percent control was reduced to 67% and herbicide rate had to be increased twofold to achieve 95% control."
804	2012. WRA Specialist. Personal Communication.	[Tolerates, or benefits from, mutilation, cultivation, or fire? Unknown, but common occurrence as a weed of crops suggests that cultivation and the inherent disturbance favors the establishment and spread of this species]
805	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.	[Effective natural enemies present locally (e.g. introduced biocontrol agents)? Unlikely, given widespread distribution in the islands]

Summary of Risk Traits

High Risk / Undesirable Traits

- Widely naturalized
- Thrives in tropical climates
- Weed of agriculture
- Related species are invasive
- Toxic seeds
- Shade tolerant
- Smothering growth habit
- Self-fertile
- Can reach reproductive maturity in 1 year (annual life cycle)
- Seeds can become a produce contaminant

Low Risk / Desirable Traits

- Unarmed (no spines, thorns or burrs)
- Well-controlled by herbicides