

Australia/New Zealand Weed Risk Assessment adapted for Florida.

Data used for analysis published in: Gordon, D.R., D.A. Onderdonk, A.M. Fox, R.K. Stocker, and C. Gantz. 2008. Predicting Invasive Plants in Florida using the Australian Weed Risk Assessment. Invasive Plant Science and Management 1: 178-195.

| <i>Paederia foetida (skunk vine)</i> | | | |
|--------------------------------------|--|--------|-------|
| Question number | Question | Answer | Score |
| 1.01 | Is the species highly domesticated? | n | 0 |
| 1.02 | Has the species become naturalised where grown? | | |
| 1.03 | Does the species have weedy races? | | |
| 2.01 | Species suited to Florida's USDA climate zones (0-low; 1-intermediate; 2-high) | 2 | |
| 2.02 | Quality of climate match data (0-low; 1-intermediate; 2-high) | 2 | |
| 2.03 | Broad climate suitability (environmental versatility) | y | 1 |
| 2.04 | Native or naturalized in habitats with periodic inundation | y | 1 |
| 2.05 | Does the species have a history of repeated introductions outside its natural range? | y | |
| 3.01 | Naturalized beyond native range | y | 0 |
| 3.02 | Garden/amenity/disturbance weed | y | 0 |
| 3.03 | Weed of agriculture | y | 0 |
| 3.04 | Environmental weed | n | 0 |
| 3.05 | Congeneric weed | y | 0 |
| 4.01 | Produces spines, thorns or burrs | n | 0 |
| 4.02 | Allelopathic | n | 0 |
| 4.03 | Parasitic | n | 0 |
| 4.04 | Unpalatable to grazing animals | | |
| 4.05 | Toxic to animals | n | 0 |
| 4.06 | Host for recognised pests and pathogens | y | 1 |
| 4.07 | Causes allergies or is otherwise toxic to humans | n | 0 |
| 4.08 | Creates a fire hazard in natural ecosystems | y | 1 |
| 4.09 | Is a shade tolerant plant at some stage of its life cycle | n? | 0 |
| 4.1 | Grows on infertile soils (oligotrophic, limerock, or excessively draining soils) | y | 1 |
| 4.11 | Climbing or smothering growth habit | y | 1 |
| 4.12 | Forms dense thickets | y | 1 |
| 5.01 | Aquatic | n | 0 |

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|--------------------|--|----|-----------|
| 5.02 | Grass | n | 0 |
| 5.03 | Nitrogen fixing woody plant | n | 0 |
| 5.04 | Geophyte | n | 0 |
| 6.01 | Evidence of substantial reproductive failure in native habitat | | |
| 6.02 | Produces viable seed | y | 1 |
| 6.03 | Hybridizes naturally | ? | |
| 6.04 | Self-compatible or apomictic | n | -1 |
| 6.05 | Requires specialist pollinators | n | 0 |
| 6.06 | Reproduction by vegetative fragmentation | y | 1 |
| 6.07 | Minimum generative time (years) | | |
| 7.01 | Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas) | y | 1 |
| 7.02 | Propagules dispersed intentionally by people | y | 1 |
| 7.03 | Propagules likely to disperse as a produce contaminant | n | -1 |
| 7.04 | Propagules adapted to wind dispersal | n | -1 |
| 7.05 | Propagules water dispersed | n | -1 |
| 7.06 | Propagules bird dispersed | y | 1 |
| 7.07 | Propagules dispersed by other animals (externally) | n | -1 |
| 7.08 | Propagules dispersed by other animals (internally) | y | 1 |
| 8.01 | Prolific seed production | | |
| 8.02 | Evidence that a persistent propagule bank is formed (>1 yr) | y? | 1 |
| 8.03 | Well controlled by herbicides | y | -1 |
| 8.04 | Tolerates, or benefits from, mutilation or cultivation | y? | 1 |
| 8.05 | Effective natural enemies present in Florida, or east of the continental divide | | |
| Total Score | | | 19 |

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| Outcome | Reject* |
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*Used secondary screen from: Daehler, C. C., J.L. Denslow, S. Ansari, and H. Kuo. 2004. A risk assessment system for screening out harmful invasive pest plants from Hawaii's and other Pacific islands. *Conserv. Biol.* 18: 360-368.

| section | # questions answered | satisfy minimum? |
|---------|----------------------|------------------|
| A | 8 | yes |
| B | 11 | yes |
| C | 19 | yes |
| total | 38 | yes |

Data collected 2006-2007

| Question number | Reference | Source data |
|-----------------|---|---|
| 1.01 | | no evidence of selection for reduced weediness |
| 1.02 | | |
| 1.03 | | |
| 2.01 | | |
| 2.02 | | |
| 2.03 | Pemberton and Pratt (2002) Skunk vine. Chp. 27 in Van Driesche et al. (eds.) Biological Control of Invasive Plants in the Eastern United States. USDA Forest Service Publication FHTET-2002-04. | "The large native range and the diversity of climatic zones and habitats occupied indicate that skunk vine has exceptionally broad environmental tolerances." |
| 2.04 | Langeland, Stocker, and Brazis (2003) Natural Area Weeds: Skunkvine (<i>Paederia foetida</i>). University of Florida, IFAS Extension, SS-AGR-80 (http://edis.ifas.ufl.edu/pdf/files/WG/WG20800.pdf). | habitats include swamps and floodplains |
| 2.05 | van Valkenburg and Bunyaphratsara, eds. (2001) Plant Resources of South-East Asia. No. 12(2). Medicinal and poisonous plants. Backhuys Publishers, Leiden. | " <i>P. foetida</i> is found from North-East India to China and Japan, southwards to Thailand, Malaysia, Indonesia and the Philippines. It has been introduced into North America (North Carolina, Texas, Louisiana), Hawaii, Christmas Islands, Mauritius and Reunion as an ornamental and escaped." |
| 3.01 | 1. Pemberton and Pratt (2002) Skunk vine. Chp. 27 in Van Driesche et al. (eds.) Biological Control of Invasive Plants in the Eastern United States. USDA Forest Service Publication FHTET-2002-04. 2. Wagner, Herbst, and Sohmer (1999) Manual of the flowering plants of Hawai'i. University of Hawai'i Press/Bishop Museum Press, Honolulu. | 1. "In addition to the United States, skunk vine has naturalized in Mauritius, Reunion, Sri Lanka (probably), New Guinea (probably), and Hawaii." 2. "in Hawaii naturalized and often locally common in disturbed mesic forest, coastal sites, dry forest, and subalpine woodland" |
| 3.02 | L. Loope, pers. comm. | Skunk vine is a weed of disturbed areas in Hawaii. |
| 3.03 | 1. Pemberton and Pratt (2002) Skunk vine. | 1. "On the island of Hawaii, <i>P. foetida</i> is a |

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| | Chp. 27 in Van Driesche et al. (eds.) Biological Control of Invasive Plants in the Eastern United States. USDA Forest Service Publication FHTET-2002-04. 2. PIER, Institute of Pacific Islands Forestry (http://www.hear.org/pier/species/paederia_foetida.htm). | very serious weed in nurseries producing ornamental foliage plants. The weed infests field plantings used for propagation." 2. a weed of sugarcane in Australia |
| 3.04 | | no evidence |
| 3.05 | Gann and Gordon (1998) <i>Paederia foetida</i> (skunk vine) and <i>P. cruddasiana</i> (sewer vine): threats and management strategies. Natural Areas Journal 18: 169-174. | <i>P. cruddasiana</i> "can cause damage to or kill native vegetation and effectively alter natural community structure" in Florida. |
| 4.01 | Pemberton and Pratt (2002) Skunk vine. Chp. 27 in Van Driesche et al. (eds.) Biological Control of Invasive Plants in the Eastern United States. USDA Forest Service Publication FHTET-2002-04. | <i>Paederia</i> spp. lack thorns. |
| 4.02 | | no evidence |
| 4.03 | Wagner, Herbst, and Sohmer (1999) Manual of the flowering plants of Hawai'i. University of Hawai'i Press/Bishop Museum Press, Honolulu. | no description of this |
| 4.04 | | |
| 4.05 | | no evidence |
| 4.06 | van Valkenburg and Bunyapraphatsara, eds. (2001) Plant Resources of South-East Asia. No. 12(2). Medicinal and poisonous plants. Backhuys Publishers, Leiden. | "In India, <i>P. foetida</i> is attacked by <i>Uredo paederiae</i> causing rust, and also by <i>Puccinia zoysiae</i> causing leaf spot. It is a host for the root-knot nematode <i>Meloidogyne</i> sp." |
| 4.07 | van Valkenburg and Bunyapraphatsara, eds. (2001) Plant Resources of South-East Asia. No. 12(2). Medicinal and poisonous plants. Backhuys Publishers, Leiden. | "In Java, the leaves are also consumed as a vegetable" [and no evidence of toxicity] |
| 4.08 | 1. Gann and Gordon (1998) <i>Paederia foetida</i> (skunk vine) and <i>P. cruddasiana</i> (sewer vine): threats and management strategies. Natural Areas Journal 18: 169-174. 2. Native Florida (http://www.nsis.org/garden/garden-native-invasive.html). | 1. "Vertical stems link branches and trees, increasing the probability of gap creation and modifying the effects of other natural processes like fire in pyrogenic communities." 2. "provides a 'fire ladder' to tree tops" |
| 4.09 | Puff (1991) Revision of the genus <i>Paederia</i> L. (Rubiaceae-Paederieae) in Asia. In: Puff (ed.) The genus <i>Paederia</i> L. (Rubiaceae-Paederieae): a multidisciplinary study. Opera Botanica Belgica 3: 207-289. | found in openings or at the edge of forest; in sunny, disturbed places |
| 4.1 | Puff (1991) Revision of the genus <i>Paederia</i> L. (Rubiaceae-Paederieae) in Asia. In: Puff (ed.) The genus <i>Paederia</i> L. (Rubiaceae-Paederieae): a multidisciplinary study. Opera Botanica Belgica 3: 207-289. | "on sandy or rocky sea coasts" |
| 4.11 | Weber (2003) Invasive Plant Species of the World. CABI Publishing. | "a climbing or twining shrub" |

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| 4.12 | Weber (2003) Invasive Plant Species of the World. CABI Publishing. | "The species forms dense curtains of intermingled stems, covering the floor, smothering all vegetation and altering the community structure." |
| 5.01 | | terrestrial |
| 5.02 | USDA, NRCS. 2005. The PLANTS Database, Version 3.5 (http://plants.usda.gov). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA. | Rubiaceae |
| 5.03 | USDA, NRCS. 2005. The PLANTS Database, Version 3.5 (http://plants.usda.gov). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA. | Rubiaceae |
| 5.04 | Weber (2003) Invasive Plant Species of the World. CABI Publishing. | "The plant has a woody rootstock." |
| 6.01 | | |
| 6.02 | van Valkenburg and Bunyapraphatsara, eds. (2001) Plant Resources of South-East Asia. No. 12(2). Medicinal and poisonous plants. Backhuys Publishers, Leiden. | " <i>P. foetida</i> is mainly propagated by seed." |
| 6.03 | Puff (1991) Selected aspects of the reproductive biology of <i>Paederia</i> L. (Rubiaceae - Paederieae). In: Puff (ed.) The genus <i>Paederia</i> L. (Rubiaceae-Paederieae): a multidisciplinary study. Opera Botanica Belgica 3: 167-178. | "From observations made in the field it is...presumed that odd hybrids (but probably not extensive hybrid populations) may be met with occasionally. This holds particularly true for species pairs which may grow in immediate vicinity to each other and flower at the same time (e.g. <i>P. cavaleriei</i> and <i>P. foetida</i> ...)" [nothing concrete...] |
| 6.04 | Puff (1991) Selected aspects of the reproductive biology of <i>Paederia</i> L. (Rubiaceae - Paederieae). In: Puff (ed.) The genus <i>Paederia</i> L. (Rubiaceae-Paederieae): a multidisciplinary study. Opera Botanica Belgica 3: 167-178. | "Flowers of <i>Paederia</i> are allogamous; self-incompatibility prevents auto- and geitonogamy." |
| 6.05 | Puff (1991) Selected aspects of the reproductive biology of <i>Paederia</i> L. (Rubiaceae - Paederieae). In: Puff (ed.) The genus <i>Paederia</i> L. (Rubiaceae-Paederieae): a multidisciplinary study. Opera Botanica Belgica 3: 167-178. | <i>P. foetida</i> pollinated by butterflies and possibly bees. |
| 6.06 | 1. Weber (2003) Invasive Plant Species of the World. CABI Publishing. 2. van Valkenburg and Bunyapraphatsara, eds. (2001) Plant Resources of South-East Asia. No. 12(2). Medicinal and poisonous plants. Backhuys Publishers, Leiden. | 1. its creeping stems root at the nodes 2. "Sometimes, shoots produce adventitious roots when they come in contact with the soil, and can thus be propagated as well." |
| 6.07 | | |
| 7.01 | Possley and Brazis (1998) Skunk vine: stinking up Florida. Wildland Weeds 2: 11-13. | "Because of the ease with which it roots at nodes, the dumping of yard waste may have aided in its spread." |

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| 7.02 | Starr, Starr, and Loope (2003) <i>Paederia foetida</i> . Plants of Hawaii, Reports. USGS, Biological Resources Division (http://www.hear.org/starr/hiplants/reports/pdf/paederia_foetida.pdf). | "cultivated in warm regions of the world as an ornamental vine" |
| 7.03 | | no evidence |
| 7.04 | 1. Weber (2003) Invasive Plant Species of the World. CABI Publishing. 2. Pemberton and Pratt (2002) Skunk vine. Chp. 27 in Van Driesche et al. (eds.) Biological Control of Invasive Plants in the Eastern United States. USDA Forest Service Publication FHTET-2002-04. | 1. "fruits are globose, orange, 5-6 mm in diameter" 2. "Skunk vine has spherical fruits and the seed (diaspores) lack wings" |
| 7.05 | | no evidence |
| 7.06 | 1. Takahashi and Kamitani (2004) Factors affecting seed rain beneath fleshy-fruited plants. Plant Ecology 174: 247-256. 2. Starr, Starr, and Loope (2003) <i>Paederia foetida</i> . Plants of Hawaii, Reports. USGS, Biological Resources Division (http://www.hear.org/starr/hiplants/reports/pdf/paederia_foetida.pdf). | 1. Seeds of <i>P. foetida</i> (as <i>P. scandens</i>) were found to be dispersed by birds in Japan. 2. "it is suspected that seeds are spread by fruit eating birds" |
| 7.07 | Weber (2003) Invasive Plant Species of the World. CABI Publishing. | "fruits are globose, orange, 5-6 mm in diameter" [no evidence of any means of attachment] |
| 7.08 | Gann and Gordon (1998) <i>Paederia foetida</i> (skunk vine) and <i>P. cruddasiana</i> (sewer vine): threats and management strategies. Natural Areas Journal 18: 169-174. | "bird and mammal dispersal of fruit seem likely" |
| 8.01 | | |
| 8.02 | Puff (1991) Selected aspects of the reproductive biology of <i>Paederia</i> L. (Rubiaceae - Paederieae). In: Puff (ed.) The genus <i>Paederia</i> L. (Rubiaceae-Paederieae): a multidisciplinary study. Opera Botanica Belgica 3: 167-178. | "It was found that a period of less than two years between harvesting and sowing had no significant influence on germination rates." [probably not soil storage, but no change in germination rates in two years] |
| 8.03 | 1. Weber (2003) Invasive Plant Species of the World. CABI Publishing. 2. Langeland, Stocker, and Brazis (2003) Natural Area Weeds: Skunkvine (<i>Paederia foetida</i>). University of Florida, IFAS Extension, SS-AGR-80 (http://edis.ifas.ufl.edu/pdffiles/WG/WG20800.pdf). | 1. "An effective herbicide is glyphosate applied to the foliage and to basal as well as creeping stems." 2. "Herbicides that contain the active ingredients triclopyr amine (Garlon 3A and Brush-B-Gone), triclopyr ester (Garlon 4), and imazapic (Plateau) provide effective control." |
| 8.04 | 1. Langeland, Stocker, and Brazis (2003) Natural Area Weeds: Skunkvine (<i>Paederia foetida</i>). University of Florida, IFAS Extension, SS-AGR-80 (http://edis.ifas.ufl.edu/pdffiles/WG/WG20800.pdf). 2. Gann and Gordon (1998) <i>Paederia foetida</i> (skunk vine) and <i>P. cruddasiana</i> (sewer vine): threats and management | 1. cut stems will resprout from below BUT 2. sensitive to fire |

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| | strategies. Natural Areas Journal 18: 169-174. | |
| 8.05 | | |