

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>Phyllanthus urinaria (chamberbitter)</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) | | |
| 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 | ? | |
| 4.06 | Host for recognised pests and pathogens | y | 1 |
| 4.07 | Causes allergies or is otherwise toxic to humans | ? | |
| 4.08 | Creates a fire hazard in natural ecosystems | n | 0 |
| 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) | n | 0 |
| 4.11 | Climbing or smothering growth habit | n | 0 |
| 4.12 | Forms dense thickets | n | 0 |
| 5.01 | Aquatic | n | 0 |

| | | | |
|--------------------|--|---|-----------|
| 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 | n | -1 |
| 6.04 | Self-compatible or apomictic | | |
| 6.05 | Requires specialist pollinators | n | 0 |
| 6.06 | Reproduction by vegetative fragmentation | y | 1 |
| 6.07 | Minimum generative time (years) | 1 | 1 |
| 7.01 | Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas) | | |
| 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 | y | 1 |
| 7.06 | Propagules bird dispersed | | |
| 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) | | |
| 8.03 | Well controlled by herbicides | y | -1 |
| 8.04 | Tolerates, or benefits from, mutilation or cultivation | | |
| 8.05 | Effective natural enemies present in Florida, or east of the continental divide | | |
| Total Score | | | 13 |

| | |
|----------------|----------------|
| Outcome | Reject* |
|----------------|----------------|

*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 | 7 | yes |
| B | 9 | yes |
| C | 16 | yes |
| total | 32 | yes |

Data collected 2006-2007

| Question number | Reference | Source data |
|-----------------|--|--|
| 1.01 | | not majorly cultivated, and no evidence of selection for reduced weediness |
| 1.02 | | |
| 1.03 | | |
| 2.01 | Norcini, Stamps, and Aldrich (1995) Preemergent control of long-stalked phyllanthus (<i>Phyllanthus tenellus</i>) and leafhopper (<i>Phyllanthus urinaria</i>). Weed Technology 9: 783-788. | "These species have the potential to spread throughout USDA hardiness zones 8a and higher." |
| 2.02 | | |
| 2.03 | | |
| 2.04 | Padua, Bunyaphatsara, and Lemmens, eds. (1999) Plant Resources of South-East Asia. No. 12. Medicinal and poisonous plants 1. Backhuys Publishers, Leiden. | "It grows...often in humid places or even in marshy ground"; " <i>P. urinaria</i> ...is generally found in wetter sites." |
| 2.05 | Padua, Bunyaphatsara, and Lemmens, eds. (1999) Plant Resources of South-East Asia. No. 12. Medicinal and poisonous plants 1. Backhuys Publishers, Leiden. | " <i>P. urinaria</i> is native to the Asian tropics, but was introduced into America and Africa and is nowadays an almost pantropical weed". |
| 3.01 | Padua, Bunyaphatsara, and Lemmens, eds. (1999) Plant Resources of South-East Asia. No. 12. Medicinal and poisonous plants 1. Backhuys Publishers, Leiden. | " <i>P. urinaria</i> is native to the Asian tropics, but was introduced into America and Africa and is nowadays an almost pantropical weed". |
| 3.02 | 1. Padua, Bunyaphatsara, and Lemmens, eds. (1999) Plant Resources of South-East Asia. No. 12. Medicinal and poisonous plants 1. Backhuys Publishers, Leiden. 2. Wehtje, Gilliam, and Reeder (1992) Germination and growth of leafhopper (<i>Phyllanthus urinaria</i>) as affected by cultural conditions and herbicides. Weed Technology 6: 139-143. | 1. " <i>P. urinaria</i> is a common weed of waste places, clearings, gardens, along paths" 2. In the U.S., considered a pest in gardens. |
| 3.03 | Holm (1979) A Geographical Atlas of World Weeds. John Wiley and Sons. | Considered a serious weed of agriculture in Surinam, and a principal weed in Korea, Malaysia, and Peru. |

| | | |
|------|--|--|
| 3.04 | | no evidence |
| 3.05 | 1. Padua, Bunyaphatsara, and Lemmens, eds. (1999) Plant Resources of South-East Asia. No. 12. Medicinal and poisonous plants 1. Backhuys Publishers, Leiden. 2. Holm (1979) A Geographical Atlas of World Weeds. John Wiley and Sons. | 1. " <i>P. amarus</i> (often reported as <i>P. niruri</i>) is a troublesome weed in pulses, soya bean, groundnut, cereals, sugar cane, cassava, taro, sesame, sunflower, and cotton." 2. <i>P. niruri</i> considered a serious weed of agriculture in Ghana, Hawaii, Honduras, Jamaica, Mexico, and Sudan. |
| 4.01 | Rossignol, Rossignol, and Haicour (1987) A systematic revision of <i>Phyllanthus</i> subsection <i>Urinaria</i> (Euphorbiaceae). American Journal of Botany 74: 1853-1862. | no description of these traits |
| 4.02 | | no evidence |
| 4.03 | Rossignol, Rossignol, and Haicour (1987) A systematic revision of <i>Phyllanthus</i> subsection <i>Urinaria</i> (Euphorbiaceae). American Journal of Botany 74: 1853-1862. | no description of this |
| 4.04 | Maithani, Bahuguna, and Lal (1986) Effect of forest fires on the ground vegetation of a moist deciduous sal (<i>Shorea robusta</i>) forest. Indian Forester 112: 646-677. | <i>P. urinaria</i> is palatable and is eaten by ungulates and elephants in India. [unclear whether eaten readily] |
| 4.05 | Padua, Bunyaphatsara, and Lemmens, eds. (1999) Plant Resources of South-East Asia. No. 12. Medicinal and poisonous plants 1. Backhuys Publishers, Leiden. | "Several <i>Phyllanthus</i> species are poisonous to livestock or fish" [unclear whether this includes <i>P. urinaria</i>] |
| 4.06 | Padua, Bunyaphatsara, and Lemmens, eds. (1999) Plant Resources of South-East Asia. No. 12. Medicinal and poisonous plants 1. Backhuys Publishers, Leiden. | " <i>P. urinaria</i> weed in Indian rice fields is infested with the rice root-knot nematode (<i>Meloidogyne graminicola</i>)." |
| 4.07 | Padua, Bunyaphatsara, and Lemmens, eds. (1999) Plant Resources of South-East Asia. No. 12. Medicinal and poisonous plants 1. Backhuys Publishers, Leiden. | "The latex of <i>Phyllanthus</i> can also cause allergic reactions." [unclear whether this includes <i>P. urinaria</i>] |
| 4.08 | | no evidence |
| 4.09 | 1. Wehtje, Gilliam, and Reeder (1992) Germination and growth of leafhopper (<i>Phyllanthus urinaria</i>) as affected by cultural conditions and herbicides. Weed Technology 6: 139-143. 2. Burger and Huft (1995) Family #113 Euphorbiaceae in Burger (ed.) Flora Costaricensis. Fieldiana, Botany new series, no. 36. Field Museum of Natural History, Chicago. | 1. "Maximum seedling development occurred in full exposure to sunlight; shading that reduced light intensity more than 26% was inhibitory...Results from this experiment are in agreement with field observations in that leafhopper infestations are equally common in full sun and in light shade, but rarely extend into deep shade." 2. "plants of open sunny sites" |
| 4.1 | Padua, Bunyaphatsara, and Lemmens, eds. (1999) Plant Resources of South-East Asia. No. 12. Medicinal and poisonous plants 1. Backhuys | "In China, warm, well-drained sandy soils and fertilization with N and K are recommended for |

| | | |
|------|--|---|
| | Publishers, Leiden. | cultivated <i>P. urinaria</i> ." [well-drained sandy soils, but with fertilization] |
| 4.11 | 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. | growth habit: forb/herb |
| 4.12 | | no evidence, and is an herb |
| 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. | Euphorbiaceae |
| 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. | Euphorbiaceae, and herbaceous |
| 5.04 | 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. | annual |
| 6.01 | | |
| 6.02 | 1. Padua, Bunyaphatsara, and Lemmens, eds. (1999) Plant Resources of South-East Asia. No. 12. Medicinal and poisonous plants 1. Backhuys Publishers, Leiden. 2. Wehtje, Gilliam, and Reeder (1992) Germination and growth of leafhopper (<i>Phyllanthus urinaria</i>) as affected by cultural conditions and herbicides. Weed Technology 6: 139-143. | 1. Seeds of <i>P. urinaria</i> germinate with light, temperatures of 25-35°C, and adequate moisture. 2. "seedlings commonly develop under the canopy of more mature plants, indicating the importance of seed reproduction" |
| 6.03 | Rossignol, Rossignol, and Haicour (1987) A systematic revision of <i>Phyllanthus</i> subsection <i>Urinaria</i> (Euphorbiaceae). American Journal of Botany 74: 1853-1862. | "There is thus an important reproductive barrier between the 50 S, 50 R, 100 S, and 100 R groups, since crosses of individuals belonging to any two groups never yields a fertile hybrid" [referring to 4 groups within what was once all considered <i>P. urinaria</i> , now considered subsection <i>Urinaria</i> , so unlikely to hybridize with species in other subsections] |
| 6.04 | | |
| 6.05 | Singh, Haider, and Bagchi (2005) Structure of floral nectaries in some medicinally important <i>Phyllanthus</i> species. Journal of Medicinal and Aromatic Plant Sciences 27: 257-261. | Flowers of <i>P. urinaria</i> contain "disk segments", which are "actually nectar glands that actively secrete nectar during flowering which attract minute insects for cross- |

| | | |
|------|---|---|
| | | pollination". |
| 6.06 | Padua, Bunyaphatsara, and Lemmens, eds. (1999) Plant Resources of South-East Asia. No. 12. Medicinal and poisonous plants 1. Backhuys Publishers, Leiden. | "The rare subspecies <i>nudicarpus</i> Rossignol & Haicour has creeping branches that root on the nodes" |
| 6.07 | 1. 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. 2. Wehtje, Gilliam, and Reeder (1992) Germination and growth of leafflower (<i>Phyllanthus urinaria</i>) as affected by cultural conditions and herbicides. Weed Technology 6: 139-143. | annual (1, 2) |
| 7.01 | | |
| 7.02 | Padua, Bunyaphatsara, and Lemmens, eds. (1999) Plant Resources of South-East Asia. No. 12. Medicinal and poisonous plants 1. Backhuys Publishers, Leiden. | cultivated in China |
| 7.03 | | no evidence |
| 7.04 | Wehtje, Gilliam, and Reeder (1992) Germination and growth of leafflower (<i>Phyllanthus urinaria</i>) as affected by cultural conditions and herbicides. Weed Technology 6: 139-143. | "The female flower produces a spherical, six-seeded, three carpellate, schizocarpic fruit." [no evidence of adaptations to wind dispersal] |
| 7.05 | Padua, Bunyaphatsara, and Lemmens, eds. (1999) Plant Resources of South-East Asia. No. 12. Medicinal and poisonous plants 1. Backhuys Publishers, Leiden. | "Seeds of the herbaceous... <i>P. urinaria</i> are dispersed by water and animals." |
| 7.06 | | |
| 7.07 | Wehtje, Gilliam, and Reeder (1992) Germination and growth of leafflower (<i>Phyllanthus urinaria</i>) as affected by cultural conditions and herbicides. Weed Technology 6: 139-143. | "The female flower produces a spherical, six-seeded, three carpellate, schizocarpic fruit." [no evidence of any means of attachment] |
| 7.08 | Padua, Bunyaphatsara, and Lemmens, eds. (1999) Plant Resources of South-East Asia. No. 12. Medicinal and poisonous plants 1. Backhuys Publishers, Leiden. | "Seeds of the herbaceous... <i>P. urinaria</i> are dispersed by water and animals." [unclear whether birds or other animals - am putting here] |
| 8.01 | Wehtje, Gilliam, and Reeder (1992) Germination and growth of leafflower (<i>Phyllanthus urinaria</i>) as affected by cultural conditions and herbicides. Weed Technology 6: 139-143. | six seeds per fruit |
| 8.02 | | |
| 8.03 | Wehtje, Gilliam, and Reeder (1992) Germination and growth of leafflower (<i>Phyllanthus urinaria</i>) as affected by cultural conditions and herbicides. Weed Technology 6: 139-143. | "The following POST treatments provided a minimum of 90% control of mature plants: paraquat at 0.21 kg ha ⁻¹ , glyphosate at 0.56 kg ha ⁻¹ , oxyfluorfen at 1.12 kg ha ⁻¹ , and acifluorfen at 2.24 kg ha ⁻¹ ." |
| 8.04 | | |
| 8.05 | | |