**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.**

| *Cupaniopsis anacardioides (carrotwood)* | | | |
|---|---|---|---|
| **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 | n | -2 |
| 3.02 | Garden/amenity/disturbance weed | n | 0 |
| 3.03 | Weed of agriculture | n | 0 |
| 3.04 | Environmental weed | n | 0 |
| 3.05 | Congeneric weed | n | 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 | n | 0 |
| 4.07 | Causes allergies or is otherwise toxic to humans | y | 1 |
| 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 | y | 1 |
| 4.1 | Grows on infertile soils (oligotrophic, limerock, or excessively draining soils) | y | 1 |
| 4.11 | Climbing or smothering growth habit | n | 0 |
| 4.12 | Forms dense thickets | y | 1 |
| 5.01 | Aquatic | n | 0 |

| | | | |
|---|---|---|---|
| 5.02 | Grass | n | 0 |
| 5.03 | Nitrogen fixing woody plant | n | 0 |
| 5.04 | Geophyte | | |
| 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 | | |
| 6.05 | Requires specialist pollinators | n | 0 |
| 6.06 | Reproduction by vegetative fragmentation | | |
| 6.07 | Minimum generative time (years) | 3 | 0 |
| 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 | y | 1 |
| 7.07 | Propagules dispersed by other animals (externally) | n | -1 |
| 7.08 | Propagules dispersed by other animals (internally) | ? | |
| 8.01 | Prolific seed production | n | -1 |
| 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 | y | 1 |
| 8.05 | Effective natural enemies present in Florida, or east of the continental divide | | |
| Total Score | | | 3 |

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| **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 | 11 | yes |
| C | 15 | yes |
| total | 33 | yes |

Data collected 2006-2007

| Question number | Reference | Source data |
|---|---|---|
| 1.01 | | cultivated as an ornamental, but no evidence of selection for reduced weediness |
| 1.02 | | |
| 1.03 | | |
| 2.01 | Lockhart, Austin, Jones, and Downey (1999) Invasion of carrotwood (*Cupaniopsis anacardioides*) in Florida natural areas (USA). Natural Areas Journal 19: 254-262. | cold tolerant to about -6° C |
| 2.02 | | |
| 2.03 | | |
| 2.04 | Lockhart, Austin, Jones, and Downey (1999) Invasion of carrotwood (*Cupaniopsis anacardioides*) in Florida natural areas (USA). Natural Areas Journal 19: 254-262. | *C. anacardioides* is tolerant of poor drainage; can be found in mangrove swamps, cypress swamps, and freshwater marshes (among other habitat types). |
| 2.05 | Oliver (1992) Carrotwood: an invasive plant new to Florida. Aquatics 14: 4-9. | "*C. anacardioides* has been introduced in various subtropical parts of the world as an ornamental plant" |
| 3.01 | | no evidence |
| 3.02 | | no evidence |
| 3.03 | | no evidence |
| 3.04 | | no evidence |
| 3.05 | | no evidence |
| 4.01 | Weber (2003) Invasive Plant Species of the World. CABI Publishing. | no description of these traits |
| 4.02 | | no evidence |
| 4.03 | Weber (2003) Invasive Plant Species of the World. CABI Publishing. | no description of this |
| 4.04 | | |
| 4.05 | | no evidence |
| 4.06 | 1. Horticopia 4.0 2. Gilman and Watson (2003) *Cupaniopsis anacardioides*: carrotwood. ENH380, University of Florida, IFAS Extension | 1. No pests, diseases, or damaging agents of major concern. 2. "free of serious pests and diseases" |

| | | |
|---|---|---|
| | (http://edis.ifas.ufl.edu/pdffiles/ST/ST22100.pdf). | |
| 4.07 | Horticopia 4.0 | "Pollen can cause significant allergy reactions." |
| 4.08 | | no evidence |
| 4.09 | Weber (2003) Invasive Plant Species of the World. CABI Publishing. | "grows in full sun and shade" |
| 4.1 | Lockhart, Austin, Jones, and Downey (1999) Invasion of carrotwood (*Cupaniopsis anacardioides*) in Florida natural areas (USA). Natural Areas Journal 19: 254-262. | In its native Australia, carrotwood occurs "on stabilized sand dunes, rock outcrops, and rocky beaches"; "This tree thrives in nutrient-poor soils." |
| 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: tree |
| 4.12 | Weber (2003) Invasive Plant Species of the World. CABI Publishing. | "it forms dense thickets that crowd out native vegetation" |
| 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. | Sapindaceae |
| 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. | Sapindaceae |
| 5.04 | | |
| 6.01 | | |
| 6.02 | 1. Gilman and Watson (2003) *Cupaniopsis anacardioides*: carrotwood. ENH380, University of Florida, IFAS Extension (http://edis.ifas.ufl.edu/pdffiles/ST/ST22100.pdf). 2. Langeland (2006) Natural area weeds: carrotwood (*Cupaniopsis anacardioides*). SS-AGR-165, University of Florida, IFAS Extension (http://edis.ifas.ufl.edu/pdffiles/AG/AG11100.pdf). | 1. "Propagation is by seed." 2. "Carrotwood freely seeds from plantings." |
| 6.03 | | |
| 6.04 | | |
| 6.05 | Plant Conservation Alliance, Alien Plant Working Group (http://www.nps.gov/plants/alien/fact/cuan1.htm). | "In its native range, carrotwood is pollinated by bees" |
| 6.06 | | |
| 6.07 | 1. Weber (2003) Invasive Plant Species of the World. CABI Publishing. 2. Lockhart, Austin, Jones, and Downey (1999) Invasion of carrotwood (*Cupaniopsis anacardioides*) in Florida natural areas (USA). Natural Areas Journal 19: 254-262. | fast growing (1, 2) |
| 7.01 | | |
| 7.02 | Oliver (1992) Carrotwood: an invasive plant new to Florida. Aquatics 14: 4-9. | "*C. anacardioides* has been introduced in various subtropical parts of the world as an ornamental plant" |

| | | |
|---|---|---|
| 7.03 | | no evidence |
| 7.04 | Weber (2003) Invasive Plant Species of the World. CABI Publishing. | fruits are capsules about 2 cm in diameter; seeds oval, 5-14 mm long [no evidence of adaptations to wind dispersal] |
| 7.05 | 1. Plant Conservation Alliance, Alien Plant Working Group (http://www.nps.gov/plants/alien/fact/cuan1.htm). 2. Oliver (1992) Carrotwood: an invasive plant new to Florida. Aquatics 14: 4-9. | 1. "Seedlings have also been found along estuary rack lines." 2. "It appears that the seed…remained viable for some length of time in saltwater" |
| 7.06 | 1. Weber (2003) Invasive Plant Species of the World. CABI Publishing. 2. Lockhart, Austin, Jones, and Downey (1999) Invasion of carrotwood (*Cupaniopsis anacardioides*) in Florida natural areas (USA). Natural Areas Journal 19: 254-262. | 1. "The brightly coloured fruits are attractive to birds that disperse seeds to new places." 2. "Numerous seedlings are often found among bird droppings under trees and telephone poles." |
| 7.07 | Weber (2003) Invasive Plant Species of the World. CABI Publishing. | fruits are capsules about 2 cm in diameter; seeds oval, 5-14 mm long [no evidence of any means of attachment] |
| 7.08 | Lockhart, Austin, Jones, and Downey (1999) Invasion of carrotwood (*Cupaniopsis anacardioides*) in Florida natural areas (USA). Natural Areas Journal 19: 254-262. | "Seedling clusters characteristic of small mammal dispersal have also been observed." [very indirect evidence] |
| 8.01 | 1. Lockhart, Austin, Jones, and Downey (1999) Invasion of carrotwood (*Cupaniopsis anacardioides*) in Florida natural areas (USA). Natural Areas Journal 19: 254-262. 2. Oliver (1992) Carrotwood: an invasive plant new to Florida. Aquatics 14: 4-9. 3. Weber (2003) Invasive Plant Species of the World. CABI Publishing. | Estimated seed production of a single, mature tree: 9,200 to 10,800 seeds (1). Tree is about 9m x 9m (2), giving a crown area of ~64$m^2$. This gives an average of 144-169 seeds/$m^2$. BUT 3. "The tree has a prolific seed production." [other evidence more specific] |
| 8.02 | Oliver (1992) Carrotwood: an invasive plant new to Florida. Aquatics 14: 4-9. | "It appears that the seed…remained viable for some length of time in saltwater" [vague about length of time] |
| 8.03 | Weber (2003) Invasive Plant Species of the World. CABI Publishing. | Mature trees can be "controlled with a triclopyr herbicide mixed with an oil dilutent and applied to the basal bark. Trees are also cut and the cut stumps treated with glyphosate or triclopyr." |
| 8.04 | Langeland (2006) Natural area weeds: carrotwood (*Cupaniopsis anacardioides*). SS-AGR-165, University of Florida, IFAS Extension (http://edis.ifas.ufl.edu/pdffiles/AG/AG11100.pdf). | Cut stumps should be treated with herbicide to prevent resprouting. [so will resprout after removal] |
| 8.05 | | |