

Identification of FLEPPC Invasive Exotics commonly encountered in LVI sampling

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DEP-SAS

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Identification of Aquatic FLEPPC Invasive Exotics

- *Alternanthera philoxeroides* (alligator weed)
- *Colocasia esculenta* (wild taro)
- *Eichornia crassipes* (water hyacinth)
- *Hydrilla verticillata* (hydrilla)
- *Hygrophila polysperma* (green hygro)
- *Landoltia punctata* (spotted duckweed)
- *Limnophila sessiliflora* (limnophila)
- *Myriophyllum spicatum* (water milfoil)
- *Ludwigia peruviana* (Peruvian primrosewillow)
- *Nymphoides cristata* (crested floating heart)
- *Panicum repens* (torpedo grass)
- *Pistia stratiodes* (water lettuce)
- *Salvinia minima* (water spangles)
- Trees: Chinese Tallow, Melaleuca, Brazillian Pepper, Australian Pine

Alternanthera philoxeroides

NON-NATIVE CAT 2

- Alligator weed
- Opposite leaves
- Minute flowers, papery white bracts
- Swollen and reddish at leaf nodes
- No teeth on leaves



Colocasia esculenta (wild taro)

NON-NATIVE CAT 1



Colocasia esculenta

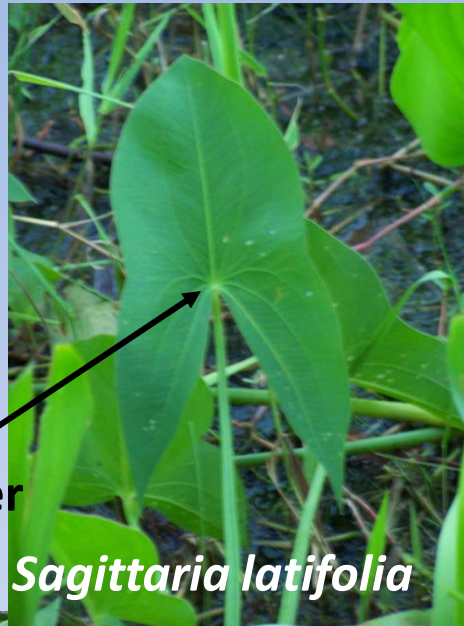
Photo by Asit K. Ghosh

Arrow-leaved Emergents



Parallel

Radiate
From center



Also radiates, but
only at base



Eichhornia crassipes

NON-NATIVE CAT 1

Eichhornia crassipes

Photo and © by Roger Hammer
Wildflowers of the Everglades



- Water-hyacinth
- Leaves elliptic, parallel-veined
- Petioles inflated, spongy
- Roots dark, fibrous
- Showy purple flower, yellow spot on keel petal
- Floating units of leaves



(Eichornia look-alikes)

Pontederia cordata



Native relative, erect habit, lance to heart shaped leaf, longer erect spike of flowers.



***Heteranthera limosa* – Blue mud plantain (non-native but not FLEPPC)**

Pistia stratiodes

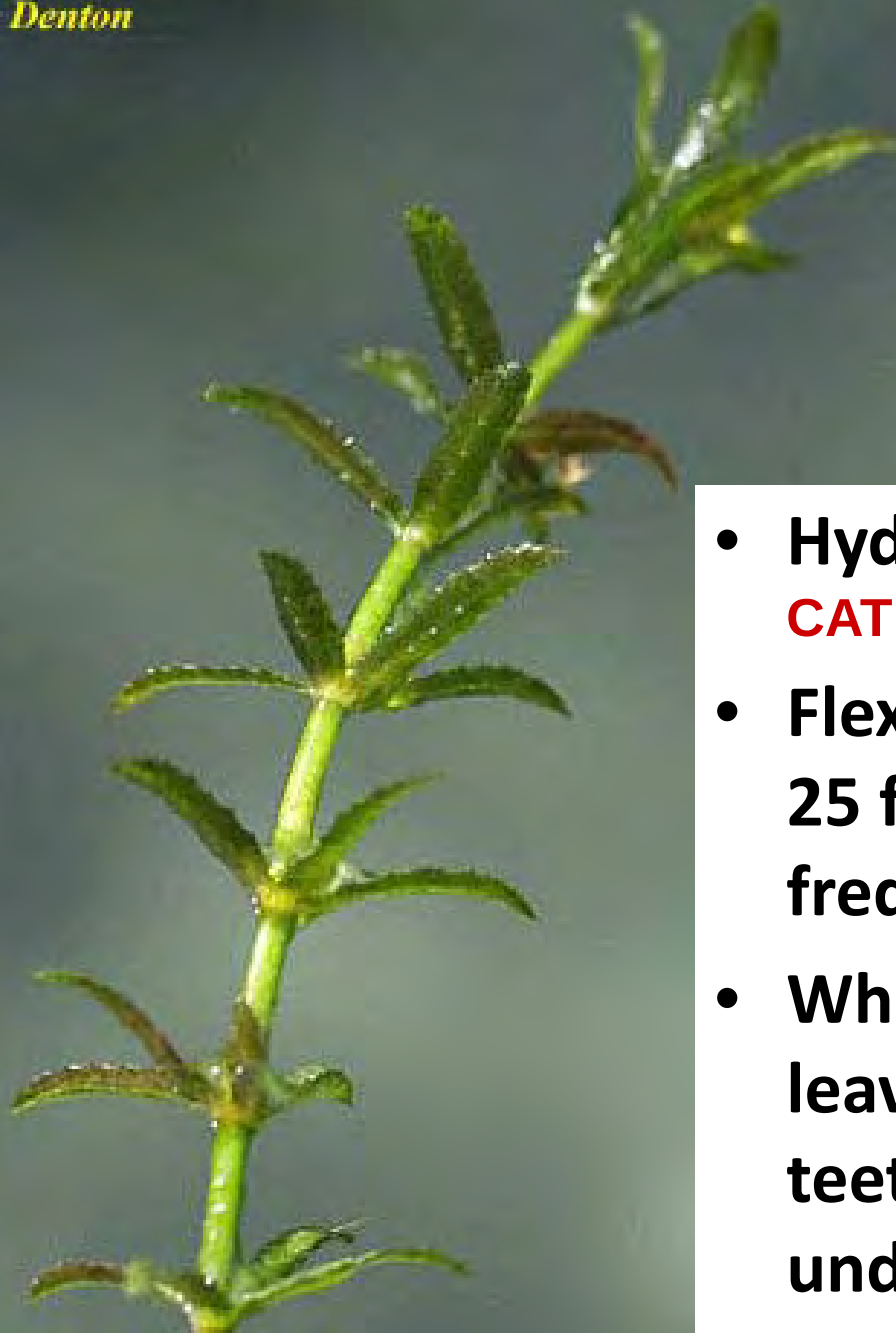
NON-NATIVE CAT 1



- Water lettuce
- Leaves fleshy, water resistant
- Floating units of leaves
- Arum family (Araceae), inconspicuous flower

Hydrilla verticillata

Photo by Shirley Denton



- Hydrilla **NON-NATIVE CAT 1**
- Flexible stems up to 25 feet long, frequently branched
- Whorled pointed leaves (3-8) with teeth on edges and underside of midrib

Hydrilla verticillata **NON-NATIVE CAT 1**



Turions=axillary buds; thousands per m²



Tubers = light brown root structures; can survive years in sediment

- **Multiple reproductive strategies**
- **Female plants only in Florida; white, inconspicuous, thin, emergent on a long stalk**
- **Multiple control strategies: drawdown, mechanical, biological, herbicide**

Hydrilla verticillata



Can be smaller, thinner, lack teeth, and have a bright green “aquarium” appearance after herbicide treatment.

Hydrilla verticillata **NON-NATIVE CAT 1**





Hydrilla, Lake Seminole, 9/2010

Egeria densa

Brazilian waterweed

NON-NATIVE (NOT FLEPPC)

- Rooted, submersed plants
- Stems: - Slender, usually a foot or two long
 - Does not branch as prolifically as hydrilla
- Leaves: - strap-shaped
 - whorls of 3 to 6
 - toothed leaf margins
 - smooth midrib
- Flowers: - short stalks 1" above water
 - 3 white petals
 - $\frac{3}{4}$ " across



Egeria densa

NON-NATIVE (NOT FLEPPC)



Landoltia punctata NON-NATIVE (CAT 2)

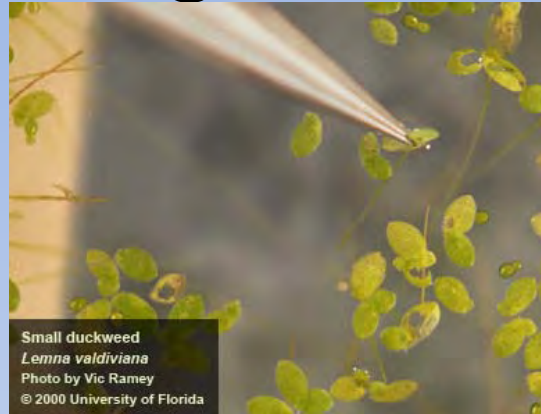


- *Landoltia punctata* 2-5 roots, usu 2 leaves attached

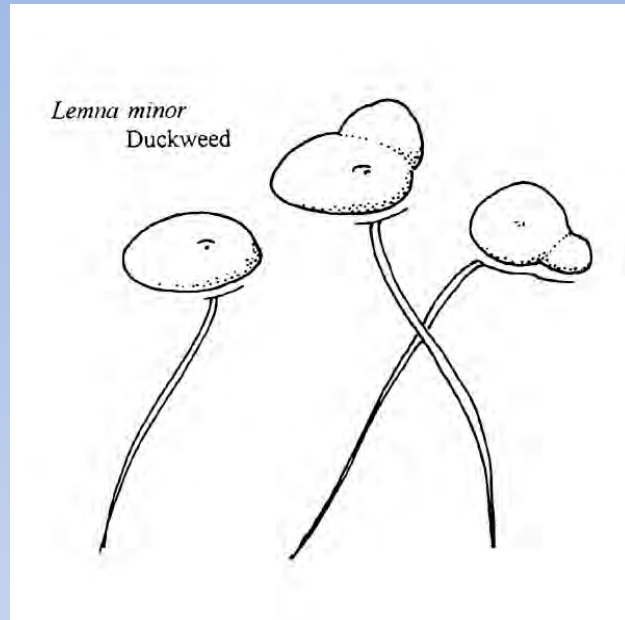


Little floating-leaved plants

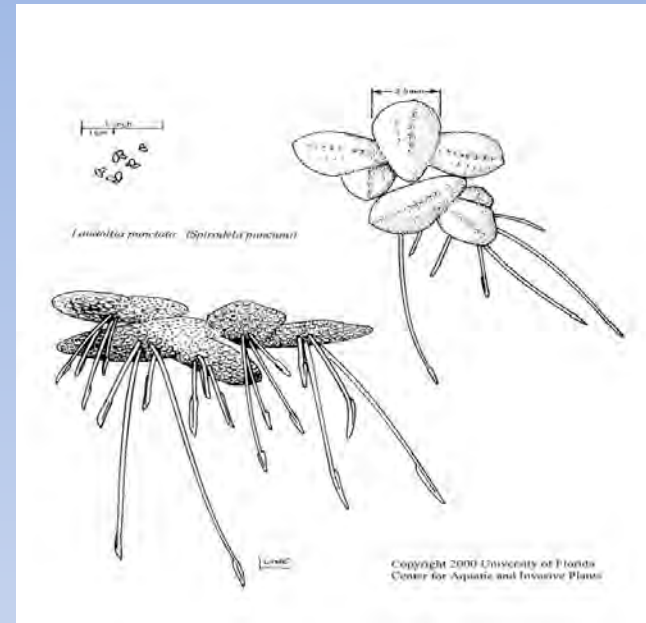
- *Lemna* spp.: 5 spp., all native, genus level, **all have 1 root**
- *Landoltia punctata* **non native** (formerly *Spirodela punctata*): usu. 2 leaves together, **2-5 roots**
- *Spirodela polyrhiza*: native, bigger, rounder leaf, with red dot, **usu 5+ roots, up to 9**



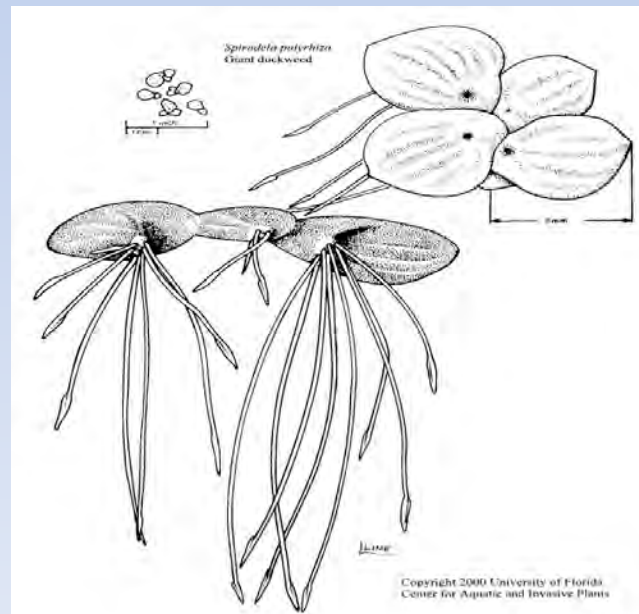
Lemna ~ 1-2 mm



Landoltia punctata ~ 2.5 mm



**Spiridula polyrhiza
~ 6 mm**



Salvinia minima (water spangles)

NON-NATIVE (CAT 1)



Azolla pinnata

Identification: Free floating aquatic plant typically found in clusters or in large mats. Each plant is 1-2.5 cm in diameter with a triangular shape; midsection is typically straight with pinnately arranged side branches that are longer towards their base. Roots and fine lateral root hairs appear feathery in the water. Each leaf is 1-2 mm long and overlap in a two-ranked pattern. Plants reproduce vegetatively and sexually. Vegetative fragments form when the main axis deteriorates and lateral branches break free. When reproducing sexually, round sporocarps (1-1.5 mm in diameter) form on the underside of the leaves. Color ranges from green to maroon-red. Red hues form when anthocyanin is produced as a reaction to unfavorable pH, temperature, moisture or nutrient availability (Holm *et al* 1997). *** Identification of this and many *Azolla* spp is notoriously difficult, requiring detailed examination of sporocarps and other features.



Azolla caroliniana

Kurt Stüber, University of Wisconsin-Stevens Point



Azolla pinnata

David Nicholls, dcnicholls.com, Bugwood.org

UGA1277044

Salvinia minima

NON-NATIVE (CAT 1)

Papillae on leaves are divided in *S. minima* but not on *S. molesta*



Juvenile

Mature



Salvinia molesta **NON-NATIVE**

Juvenile

Salvinia molesta
Giant salvinia



Mature

Salvinia molesta
Giant salvinia



Ludwigia *peruviana*

NON-NATIVE (CAT 1)

- Largest *Ludwigia* species, to 3 m tall
- Capsules pyramidal
- 4-5 petals, sepals
- Stem pubescent
- May form large thickets on lake shores, along roadsides



Ludwigia peruviana **NON-NATIVE (CAT 1)**



Peruvian water-primrose
Ludwigia peruviana
Photo by Vic Ramey
Copyright 2001 Univ. Florida

Panicum repens – Torpedograss **NON-NATIVE (CAT 1)**

- Floating mats
- Bluish-green color
- Flowers purple and orange
- Rhizome tip pointed and white (torpedo-like)





Torpedo grass, *Panicum repens*



Torpedo grass, *Panicum repens* (center)

Myriophyllum aquaticum

Parrot feather

NON-NATIVE (not FLEPPC)

- Emersed plant
- Stems: - can be 5' long
 - trail along the ground or water surface
 - become erect and leafy at the ends
- Leaves: - oblong, deeply cut and feathery looking
 - bright blue-green
 - in whorls of 4 to 6



Myriophyllum spicatum

Eurasian water milfoil

NON-NATIVE (CAT 2)

- Submersed
- Stems: - branched, long, 6 to 9 feet long
- dark green to grayish
- Leaves: - deeply divided, soft, feather-like, 2" long
- arranged in whorls of 3 to 6 around stem
- Flowers: - very small, reddish, bracts tiny
- on flower spike above water



Myriophyllum spicatum
Eurasian water milfoil
Photo by Vic Ramey
Copyright 2000 Univ. Florida



Myriophyllum spicatum
1996 David Sutton

Native *Myriophyllum*



- Reddish stems
- Rough stems
- Leaves in whorls of 3-6
- Includes *M. heterophyllum*, *M. pinnatum*, and *M. laxum*
- Leaves with 12-28, 8-10, and 11-21 divisions (cannot distinguish these 3 without fruiting tips)

Myriophyllum heterophyllum (Carr Lake)

Limnophila sessiliflora

Limnophila

NON-NATIVE (CAT 2)

- **Rooted**
- **Stems: up to 12 feet long, with a few inches emerged**
- **2 types of leaves:**
 - **SUBMERSED:** - finely divided and feathery, 1" long
 - in whorls along stem
 - **FLOATING:** - more or less lance-shaped, in whorls
 - leaf margins appear to be torn irregularly
- **Flowers:** - single flower on emerged part of stem
 - blue, violet, pink or lavender

Limnophila sessiliflora

NON-NATIVE (CAT 2)



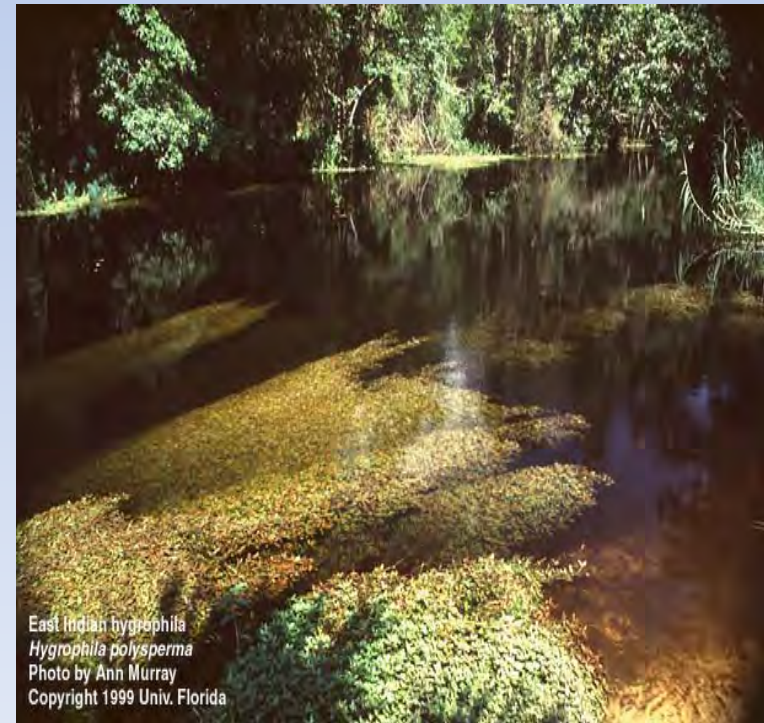
Limnophila
Limnophila sessiliflora
Photo by A. Murray
Copyright 2000 Univ. Florida

Hygrophila polysperma

East Indian hygrophila; green hygro

NON-NATIVE (CAT 1)

- Found in streams and slowly moving waters
- Submersed with few inches sometimes emerged
- Stems: - square
 - up to 6 feet long
- Leaves: - opposite, pointed
 - 1 ½" long, ½" wide
- Flowers: - at leaf axils
 - bluish-white to white
 - 2 lips

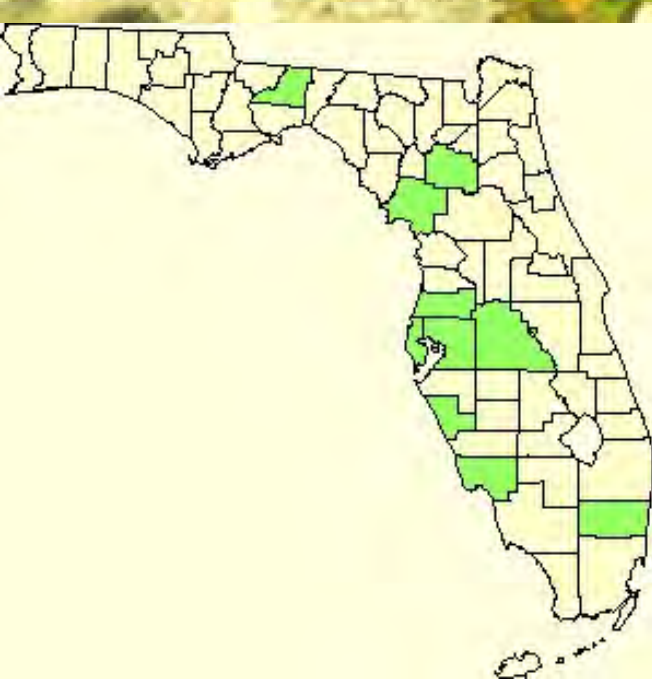


East Indian hygrophila
Hygrophila polysperma
Photo by Ann Murray
Copyright 1999 Univ. Florida

Hygrophila polysperma

Photo by Patricia Howell

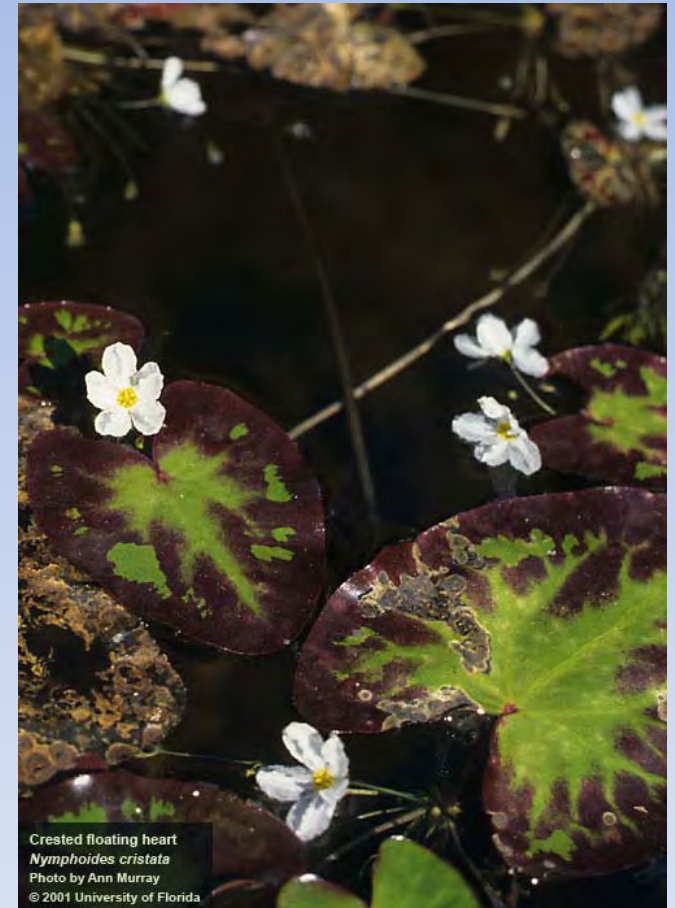
NON-NATIVE (CAT 1)



Nymphoides cristata (crested floating heart)

NON-NATIVE (CAT 1)

- Smooth underside of leaves
- white flower with crest





Nymphoides peltata NON-NATIVE (not FLEPPC) in FL known only from Leon Co. Of national concern. Larger than natives, smooth underneath, “ruffly” flwr.

Nymphoides indica NON-NATIVE (not FLEPPC) in FL known from Manatee and Lee Cos. Conspicuously fringed.



Nymphoides indica
Photo by Ernesto Lasso de la Vega

Nymphoides aquatica (native floating heart)

- Heart shaped leaves, very roughly red-punctate on undersides and stem
- Small white flwr, 1-2 cm



Sapium sebiferum (Chinese tallow) **NON-NATIVE**



Schinus terebenthifolius (Brazilian pepper)

NON-NATIVE (CAT 1)

- Evergreen shrub or tree, multi-stemmed, arching, tangled habit
- Pinnately compound leaves, dk green, lt green veins, margins toothed; peppery smell when crushed
- Small white flwrs clustered in leaf axils, fruit a bright red round drupe
- Anacardiaceae family (poison ivy, poison sumac) introduced 1840s



Schinus terebenthifolius (Brazilian pepper) **NON-NATIVE (CAT 1)**



Melaleuca quinquenervia (Melaleuca, pork tree) **NON-NATIVE (CAT 1)**

- Evergreen, potentially large (30 m) tree, narrow, with whitish peeling bark.
- Lvs alt, simple gray-green, smell like camphor when crushed
- Flwrs white in bottle-brush like spikes; frt a a round, woody capsule
- Prefers saturated soil, but does well inundated or well-drained. Stump and root sprouts. Introduced 1906.



Melaleuca quinquenervia
Photo by Keith Bradley

Melaleuca quinquenervia (Melaleuca, punk-tree) **NON-NATIVE (CAT 1)**



Casuarina equisetifolia (Australian pine)

NON-NATIVE (CAT 1)

- Large evergreen to 40+m, single trunk, irregular crown; gray rough, brittle bark
- Lvs are tiny scales whorled around pine-needle like branchlets
- Flwrs inconspicuous; frt a nutlet in a woody, cone-like cluster

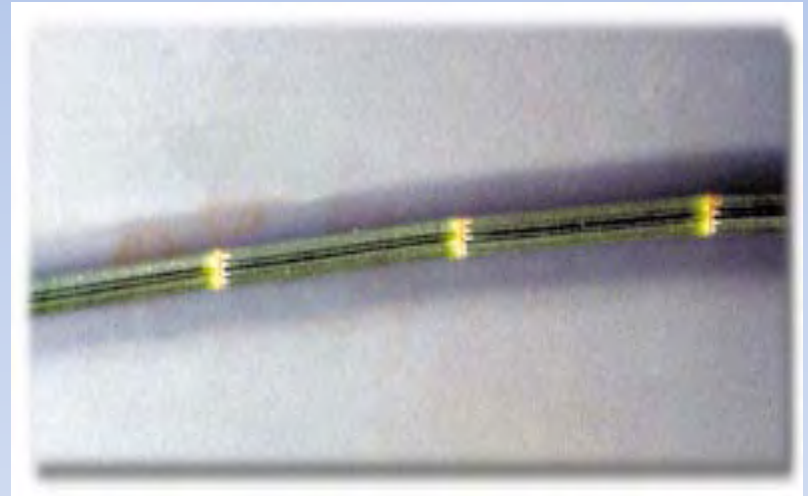


Australian pine
Casuarina species
Photo by Vic Ramey
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Casuarina equisetifolia (Australian pine) **NON-NATIVE (CAT 1)**



C. glauca (cat 1) , *C. cunninghamia* (cat 2)



Resources

- USGS Nonindigenous Aquatic Species (NAS)
<http://nas.er.usgs.gov/default.aspx>
- UF Center for Aquatic and Invasive Plants
<http://plants.ifas.ufl.edu/>
- Florida Exotic Pest Plant Council
<http://www.fleppc.org/index.cfm>

