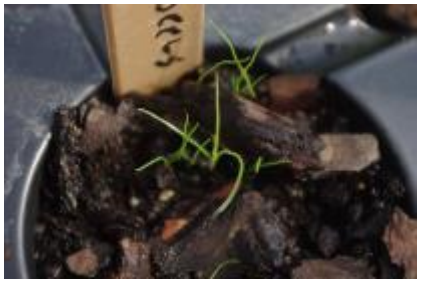
Weed ID and Emerging Weed Pests in Florida

Chris Marble
University of Florida MREC



Why is weed control so critical?

- ~$450 million in losses to Florida agriculture
- >75% of all pesticide sales are from herbicides
- Ornamental growers face unique dilemma:
  - Need to control weeds to reduce competition, AND pots must be weed-free to be marketable
  - Customers demand weed-free landscapes

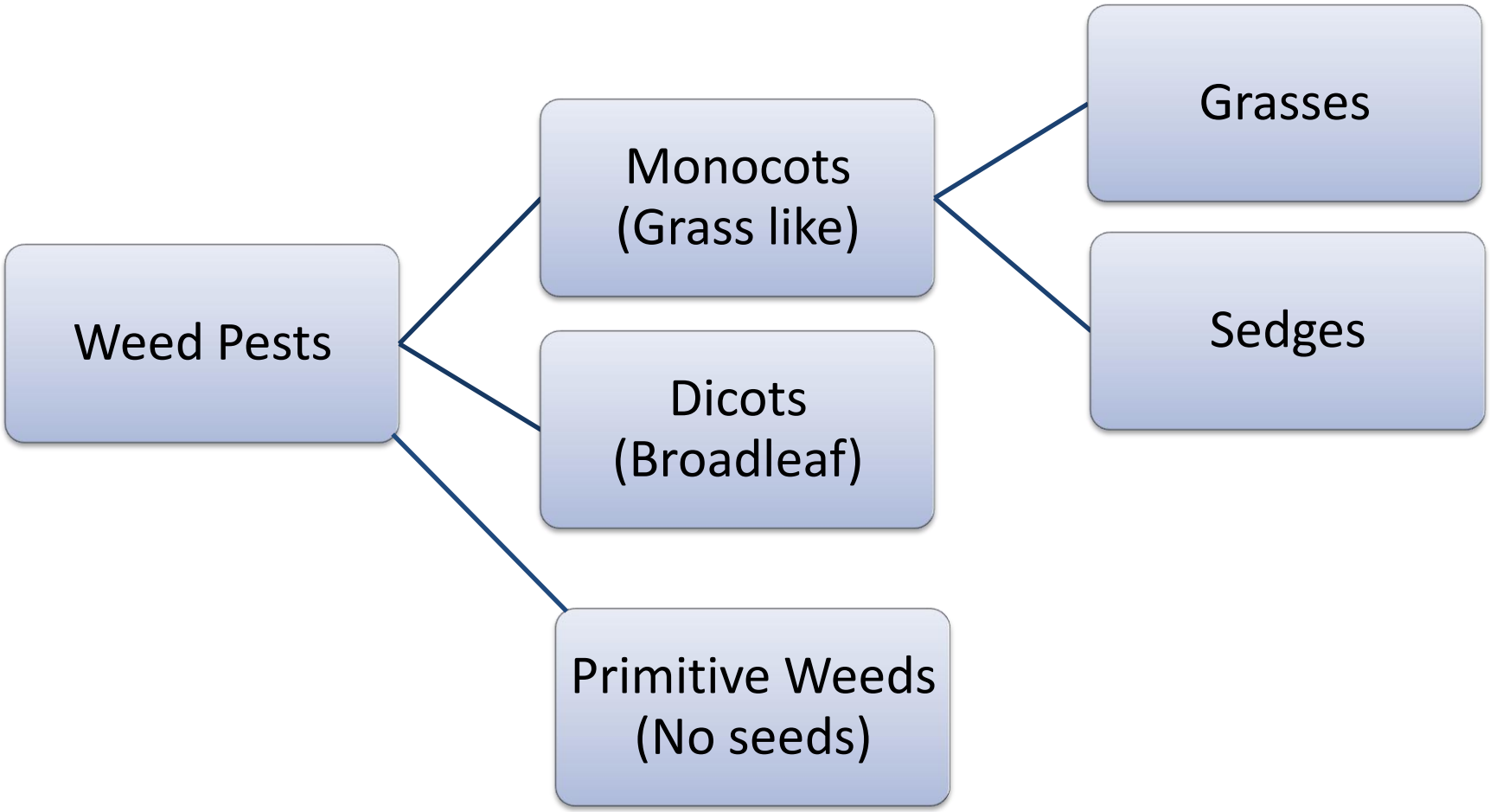
Why does weed ID matter?

- Most important part of weed control:
  - Critical to always ID your pests before beginning your attack (step 1 in IPM)
  - Determines what control measures are needed (and which ones will work)
    - Some herbicides are weaker/better on certain weeds – no herbicide controls all weeds
    - Systemics – perennials
    - Contacts – will work on annuals
  - Could help identify cultural problems at your site
    - Growing too wet = Liverwort, alligator weed, eclipta
    - Dry areas – spurges
    - Nematodes – Florida pusley
  - Promote professional image

Weed ID Basics

- Plant ID usually based on flowers/fruits
  - Can't wait this long to ID weeds in the nursery
- Try to use growth habit, color, smell, feel, season, placement (shade/sun, dry/wet, etc.) to ID
- Goal is to ID and control before seed develops

Where to start…



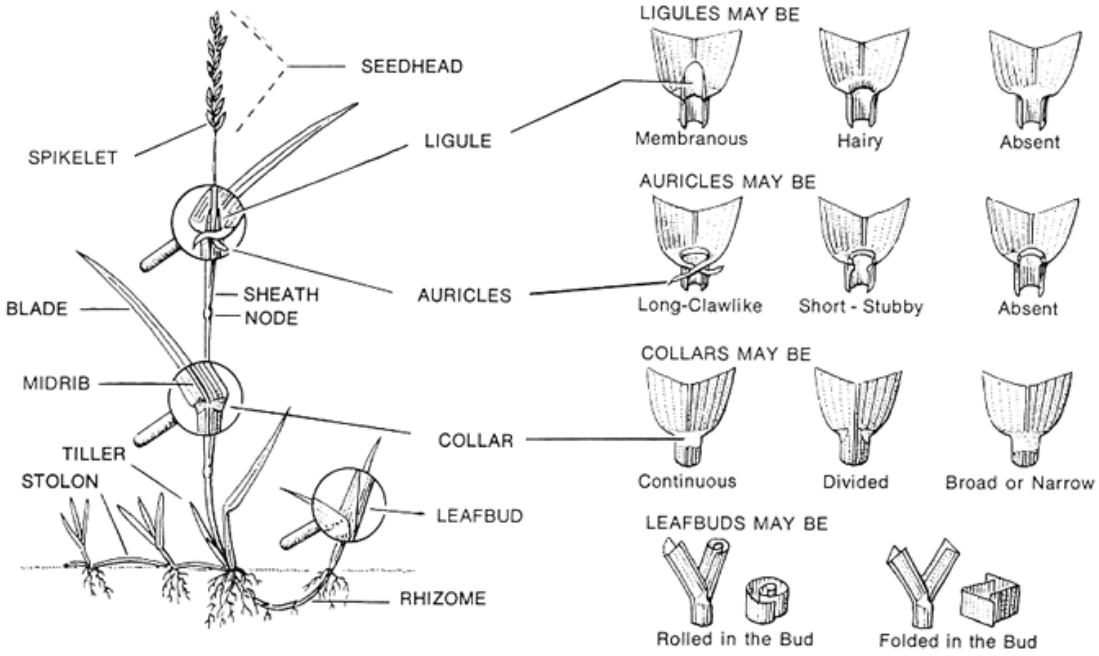
Monocots: The grassy weeds

- One cotyledon or seed leaf inside seed coat
- One single leaf emerges during germination
- Hollow, rounded or flattened stems, closed/hard nodes
- Parallel veins

Monocots: Sedges

- Grass “like” but not true grasses
- “Sedges got edges”– solid triangular shaped stems, leaves extend in 3 directions
- Annual & perennial; perennial are TOUGH to control

Monocot ID

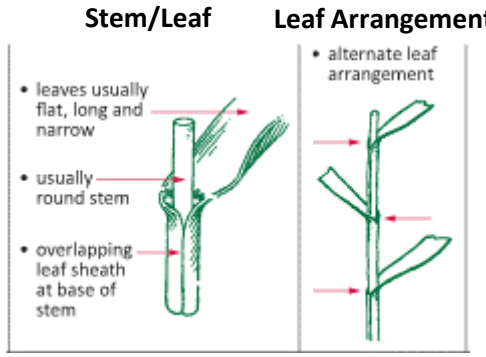


Look for:

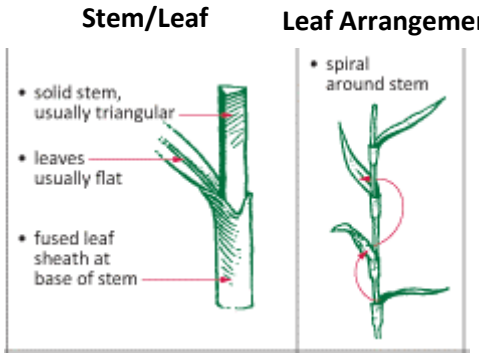
- Stem **shape**

Presence and shape of:

- **Ligule** – membranous scale on inner leaf sheath at junction with blade
- **Auricle** – "claw" appendages at base of blade
- **Collar** – band of meristematic tissue at junction of blade and sheath
- **Sheath** – tubular part of leaf that wraps around stem
- **Midrib** – central vein
- **Root structures** (bulbs, stonlons, etc.)
- **Hair**?



Grass

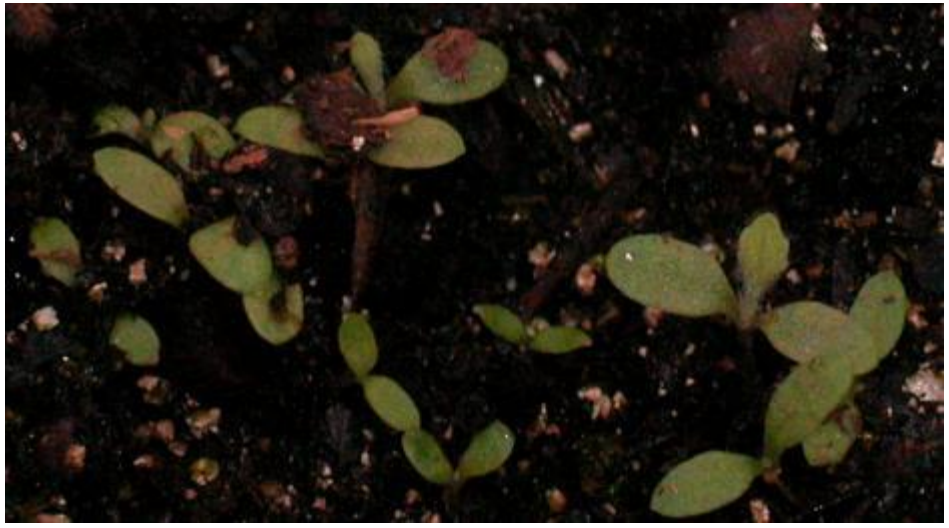


Sedge

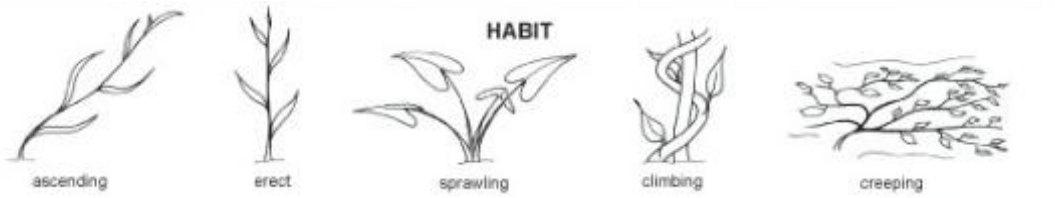
http://www.extension.org/pages/32635/weed-identification-tools-and-techniques#.U86fa_ldV1A; etc.usf.edu

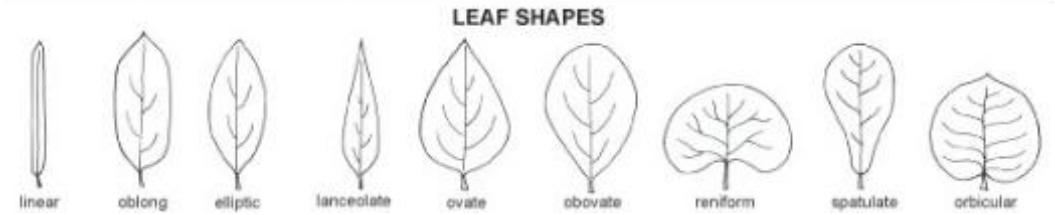
Dicots: Broadleaf weeds

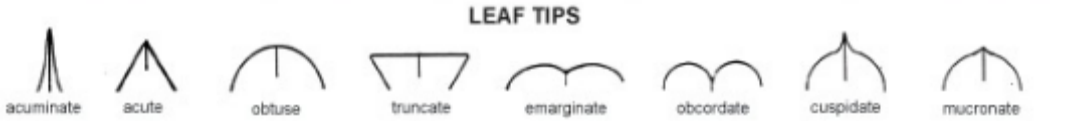
- Two cotyledons inside the seed coat
- Two leaves emerge when germinating
- Highly variable in appearance
- Typically “showy” flowers, net-like veins

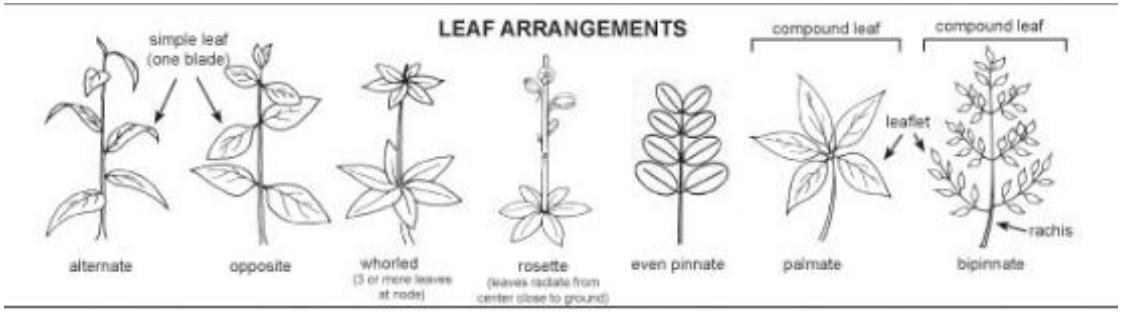


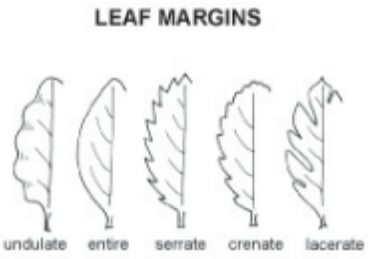
Dicot ID

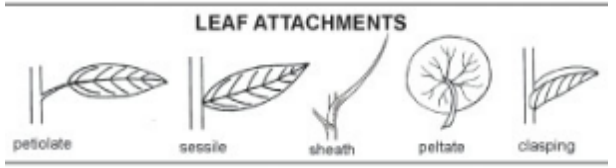


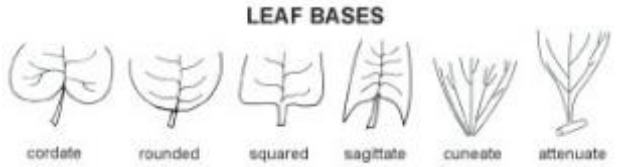












Other ways to ID:

- Root structures
- Flowers
- Fruit

Images courtesy of UF Center for Aquatic and Invasive Plants http://plants.ifas.ufl.edu/education

Primitive, Non-vascular weeds

- Algae (cyanobacteria), moss, and liverworts
- Mossy, slime like plants
- Reproduce sexually by spores, gemmae, or asexually
- Primitive plants – ID by appearance, color, reproductive structures (cup or umbrella like structures)

Rob Routledge, Sault College, Bugwood.org

Where to start…

- Know the life cycle…

Annuals	Biennials	Perennials
(The once a year guests)	(Few are far in between)	(The permanent residents)

Howard F. Shwartz, Colorado St. U., Bugwood.org

- This will help you determine what control options will work

Life Cycles:

- Annuals
  - Complete life cycle in 1 year
  - Grasses, sedges, broadleaves
  - Life cycle can begin at different times of year
- Biennials
  - 2 year life cycle; germinate in fall, develop roots and leaves in first year
  - Produce seed and die in second year
  - Often form a basal rosette of leaves in first year, then “shoot” up and flower in the second (cudweed, thistles)
- Perennials
  - Live more than 2 years
  - Can reproduce from tubers, rhizomes, stolons, or seed
  - Go dormant, lose vegetative growth, regenerate from food reserves in root systems
  - Hard to control with contact/PRE herbicides

Other ID Methods….

- Height and lateral spread
- Branching, arrangement of branches on main stem
- Leaf size
- Leaf/stem color and shape
- Smell and taste (if you dare)

Steve Dewey, Utah St. U., bugwood.org

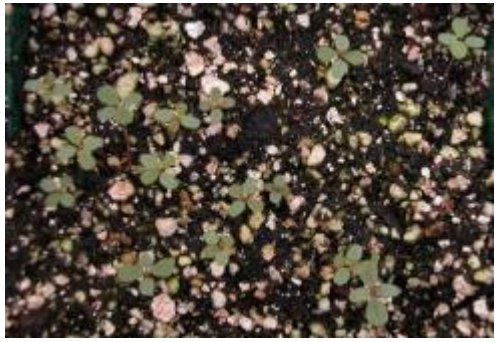
Easy Ways to ID Common Nursery/Landscape Weeds

Chamaesyce ssp. (Spurges)

C. hirta (sandmat spurge)

C. hypericifolia (graceful sandmat)

C. hyssopifolia (Hyssop spurge)



C. maculata (Spotted spurge)

C. graminea (Grassleaf spurge)

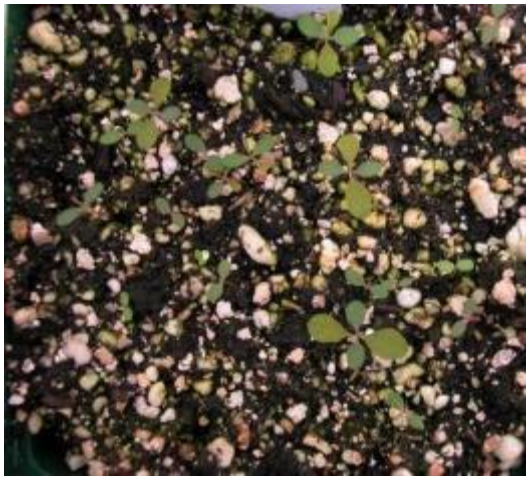
- Very common, drought tolerant
- **Life cycle:** summer annual
- **Leaves:** opposite, toothed, hairs by base
- **Stems:** erect, glabrous, red
- **Flower:** white, appear clustered
- **Roots**: taproot
- **EZ ID:** milky sap, reddish stems, spotted leaves, seed clusters
- **Control:**
  - Handweed before seeding; Many herbicides
  - DNA's, less control with oxadiazon (Ronstar) or oxyfluorfen (Goal)
  - Tower can control early POST

Eclipta prostrata (Eclipta)

- **Life cycle:** summer annual
- **Leaves:** elliptic to lanceolate, lack petiole, serrated at margins
- **Stems:** reddish brown/purple, root at nodes
- **Flowers**: white disk & ray flowers
- **Roots**: fibrous, shallow taproot, HARD TO HANDWEED!
- **EZ ID**: button-like green to black seed head
- **Control**: Many herbicides provide fair control – Indaziflam looks good

Phyllanthus spp. (Longstalk phyllanthus; Gripweed)

- **Life cycle**: summer annual, tropical perennial
- **Leaves:** oblong, smooth, in two rows on branchlets
- **Stems:** single erect stem up to 2’
- **Flowers:** greenish white, round fruit on underside of lateral branches in axils of leaves
- **Roots:** extensive fibrous roots
- **EZ ID:** longstalk leaves more round, fruit have longer petioles, gripeweed fruit are sessile, resemble legume
- **Control:** most PRE’s offer poor to fair control, handweed when small, scout



P. tennellus

P. urinaria

Cardamine spp.
(Pennsylvania bittercress, Hairy bittercress)

- **Life cycle:** winter annual
- **Leaves:** basal rosette of leaves
- **Stems:** thin, green
- **Flowers:** small white flowers and cigar shaped fruit – explosive!
- **Roots:** fibrous
- **EZ ID:** cigar-shaped fruit pop when mature
- **Control:** Most PREs – must stay on top due to prolific seed production; *corymbosa* spreads by stolons (potentially new weed problem)

Leslie J. Mehrhoff, Univ. Conn., Bugwood.org

Oxalis spp. (Oxalis, woodsorrel)

O. stricta
James H. Miller & Ted Bodner, SWSS, Bugwood.org

O. corniculata

O. debilis

Bruce Ackley, Ohio St. U., Bugwood.org

- **Life cycle:** spring/summer annual, into fall and winter
- **Leaves:** 3 heart-shaped leaflets, light green to reddish purple
- **Stems:** erect, weak, branched at base
- **Flowers:** yellow (creeping and yellow ws), 5 petals, green capsules for fruit, become thin when maturing; EXPLOSIVE
- **Roots:** taproot, rhizomes
- **EZ ID:** “tiny okra” fruit, heart leaves in 3’s
- **Control:** Most Pre’s; handweeding; Indaziflam SC takes it out early POST (up to 2 -4 leaf stage)

Bidens alba (Beggarticks)

- **Life cycle:** annual or short lived perennial
- **Leaves:** opposite with depressed midvein, progress to compound leaves with 3-9 saw toothed oval leaflets
- **Stems:** purplish stems
- **Flowers:** stalked clusters, white, has black seeds with hooks that attached to clothing
- **Roots:** taproot, can root at nodes
- **EZ ID:** “needle” like seeds, white 5 petal flowers with yellow center
- **Control:** Most broadleaf herbicides (2,4-D, dicamba, triclopyr, broadspectrum PREs); Aminopyralid (Milestone) provides great control

Pectis prostrata (spreading chinchweed)

- **Life cycle:** Annual
- **Leaves:** linear to lanceolate, 4-12 pairs of setae (bristles, hair-like structures)
- **Stems:** prostrate to ascending, mat forming
- **Flowers:** July to November, yellow, 5 petals
- **Roots:** fibrous
- **EZ ID:** hair-like spins (setae), mat-forming, yellow flowers
- **Control:** Broad spectrum PREs

Portulaca spp. (purslane)

Portulaca pilosa (pink purslane, kiss-me-quick)

Portulaca oleraceae (common purslane)

Portulaca amilis (Paraguayan purslane)

- **Life cycle:** annual
- **Leaves:** alternate, spatulate to lanceolate, obovate; smooth margins
- **Stems:** succulent, smooth, fleshy, purplish to red, forms dense mats
- **Flowers:** yellow (*oleraceae*) to hot pink (*amilis, pilosa*),5 petals
- **Roots:** taproot but rooting at nodes
- **EZ ID:** succulent stems and leaves
- **Control:** Most herbicides, control early due to prolific seed production

Youngia japonica (Asiatic hawksbeard)

- **Life cycle:** annual herb, can persist year round
- **Leaves:** form rosette, hairy, round, wavy margins
- **Stems:**
- **Flowers:** long stalks, ray florets, yellow to orange-yellow, outer petals have tiny teeth
- **Roots:** short taproot
- **EZ ID:** basal rosette of leaves, yellow to orange flowers with 5 tiny teeth at end of outermost petals
- **Control:** Most PREs, can survive winter in the Southeast

Amaranthus blitum (Purple/livid amaranth)

- **Life cycle:** summer annual “pigweed”
- **Leaves:** oval, wider at middle, often with notched leaf tips
- **Stems:** prostrate to ascending, smooth, up to 3’
- **Flowers:** white to greenish/brown; terminal spikes
- **Roots:** taproot system
- **EZ ID:** spikes, growth habit (prostrate), notched leaf tips
- **Control:** Most pre’s should work; control adjacent areas (mow, spot spray) next to pads or where soil was disturbed

Cerastinum fontanum (Mouseear Chickweed)

Theodore Webster, USDA-ARS, Bugwood.org

- **Life cycle:** cool season perennial
- **Leaves:** dark green, opposite, bluntly pointed
- **Stems:** slender, weak, sticky pubescence
- **Flowers:** white with 5 petals
- **Roots:** fibrous, shallow
- **EZ ID:** perennial, sepals and leaves pubescent, darker green foliage, flower petals only slightly notched
- **Control:** Most PREs provide control

Stellaria media (Common chickweed)

- **Life cycle:** winter annual
- **Leaves:** opposite, oval or elliptic, hairy toward base of petiole, upper leaves sessile, lower (older leaves) have long petioles
- **Stems:** prostrate, rooting at nodes, freely branching, soft hairs, often appear reddish
- **Flowers:** solitary or in small clusters, white petals
- **Roots:** shallow, fibrous, a bit frail
- **EZ ID:** hairs pubescent in vertical lines but not distinct, lighter green foliage, notches so deep it appears there are 10 petals
- **Control:** most PREs, oxadiazon (Ronstar) offers poor control

Conyza canadensis (Horseweed, marestail)

- **Life cycle:** winter annual (spring)
- **Leaves:** rosette of hairy leaves, oblanceolate, sessile, entire or toothed margins
- **Stems:** solid, erect, bristly hairs
- **Flowers:** numerous, small white and yellow (disc) flowers in panicle
- **Roots:** fibrous
- **EZ ID: tall** dark green erect plant, sessile leaves
- **Control:** Control with PREs. Glyphosate resistance reported

Cuscuta spp. (Dodder)

Ronald F. Billings, TFS, bugwood.org

Kim Camilli, TFS, bugwood.org

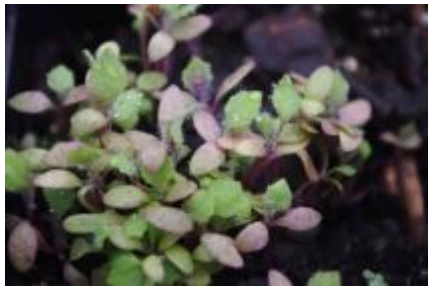
- **Life cycle:** annual – can persist year round in tropics
- **Leaves:** very small "scale-like" 1/16" long
- **Stems**: very thin, usually yellow/orange or pale green
- **Flowers**: small white to pink or cream and bell-shaped
- **Roots** – "haustoria" invade plant vascular tissues; needs a host plant within several days of germinating
- **EZ ID**: leafless looking vines
- **Control:**
  - Use non-host plants (grasses)
  - Remove by hand
  - If attached, prune host plant where attachment was made
  - Use PREs (trifluralin, Snapshot); POST (Scythe, others) but will harm ornamentals

Cyclospermum leptophyllum (Marsh parsley)

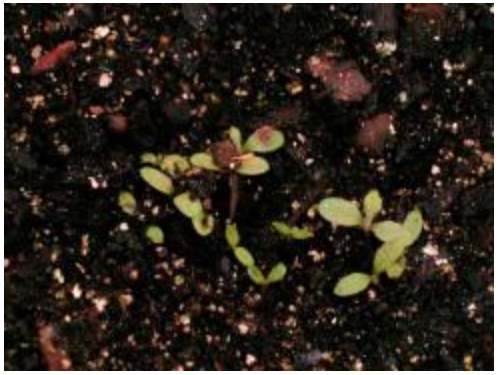
- **Life cycle:** summer annual
- **Leaves:** finely dissected, opposite arrangement
- **Stems:** numerous branched stems originating at base
- **Flowers:** small clusters of tiny white/pinkish flowers in umbels, March - June
- **Roots:** taproot and secondary fibrous root system
- **EZ ID:** finely dissected leaves, upright growth habit,
- **Control:** Use broad-spectrum PRE herbicides

Emilia spp.(tasselflowers)

- **Life cycle:** summer annual
- **Leaves:** wider at base (oblanceolate), toothed margins (resemble sowthistles), winged petioles, leaves on flower stalks clasp stem with no petiole
- **Stems:** hairy when young, upright (2-3')
- **Flowers:** red, pink, light purple; seed heads are small, dandelion-like white globes
- **Roots:** taproot
- **EZ ID:** dandelion seed head, clasping leaves, pink-red flowers
- **Control:** Most PREs should work, keep non-crop areas mowed

E. fosbergii (Florida Tasselflower)

E. sanchifolia (Lilac Tasselflower)

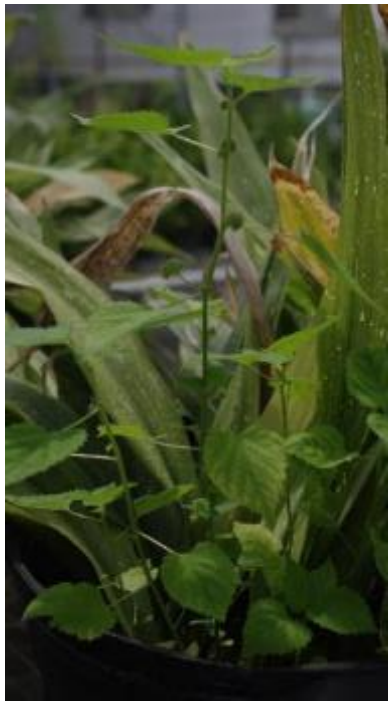
Erechtites hieraciifolia (American burnweed)

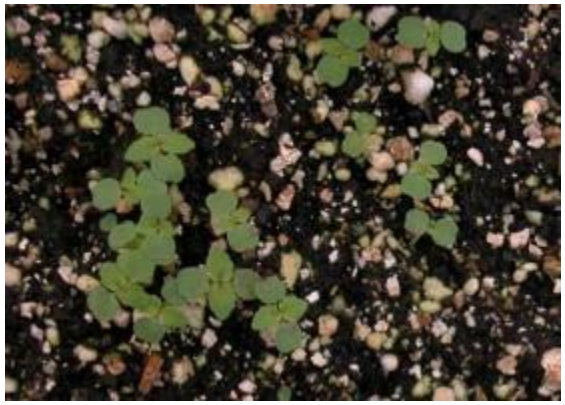
- **Life cycle:** summer annual/perennial
- **Leaves:** elliptic with finely toothed margins, mid-veins often red; mature toothed leaves clasp stem
- **Stems:** erect, thick green stems, round, can grow up to 8’ tall
- **Flowers:** lack petioles, white/cream to yellow in color; seeds white puffy balls
- **EZ ID:** large growth habit, toothed leaves clasping stem
- **Control:** use multiple MOA – single-active herbicides seem to be less effective

Eupatorium capillifolium (Dogfennel)

- **Life cycle:** annual/short lived perennial
- **Leaves:** once or twice pinnately dissected, glabrous
- **Stems:** stout, woody base, hairy, rough (appears dying), unbranched lower down stem, reddish purple or brown
- **Flowers:** highly branched panicle with many heads; achene fruit
- **Roots:** taproot with coarse rhizomes
- **EZ ID:** tall, finely dissected leaves, lower stems brown
- **Control:** IMPOSSIBLE TO HAND-WEED; Hard to weed-eat; control when young; use broad-spectrum PRE herbicides, POST in non-crop areas

Fatoua villosa (Mulberry weed)





- **Life cycle:** summer annual
- **Leaves:** alternate, triangular, undulated or toothed margins
- **Stems:** upright green stems up to 4’ tall
- **Flowers:** feathery green/purple clusters (no petals) in leaf axils
- **Roots:** taproot
- **EZ ID:** looks like mulberry seedling growing in pots with flowers in leaf axils; pubescent all over
- **Control:** Most PREs – be diligent in non-crop areas; hand weed escapes due to prolific seed production

Gnaphalium, Pseudognaphalium, Gamochaeta spp. (Cudweeds)

- **Life cycle:** annuals/short-lived perennials
- **Leaves:** basal rosettes or whorled, simple, lobed or unlobed, oblanceolate to obovate to spatulate, taper toward base, no teeth or lobes
- **Stems:** erect, whitish, can be thick
- **Flowers:** crowded, spikelike, arranged on stem or at base of leaf stalks
- **Roots:** taproot
- **EZ ID:** white whooly hairs all over leaves and stems
- **Control:** Typically grow in low fertility areas but thrive in containers; Most PREs will work

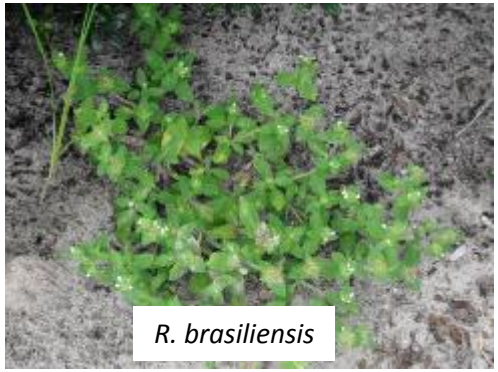
Geranium carolinianum (Carolina geranium)

- **Life cycle:** winter annual/biennial
- **Leaves:** rosette of leaves, deeply 5 to 7 lobed, dissected, bluntly toothed, hairy
- **Stems:** hairy pubescent stems, often pinkish to red in color
- **Flowers:** several flowers in compact clusters at stem tips, white/pink/purple flowers; crane's beak like fruit
- **Roots:** fibrous with shallow taproot
- **EZ ID:** dunce-cap (cranes' bill) fruit, deeply dissected leaves
- **Control:** Many PREs

Parietaria floridana (Florida pellitory)

- **Life cycle:** cool season annual/sometimes perennial
- **Leaves:** alternated, ovate, rounded with short point, pale green in color
- **Stems:** fragile, translucent stems (called “clear weed” often)
- **Flowers:** form in the leaf axil, whitish to green
- **Roots:** fibrous roots
- **EZ ID:** Think triangular shaped leaves, clear translucent stems, flowers in leaf axils
- **Control:** Loves shade and moist soil – most broad-spectrum PREs should work

Richardia spp. (Florida, Brazilian pusley)



R. brasiliensis

R. scabra

- **Life cycle:** annual
- **Leaves:** opposite, ovate to elliptic lanceolate, smooth to rough on both surfaces, rough on main veins; leaf apex rounded to pointed
- **Stems:** hairy, usually do not root at the nodes
- **Flowers:** star shaped, terminal head like cluster of up to 20 flowers, usually accompanied by two smaller leaves; white to pink
- **Roots:** deep fibrous root system, can harbor nematodes; *brasiliensis* has thicker roots
- **EZ ID:** Florida pusley does not have thick, woody roots or stiff hairs on fruits, both have opposite leaves, white start shaped fruit, and small leaves by flowers
- **Control:** can bloom anytime there is no frost – best controlled using broad-spectrum PRE herbicides

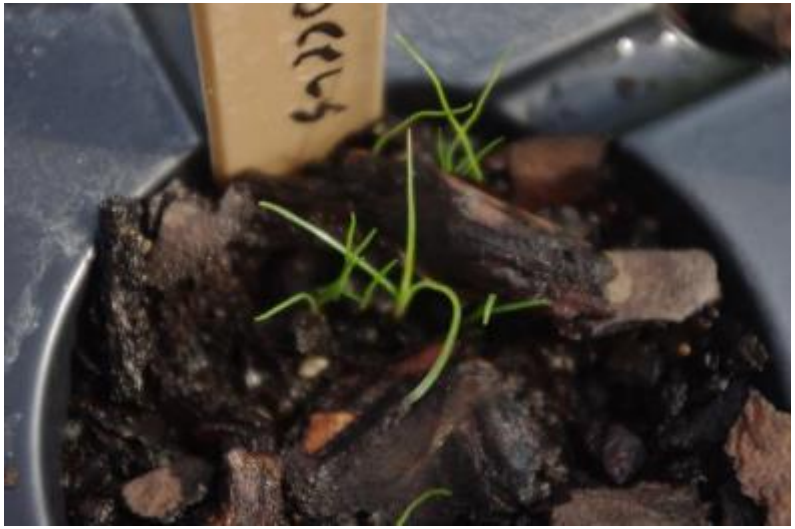
Stachys floridana (Florida betony, Rattlesnake weed)

- **Life cycle:** summer/fall perennial
- **Leaves:** opposite, triangular, toothed margins, long (1.5”) petioles
- **Stems:** greenish to reddish square stems
- **Flowers:** clusters of lavender/purple flowers in upper leaf axils
- **Roots:** thick, rhizomatous root system, segmented tubers (rattlesnake’s tail)
- **EZ ID:** segmented tubers, square stems, triangular toothed margins
- **Control:** prevention is best, most PREs ineffective, dichlobenil (Cassaron) can be effective; prodiamine (Barricade) will stunt plant; repated apps of Rup or broadleaf herbicides will work

Ambrosia artemisiifolia (Ragweed)

- **Life cycle:** summer annual
- **Leaves:** simple, pinnately to bi-pinnately lobed, hairy on top, strong odor
- **Stems:** erect, freely ascending, hairy when young
- **Flowers:** green racemes at ends of branches, droop down often; woody achene fruit
- **Roots:** shallow taproot
- **EZ ID:** finely dissected leaves, underside of cotyledons purple, green racemes, woody achene fruit looks like crown
- **Control:** More of a problem around beds, shade houses etc.; broad spectrum PREs and POSTs

Cyperus croceus (Baldwin's flatsedge)



- **Life cycle:** summer perennial
- **Leaves:** densely tufted leaves, flat smooth blades
- **Stems:** triangular
- **Flowers:** globe like clusters
- **Roots:** fibrous, extensive root system
- **EZ ID:** globe like structures on stalks at top of stem
- **Control:** Exclusion is best; some POST options effective, handweed quickly

Cyperus compressus (Annual Sedge)

Photos courtesy of Charles T. Bryson, USDA-ARS, bugwood.org

- **Life cycle:** summer annual
- **Leaves:** three ranked, dark green, linear lanceolate
- **Stems:** triangular
- **Flowers:** erect, spreading from base, scale like
- **Roots:** fibrous, reddish in color
- **EZ ID:** annual, no bulbs stolons, seed head is flat
- **Control:** PREs effective because it is an annual (spreads only by seeds)

Cyperus esculentus (Yellow Nutsedge)

- **Life cycle:** warm season perennial
- **Leaves:** three ranked, mostly basal leaves, prominent mid-vein, long attenuated tip
- **Stems:** triangular, born individually from tuber
- **Flowers:** yellowish brown/straw colored spikelets, dense
- **Roots:** fibrous, extensive from tubers, rhizomes, and bulbs
- **EZ ID:** densely arranged yellow seed heads, prominent "nuts"
- **Control:** Glyphosate, halosulfuron, others POST; Do not till!

Howard F. Shwartz, CSU, bugwood.org


Steve Dewey, Utah State U., bugwood.org


Mark Czarnota, UGA, bugwood.org

Cyperus rotundus (Purple Nutsedge)

- **Life cycle:** warm season perennial
- **Leaves:** three ranked, mostly basal leaves, dark green, prominent mid-vein, abruptly tapering at tip
- **Stems:** triangular, individually born from tuber or bulb
- **Flowers:** linear, dark red or purple or reddish brown, loosely disposed (not crowded)
- **Roots:** fibrous, slender white rhizomes covered with scales, connected together
- **EZ ID:** reddish purple seed heads, extensive rhizomes, tubers "on a string"
- **Control:** Halosulfuron, glyphosate; less tolerant to cultivation/tilling

Charles T. Bryson, USDA-ARS, bugwood.org

Joseph M. DiTomaso, UC Davis, bugwood.org

Digitaria sanguinalis (Large, hairy crabgrass)

- **Life cycle:** summer annual
- **Leaves:** 1 to 10 inches long, usually hairy on both surfaces, hairy closed sheath
- **Stems:** prostrate, spreading, branched at older nodes, rooting at nodes
- **Flowers:** 4 to 6 spike heads that are 2 to 10 inches long
- **Roots:** fibrous
- **EZ ID:** very similar to smooth crabgrass but has hairs
- **Control:** POST grass herbicides [Fluazifop (Fusilade), clethodim (Envoy), Sethoxydim (Vantage)], DNAs PRE, many others

Digitaria ischaemum (Smooth crabgrass)

Joseph M. DiTomaso, UC Davis, bugwood.org

- **Life cycle:** summer annual
- **Leaves:** 2 to 8 inches long, glabrous (no hairs) on both sides
- **Stems:** prostrate, up to 2” branching at lower nodes, not rooting
- **Flowers:** seed head composed of 2-6 fingerlike branches
- **Roots:** fibrous
- **EZ ID:** no hairs, can have some at mouth of sheath
- **Control:** POST grass herbicides [Fluazifop (Fusilade), clethodim (Envoy), Sethoxydim (Vantage)], DNAs PRE, many others

Lynn Sosnoskie, UGA, bugwood.org

Murdannia nudiflora (Doveweed)

John D. Byrd, Mississippi State, bugwood.org

John D. Byrd, Mississippi State, bugwood.org

- **Life cycle:** summer annual, in spiderwort family (not a grass, it laughs at you if you use grass herbicides)
- **Leaves:** narrow, 2 to 5” long, pointed, parallel veins, alternate and clasping at stem
- **Stems:** succulent, roots at nodes
- **Flowers:** blue to purple colored flowers, open clusters, short stalks
- **Roots:** fibrous
- **EZ ID:** thick green leaves, rooting at nodes, thick clumps, what’s left in the lawn after applying herbicide
- **Control:** difficult to control. Repeated applications of MSMA + 2,4-D post, sulfentrazone – Broadstar (flumioxazin), Pennant Magnum (s-metolachlor) and Tower (dimethenamid-P) controlled this weed PRE (Walker et al., 2010)

Eleusine indica (Goosegrass)

Joseph M. DiTomaso, UC Davis, bugwood.org

Rebekah D. Wallace, Univ. of GA, bugwood.org

Charles T. Bryson, USDA-ARS, bugwood.org

Joseph M. DiTomaso, UC Davis, bugwood.org

- **Life cycle:** summer annual
- **Leaves:** 2 to 14” long, glabrous or few hairs
- **Stems:** flat, erect to spreading, up to almost 3’ tall
- **Flowers:** 2 – 13 fingerlike spikes
- **Roots:** fibrous
- **EZ ID:** stems flattened, whitish green, almost parallel to ground on new plants
- **Control:** PREs, selective grass herbicides

Paspalum dilatatum (Dallisgrass)

James H. Miller and Ted Bodner, SWSS, bugwood.org

Barry Rice, sarracenia.com, bugwood.org

Rebekah D. Wallace, Univ. of GA, bugwood.org

- **Life cycle:** warm season perennial
- **Leaves:** up to 15” long, glabrous except base
- **Stems:** flat, erect to spreading, up to almost 3’ tall
- **Flowers:** 3 to 7 erect branches not paired on stem
- **Roots:** fibrous with short rhizomes
- **EZ ID:** hairs at base of leaf, 3 to 7 racemes not paired with long hairs in the axils
- **Control:** PREs, selective grass herbicides

Marchantia polymorpha (Liverwort)

- **Life cycle:** Can survive anytime temperatures are mild (not extremes) and moist
- **Leaves/Stems:** produces thalli, moss-leaf-like mats on soil surface and ground cloth/nursery pads
- **Flowers:** gemmae cup-like structures – can spread sexually by spores or asexually
- **Roots:** rhizoids that attach plant to soil
- **EZ ID:** umbrella or cup-like heads, dense green mats, alien-lookin'-deal
- **Control:** can be suppressed by some PREs (flumioxazin, dimethenamid-P) and some organics (oregano oil and others); best to change cultural practices, increase air-flow, drainage, allow greenhouse space to dry

Nostoc spp. (Blue-green algaes)

- **Description:** primitive, root-less plant-like organisms; dark green gelatinous masses on plastic, ground cloth, gravel pads; scientifically a bacteria; can cause ground cloth to be very slick
- **EZ ID:** gelatinous greenish brown masses
- **Control:** improve drainage, reduce irrigation or irrigate earlier in the day, some peroxide based disinfectants can be successful (label?)

"Nostoc commune" by YAMAMAYA - Photo taken by YAMAMAYA. Wikipedia.com

“New” Emerging Weed Problems in FL

Alternanthera philoxeroides (Alligator weed)

- **Life cycle:** perennial
- **Leaves:** opposite, entire, elliptic with distinct mid-vein
- **Stems:** simple or branched, smooth, hollow
- **Flowers:** solitary white head on long peduncles; spreads vegetatively but seeds have been confirmed as viable (Holm et al., 1997)
- **Roots:** fibrous roots at stem nodes
- **EZ ID:** aquatic (mostly) with hollow stems, opposite leaves, solitary white flower heads
- **Control:** remove from ponds, streams, non-crop sites; POSTs are effective, no good PREs

Charles T. Bryson, USDA-ARS., bugwood.org

John D. Byrd, Mississippi State U., bugwood.org

James H. Miller, USDAFS bugwood.org

Commelina benghalensis (Bengal Dayflower, Tropical Spiderwort)





- **Life cycle:** perennial, can act as an annual
- **Leaves:** broadly ovate to lanceolate, entire margins, parallel veins, pubescent
- **Stems:** erect or prostrate along ground and can root at nodes, pubescent
- **Flowers:** often in clusters, funnel shaped, violet to light blue in color (other day flowers often have darker flower colors); can produce subterranean flowers/seeds
- **Roots:** fibrous
- **EZ ID:** white underground stems and flowers, parallel veins, wide leaves, violet flowers
- **Control:** Prevent, eradicate, eliminate. Inspect new shipments and sources of materials for presence of BDF. Noxious weed. Glyphosate tolerant. Flumioxazin (SureGuard/Broadstar) provides good PRE control

Mikania micranthra (mile-a-minute)

Andrew Derksen, FDACS/DPI, bugwood.org

- **Life cycle:** Perennial vine; vigorous growth
- **Leaves:** pale green/yellow, opposite, heart-shaped, 2 to 5 in. long, taper to an acute point, serrated
- **Stems:** glabrous, highly branched, can root at nodes
- **Flowers:** panicled corymbs, 4 flowers per cluster, white, single stalk can produce up to 40,000 seeds
- **Roots:** fibrous, can be thick
- **EZ ID:** heart-shaped leaves, thick stems, white flower clusters – still similar to native species (*M. scandens*)
- **Control:** Can grow >3' a week. Call FDACS if spotted. Noxious weed; mowing/cutting does no good; glyphosate (2-3%) + triclopyr (1-2%) will control; dig up, remove, incinerate

Andrew Derksen, FDACS/DPI, bugwood.org

Andrew Derksen, FDACS/DPI, bugwood.org

Parthenium hysterophorus (Ragweed parthenium, Whitetop)

- **Life cycle:** annual
- **Leaves:** alternate, first form basal rosette, finely lobed (pinnatifid to bipinnatifid), pubescent
- **Stems:** erect, paniculatly branched and pubescent
- **Flowers:** white disk flowers on stem tips
- **Roots:** taproot
- **EZ ID:** light green/white pubescent on leaves, white flowers (“white top” name)
- **Control:** glyphosate tolerant; PREs are effective

Crotalaria lanceolata (Lanceleaf rattlebox) and other *Crotalaria spp.* (Rattlebox)

- **Life cycle:** annual legume
- **Leaves:** alternate, 3 foliate or simple, linear to lanceolate to elliptic, upper surface usually glabrous, lower pubescent
- **Stems:** slightly pubescent, green
- **Flowers:** racemes at top of plant, usually yellow to purplish brown; pod darkens with age
- **Roots:** taproot
- **EZ ID:** cylindrical pods with inflated appearance, rattle sound when shaken (at maturity)
- **Control:** Broad spectrum PREs could work; Lontrel possibly

Regulated Ornamentals

- What is a regulated ornamental (or plant)?
  - Plant that has causes severe economic/ecological damage and is now a serious pest
  - State and Federal (USDA) lists noxious weed lists

"It is unlawful to introduce, multiply, possess, move, or release any noxious weed or invasive plant regulated by FDACS or USDA"

  - Can be any living part of the plant
  - Nurseries can be subject to inspections, fined, placed under quarantine, have shipments seized, etc.

Complete listing of all FL noxious weeds and additional information:
www.flrules.org & www.plants.usda.gov

Schinus terebinthifolius (Brazillian peppertree)

Photo courtesy of UF/IFAS Center for Aquatic & Invasive Plants

Photo courtesy of UF/IFAS Center for Aquatic & Invasive Plants

- Introduced into FL because of attractive red berries and other unique characteristics
- Prolific seed producer, spread by birds, water
- Very aggressive, wide-spread in FL, out-competes natives in forest understory
- In Anacardiaceae family (poison oak, ivy, sumac), can cause dermatitis

Ardisia creneta (Coral ardisia)

Photo courtesy of UF/IFAS Center for Aquatic & Invasive Plants

Chris Evans, IL Willife action plan, bugwood.org

Photo courtesy of UF/IFAS Center for Aquatic & Invasive Plants

- Often sold as “Christmas Berry”
- Bright red berries carried off by birds
- Become naturalized in many parts of FL, dominates forest floor and shades out natives
- Suspected to be poisonous to livestock/pets

Ardisia elliptica (Shoebutton)

- Evergreen glabrous shrub or small tree with smooth stems
- Started to invade hammocks, old fields, disturbed wetlands, marsh lands, cypress and mangrove areas

All photos courtesy of UF/IFAS Center for Aquatic & Invasive Plants

Cupaniopsis anacardioides (Carrot wood)

- Attractive grey bark, evergreen foliage, orangeish/yellow fruit
- Produces a lot of seed, spread by birds, high germination percentage
- Now invading beach dunes, islands, marshes, tropical hammocks, mangrove/cypress swamps

Ligustrum sinense (Chinese privet)

All photos courtesy of UF/IFAS Center for Aquatic & Invasive Plants

- Tolerates many different growing conditions (made it a desirable landscape plant)
- Produces hundreds of seeds, spread by wildlife
- Spreads by seeds, or from root or stump sprouts
- Forms dense thickets in natural areas and in landscapes if allowed
- Plant non-invasive cultivars (i.e. variegatum)

Sapium sebiferum
(Chinese tallow/Popcorn tree)

All photos courtesy of UF/IFAS Center for Aquatic & Invasive Plants

Cheryl McCormick, Univ. Florida, bugwood.org

- Can tolerate a variety of growing conditions, growing up to 50’ tall
- Deep tap-roots make young seedlings very drought-tolerant
- Produces a lot of seed, young seedlings sprout up quickly in natural areas and landscapes
- Invades many different areas, sun or shade; leaves and fruit are toxic to cattle

Mimosa pigra (cat-claw mimosa)

Photo courtesy of UF/IFAS Center for Aquatic & Invasive Plants

- Mimosa with thorns on stems, branches, leaves retract when touched
- Can withstand total submergence by forming adventitious roots from stems
- Mature plants can produce over 40,000 seeds per year in pods
- Can tolerate a wide variety of growing conditions (wet to dry)

Potentially Invasive Ornamentals

- Ornamentals that are not regulated, but could become regulated due to invasive potential
  - Associated with higher maintenance costs in the landscape
  - Could possibly spread throughout your nursery
- Category I or II invasive pests by Florida Exotic Plant Pest Council (FLEPPC)
  - Category I – invasive exotics that are **altering native plant communities** by displacing natives, changing community structures, ecological functions, or hybridizing with natives
  - Category II – exotics that have increased in abundance but **not yet altered FL plant communities** the way Category I plants have
  - Complete listings available at www.fleppc.org

Albizia lebbeck, julibrissin (woman's tongue, mimosa)

A. lebbeck

Photos courtesy of UF/IFAS Center for Aquatic & Invasive Plants

- Attractive but can become invasive due to fast growth and wind dispersed seed
- Brittle wood prone to wind damage
- Large diameter roots can damage patios/sidewalks

A. julibrissin

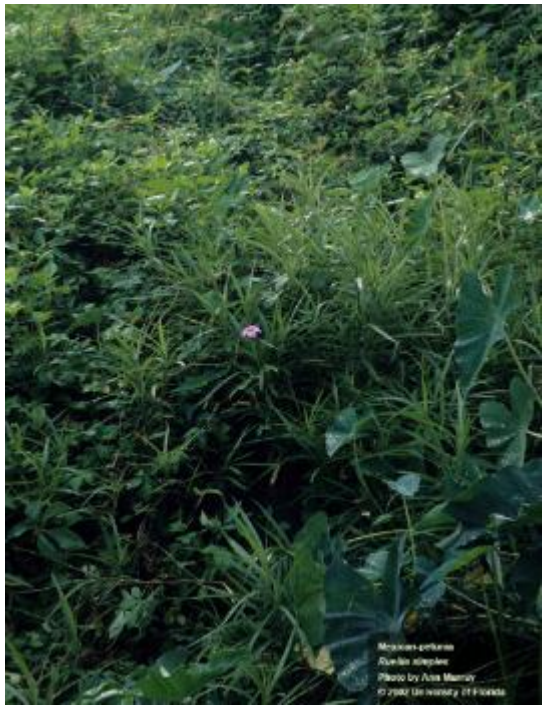
Photos courtesy of UF/IFAS Center for Aquatic & Invasive Plants

Wisteria sinensis (Chinese wisteria)

Photo courtesy of UF/IFAS Center for Aquatic & Invasive Plants

- Introduced in 1800's because of ornamental value
- Showy blooms in spring, but aggressive growing vine
- Stems can reach 15" in diameter, damaging fences and other structures
- Can grow from seeds or rooted stolons (hard to hand weed new seedlings)

Ruellia simplex (Mexican petunia)



Photos courtesy of UF/IFAS Center for Aquatic & Invasive Plants

- Still widely used as an ornamental for showy flowers, but can become hard to control
- Seed spread by storm-water, spreads vegetatively by rhizomes
- Can recover following glyphosate applications
- Hard to remove from landscape areas, not recommended for use in FL, use a sterile or non-invasive variety i.e. ‘Purple Showers’

Nandina domestica (Heavenly bamboo)

- Escaped from cultivation, now found in natural areas
- ‘Firepower’, ‘Gulfstream’, ‘Harbor Belle’, ‘Harbor Dwarf’ not invasive

Photos courtesy of UF/IFAS Center for Aquatic & Invasive Plants

Lantana camara (Lantana)

Photo courtesy of UF/IFAS Center for Aquatic & Invasive Plants

Photo courtesy of UF/IFAS Center for Aquatic & Invasive Plants

- Serious weed problem in some agronomic situations and citrus
- Use sterile/non-invasive varieties (many to choose from)

Melia azedarach (chinaberry)

Photo courtesy of UF/IFAS Center for Aquatic & Invasive Plants

- Showy flowers and fruit make it desirable ornamental
- Birds can spread seed but it is toxic and can paralyze birds; poisonous to other mammals/humans
- Can displace native vegetation because no natural predators exist in US
- Prone to breaking in landscape

Hedera helix (English ivy)

Rebekah D. Wallace, UGA, bugwood.org

Leslie J. Mehrhoff, Uconn, bugwood.org

- Has become a nuisance weed in many states, regulated in Oregon
- Tiny roots can damage walls, grow through windows and doors in abandoned homes
- Many herbicides ineffective; Metsulfuron (Manor) can provide control but difficult to get spray coverage needed

Liriope spicata (Creeping Liriope, Lilyturf)

- Very tough, grows well in deep shade or fun sun, drought tolerant
- Commonly used as a groundcover or border planting
- Similar plant (*L. muscari*) is not as invasive, but *L. spicata* can spread by underground rhizomes
- Hard to remove from landscapes; can tolerate glyphosate up to 5% or more in some situations
- Glyphosate + metsulfuron (Envoy) can provide good control in the landscape

More information and resources…

- Florida EDIS weed management website: https://edis.ifas.ufl.edu/topic_guide_weed_management_guide
- Florida Extension Weed Science: weedext.ifas.ufl.edu
- Center for Aquatic and Invasive Plants: plants.ifas.ufl.edu
- Florida Department of Agriculture and Consumer Services Division of Plant Industry: http://www.freshfromflorida.com/Divisions-Offices/Plant-Industry
- Alternatives to invasive ornamentals: edis.ifas.ufl.edu/ep467
- Florida Invasive species partnership: www.floridainvasives.org
- Florida exotic plant pest council: www.fleppc.org
- Weeds of container nurseries in U.S.; NCSU: www.cals.ncsu.edu/plantbiology/ncsc/containerweeds/

Contact Information

Chris Marble

407-410-6960

marblesc@ufl.edu