UF | IFAS Extension
UNIVERSITY of FLORIDA

EXTENSION ACADEMY

Training on Forage and Weed Identification

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FORAGE AND WEED IDENTIFICATION

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WARM-SEASON PERENNIAL GRASSES

Common Name: Bahiagrass

Scientific Name: *Paspalum notatum*

Life Cycle: Perennial

Morphology: Spreads by J-shaped purplish rhizomes and seed. Seed head two or occasionally three spikes. Forms a dense sod. Very aggressive. Deep rooted. Grows 12 to 20 inches tall.

Reproduction: Seed; plant seed at 15 to 20 lb/A in March to April.

Ecological Adaptation: Best adapted on sandy soils. Tolerant of drought and poor drainage.

Uses: Pasture, hay, and erosion control.

Management: Best used for pasture. Close grazing is desirable. Overseed with winter annuals if desired.

Photo credits: Flora of Zimbabwe, Flora of Zambia, and Wikimedia Commons.

Common Name: Bermudagrass

Scientific Name: *Cynodon dactylon*

Life Cycle: Perennial.

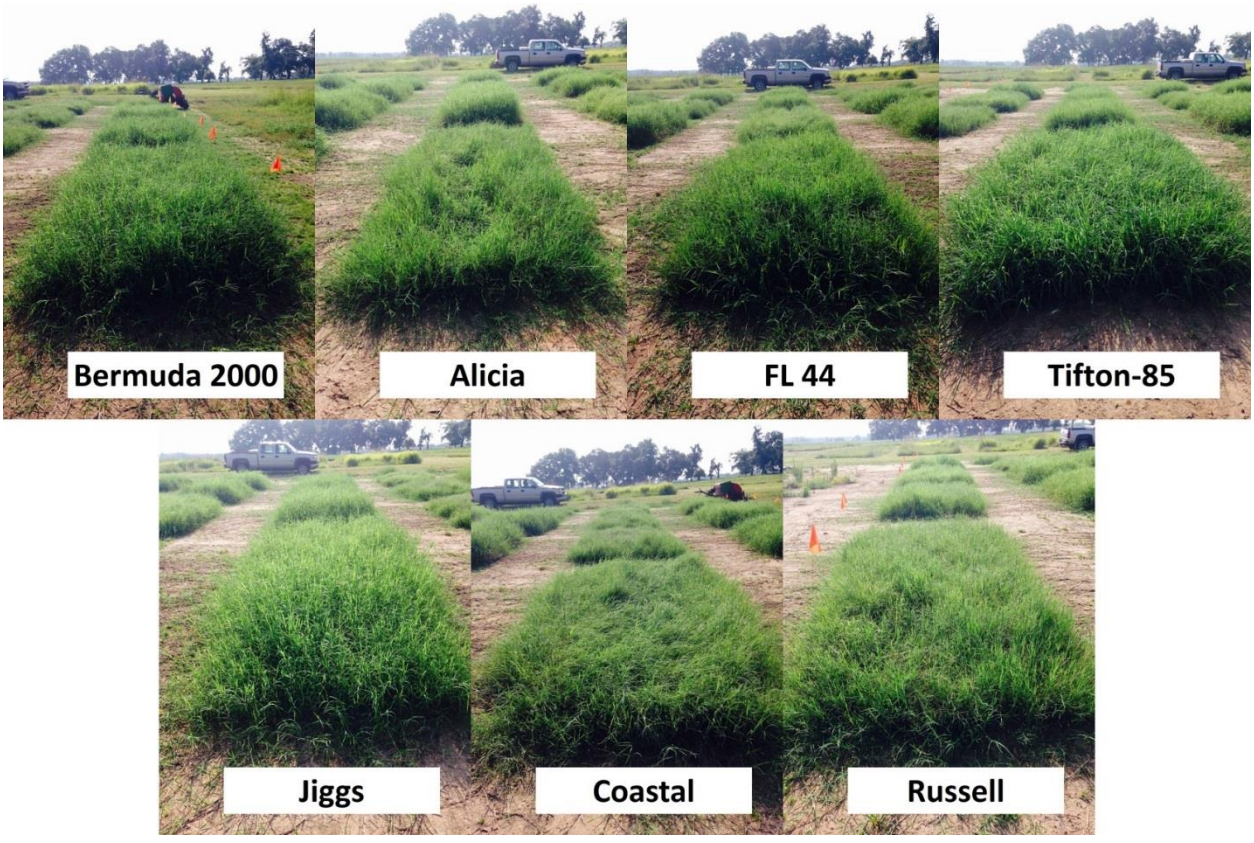
Morphology: Hairy ligule. Seed head three to five slender spikes. Hybrids are deep-rooted. Grows 15 to 24 inches tall.

Reproduction: Spreads by rhizomes, stolons, and (in some types) by seed.

Ecological Adaptation: Best adapted on sandy soils. Extremely drought-tolerant.

Uses: Pasture and hay.

Management: Hay should be harvested at four to six week intervals. With good management, hay yields of 5 to 7 tons/A can be obtained. Should be closely grazed to maintain quality. Annual clovers, small grains, and ryegrass should be overseeded in autumn in winter-spring production is desired.



Seven cultivar of bermudagrass: Photo credits: Dr. Dubeux, UF.

Common Name: Guinea grass

Scientific Name: *Panicum maximum*

Life Cycle: Perennial.

Morphology: Bunch type semi-erect to erect. It has glabrous sheath, pubescent collar, white midrib and brown ligule.

Reproduction: Seeds or clones. Should be planted from May through August in Florida, at a rate of 2-5 lbs acre of viable seed.

Ecological Adaptation: Dry to wet subtropical to tropical. It does better in sand to clay soils with moderate to high fertility. Not grown extensively in Florida.

Uses: Grazing and green chop.

Management: Requires good soil fertility.

Guinea grass. Photo credits: Marangatu and NSWONG.

Common Name: Limpograss

Scientific Name: *Hemarthria altissima*

Life Cycle: Perennial.

Morphology: Erect to decumbent growth. It has long and simple grass leaves, membranous ligule, and spikelike raceme inflorescence.

Reproduction: Vegetative planting of stems tops or stolons from June-August at a rate of 1000 to 1500 lbs per acre.

Ecological Adaptation: Subtropical to tropical wet. Requires fertile of fertilized sand to clay soils, and tolerates poor drainage; moist to wet soils preferred. Usually the growth season is extended if no frost occurs, especially in South Florida.

Uses: Grazing, green chop, and hay.

Management: No less than 12 inches when rotationally grazing (stocking). When continuously stocking, no less than 16 inches of stubble height should be left to ensure adequate stand persistence regardless of where in the state it is planted. Plant material that reaches 20 to 24 inches tends to lay flat where cattle will likely trample on it; if not used, it will build up an undesired thatch.

Limpograss. Photo credits. University of Florida/IFAS Agronomy, Forages of Florida; and Erick Santos.

Common Name: Mulato

Scientific Name: *Brachiaria spp*.

Life Cycle: Perennial.

Morphology: Upright growth habit, large leaves, hairy leaves and ligule. It has a raceme-like panicle inflorescence.

Reproduction: Seed; should be planted in humid to wet season, June through August in Florida at a rate of 10 lbs per acre.

Ecological Adaptation: Humid wet tropical or subtropical; sand to clay soils. Adapted to well-drained to moist soil; not well adapted to poorly drained sites.

Uses: Grazing.

Management: As with any forage species, proper fertility and grazing management are very important for weed control. Weed management in Mulato, since it is a bunch-type grass, may be more challenging than for bahiagrass and bermudagrass. This makes fertility and grazing management very important with regards to weed control.

Mulato. Photo credits: University of Florida/IFAS Agronomy. Forages of Florida.

WARM-SEASON ANNUAL GRASSES

Common Name: Browntop millet

Scientific Name: *Panicum ramosum*

Life Cycle: Annual.

Morphology: Erect, 2 to 3 feet tall. Leafy, fine-stemmed. Seed head a yellow to brown panicle.

Reproduction: Seed; Seed drilled at 15 to 20 lb/A or broadcast at 25 to 30 lb/A in April-August. Growing season about 60 days.

Ecological Adaptation: Does not produce well on calcareous soils.

Uses: Pasture and hay.

Management: Hay should be cut at heading. Usually a one-cut crop.

Browntop millet. Photo credits: Green cover seed.

Common Name: Pearl Millet

Scientific Name: *Pennisetum glaucum*

Life Cycle: Annual.

Morphology: Erect, 3 to 8 feet tall. Leafy. Very wide leaves serrated at margins; hairy ligule. Seed head a large cylindrical spike.

Reproduction: Seed. Seed are drilled at 12 to 15 lb/A or broadcast at 25 to 30 lb/A in April-June.

Ecological Adaptation: Best adapted on sandy soils. Does not do well on calcareous soils. Tolerant of drought and soil acidity.

Uses: Pasture and silage. Difficult to make hay because of thick stems. High nutritive value if harvested at immature stage. Nitrate accumulation can cause toxicity under some circumstances.

Management: Requires high stocking rate, preferably with rotational stocking. Stems may need to be mowed after grazing. Should be cut for hay when plants are 30 to 40 inches tall.

Pearl Millet. Photo credits: University of Florida/IFAS Agronomy, Forages of Florid; and Alchetron

Common Name: Sorghum

Scientific Name: *Sorghum bicolor*

Life Cycle: Annual.

Morphology: Coarse-stemmed. Erect, 4 to 15 feet tall. Grain types are short with large seed heads. Forage types are tall with small seed heads.

Reproduction: Seed; Seed are drilled in wide rows at 4 to 6 lb/A or broadcast at 15 to 20 lb/A in May-June.

Ecological Adaptation: Very drought-tolerant. Not tolerant of highly acid soils.

Uses: Silage. Nutritive value is 85 to 90 percent of corn silage. Nitrate accumulation or prussic acid can cause toxicity under some circumstances.

Management: Harvested for silage when seeds are in early dough stage.

Sorghum. Photo credits: King's AgriSeeds Inc.

WARM-SEASON LEGUMES

Common Name: Aeschynomene, American jointvetch, or deer vetch

Scientific Name: *Aeschynomene americana*

Life Cycle: warm-season annual.

Morphology: Erect growing, herbaceous and branching plant. It has pubescent stems with reddish color. There are usually 10-30 pairs of leaflets per leaf that are sensitive to touch.

Reproduction: Seed.

Ecological Adaptation: Adapted to humid subtropical to tropical climates. It grows from April to November in Florida and it grows best in moderate to poorly drained wet soils, and in both clay to sandy soils.

Uses: Grazing.

Management: There are very few pests or insect problems reported. If grazing, it is suggested to graze when plants reach heights of 18 inches, and graze to 8-14 inch stubble in order to achieve maximum regrowth. It is important to not leave Aeschynomene ungrazed as to avoid the plants becoming woody and unpalatable.

Aeschynomene americana. Photo credits: University of Florida/IFAS Agronomy. Forages of Florida. Right: Ravan Schneider (phytoimages.siu.edu, ref. DOL55585).

Common Name: Carpon desmodium

Scientific Name: *Desmodium heterocarpon*

Life Cycle: Perennial.

Morphology: Semierect to prostrate growing species. It has three leaflets per lead with mottled leaflet marks and dense pink to purple racemes.

Reproduction: Seed.

Ecological Adaptation: Adapted to humid subtropical to tropical climates. And sand to clay soils of moderate pH. It grows mostly in South Florida from moderately well to poorly drained soils. It typically grows from April to October

Uses: Grazing and hay.

Management: It should not be planted into soils infected with rootknot nematode.

Carpon desmodium. Photo credits: Medical Plants.

Common Name: Stylo

Scientific Name: *Stylosanthes guianensis*

Life Cycle: Perennial in South Florida, annual in North Florida.

Morphology: Semierect to erect growing species. It has three leaves that are pronounced and pointed at the tip. Stylo can grow up to 4 ft. tall.

Reproduction: Seed.

Ecological Adaptation: Adapted to subtropical to tropical climates. It is not frost tolerant but can tolerate dry to wet climates. Stylo tolerates sandy soils with low pH and low fertility. It typically grows from April to November.

Uses: Grazing and hay.

Management: Stylo is not susceptible to any major insect problems but it is susceptible to anthracnose.

Stylo. Photo credits: Agrossol sementes, BRSEEDS, and Tropical Forages.

Common Name: Phasey Bean

Scientific Name: *Macroptilium lathyroides*

Life Cycle: Annual.

Morphology: Erect, branching species. Phasey beans is trifoliate with 3-8 cm long and 1-3.5 cm broad leafslets.

Reproduction: Seed.

Ecological Adaptation: Adapted to humid to dry, subtropical to tropical climates. It is adapted to infertile soils from sand to clay. It typically grows from April to October.

Uses: Wildlife feed and grazing.

Management: It should not be planted into soils infected with rootknot nematode.

Phasey bean. Photo credits: Sheldon Navie.

Common Name: Alyceclover

Scientific Name: *Alysicarpus vaginalis*

Life Cycle: Warm-season annual.

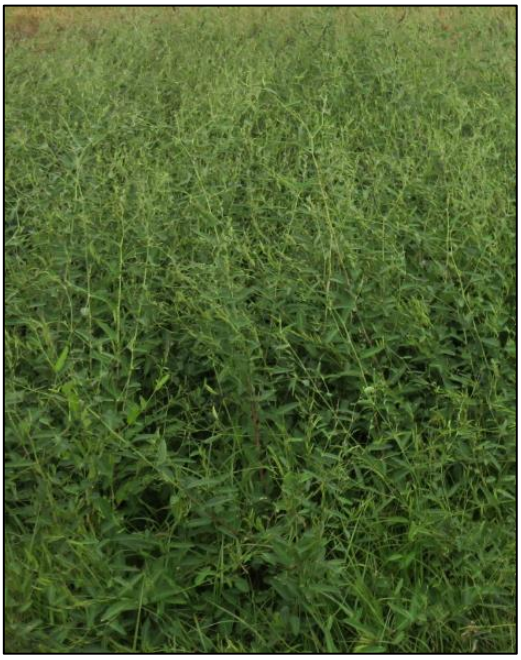
Morphology: Erectly branching plant growing up to 3 ft. It has thin stems with single leaflet per leafs. It has pink flowers and leaf marks in the midvein.

Reproduction: Seed.

Ecological Adaptation: Adapted to hot humid wet tropical climates. It typically grows in sandy to clay soils of moderate fertility. It grows throughout Florida, especially in moist but well drained soils. Alyceclover grows typically between May through September.

Uses: Grazing and hay. High nutritive value. Maintains quality well in late summer.

Management: Best adapted to well-drained, sandy soils. Grazing should begin at 12 to 15 inches. Hay should be cut at 18 to 24 inches. A second cutting of hay is possible under favorable growing conditions. Reseeding is not dependable.



Alyceclover. Photo credits: Doug Mayo and University of Florida/IFAS Agronomy. Forages of Florida.

Common Name: Arrowleaf Clover

Scientific Name: *Trifolium vesiculosum*

Life Cycle: Cool-season annual.

Morphology: Semierect to prostrate growing species. The leaves tend to have pointed tips. There is no pubescence at the petiole, which marks the difference with red clover. Arrowleaf clover has white to cream-colored flowers.

Reproduction: Seed.

Ecological Adaptation: Adapted to cool humid seasons to subtropics and temperate areas. It grows well throughout North central and West Florida in sandy soils and clay soils if fertile. Arrowleaf clover grows best under well drained areas from November to May.

Uses: Grazing and hay.

Management: It should not be planted into soils infected with rootknot nematode. It is typically affected to root rots and several virus diseases.

Arrowleaf clover. Photo credits: Pasture Genetics.

Common Name: Leucaena

Scientific Name: *Leucaena leucocephala*

Life Cycle: Perennial.

Morphology: Branching, upright growing small tree. Leucaena has leaves that are sensitive to touch. In Florida, it grows mostly in South Florida.

Reproduction: Seed.

Ecological Adaptation: Adapted to cool humid seasons to subtropics and temperate areas. It grows well throughout North central and West Florida in sandy soils and clay soils if fertile.

Uses: Grazing or cut and carry.

Management: Leucaena is relatively free of diseases.

Leucaena. Photo credits: Guide to Poisonous Plants, Colorado State University; and J. Baniszewski.

Common Name: Hairy Indigo

Scientific Name: *Indigofera hirsuta*

Life Cycle: Reseeding annual legume.

Morphology: Erect growing species. It has stems and petioles that are covered with reddish brown hairs. It also has red flowers on dense, long racemes.

Reproduction: Seed.

Ecological Adaptation: Adapted to humid to dry and subtropical to tropical climates. It can grow in sandy or clay soils with marginal to low fertility. Hairy Indigo is found throughout Florida, growing from April to October.

Uses: Grazing, silage, or soil improvement.

Management: Hairy Indigo is resistant to most pests and diseases.

Hairy Indigo. Photo credits: University of Florida/IFAS Algunas Malezas de Costa Rica y Mesoamerica.

Common Name: Rhizoma Peanut

Scientific Name: *Arachis glabrata*

Life Cycle: Warm-season perennial.

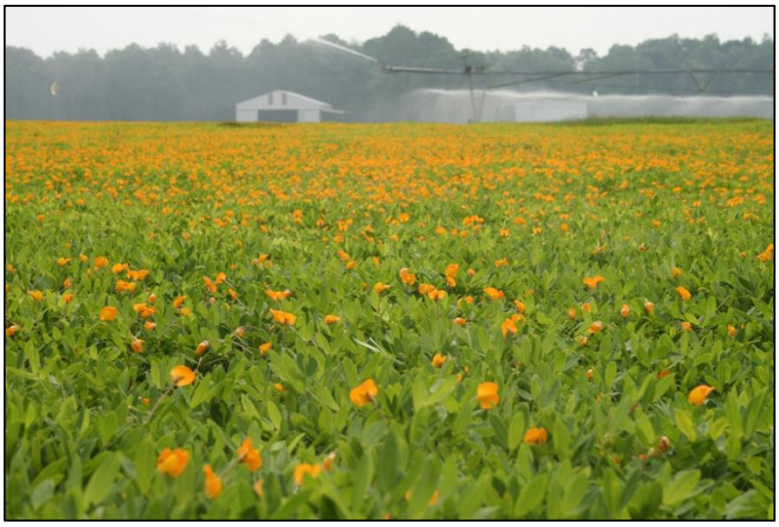
Morphology: Prostrate to semierect growing species. It has two pairs of leaflets per leaf. Rhizoma peanut produces yellow flowers.

Reproduction: Vegetative.

Ecological Adaptation: Adapted to humid to dry and subtropical to tropical climates. It grows mostly on sandy soils, and it is found in north, central, and west Florida. Rhizoma peanut grows from March to October.

Uses: Grazing, and hay.

Management: Rotational stocking that allows at least a three-week rest between grazing periods of 10 days or less in best, but continuous stocking to maintain a height of at least 4 inches can be used. Two to three hay cuts can be obtained per year. No cutting should be made five to six weeks before killing frost to allow replacement of rhizome food reserve.



Rhizoma peanut. Photo credits: University of Florida/IFAS, Agronomy, Forages of Florida.

Common Name: Sunnhemp

Scientific Name: *Crotalaria juncea*

Life Cycle: Warm-season annual.

Morphology: Branched, erect, shrubby, fibrous ridged stems that grow between 3 and 9ft tall. The leaves are oblong shaped, and are typically 5 inches long and up to 1.5 inches wide. It produces bright yellow flowers.

Reproduction: Seed.

Ecological Adaptation: Adapted to humid to dry and subtropical to tropical climates. It is adapted to a wide range of soils, and grows well on infertile sandy soils. It typically grows best on well-drained soils with pH ranging from 5.0 to 7.5.

Uses: Cover crop.

Management: Some species in the *Crotalaria* family contain toxic alkaloids. 'Tropic Sun' is non-toxic and is resistant to rootknot and reniform nematodoes.

Sunnhemp. Photo credits: Erick Santos and Hancock Seed Company.

COOL-SEASON GRASSES

Common Name: Annual Ryegrass

Scientific Name: *Lolium multiflorum*

Life Cycle: Annual.

Morphology: It is a semi-erect to erect bunch grass, yellowish-green at the base, with long glossy green leaves up to 12" each. The plant may reach up to four feet in height at maturity.

Reproduction: Seed.

Ecological Adaptation: It is tolerant of wet soils and temporary flooding, will grow in sandy soils but is better adapted to heavy clay or silty soils. It also responds well to P on eroded soils. Annual ryegrass tolerates a pH range of 5-8 with the optimum between 6 and 7.

Uses: Grazing, green chop, ground cover.

Management: Requires seedbed preparation: weed free, clean tilled, and even surface. Seeded shallow or topseeded and lightly covered with soil. Ryegrass will tolerate close continuous grazing. It should be planted alone in the Gulf Coast area, but in the north is usually planted with small grains or clover.

Annual ryegrass. Photo credits: Erick Santos and UF/IFAS EDIS.

Common Name: Oat

Scientific Name: *Avena sativa*

Life Cycle: Annual

Morphology: Prostrate to erect. The leaves are non-auriculate, green, and the sheaths rounded on the back; ligules are blunt and membranous. The inflorescence is a diffuse panicle with 2 – 3 florets.

Reproduction: Seed.

Ecological Adaptation: Require well drained soils, with moderate fertile or fertilized. It is a cool season grass in semi-tropics and warm season in temperate zones. *Avena sativa* is a very useful 'nurse' crop to grow with winter clovers.

Uses: Grazing, grazing and grain production, green chop, grass silage or grain.

Management: Stocking rate should be adequate to utilize forage. If cut for hay or silage, the harvest should be made in the boot early heading stage. It could be planted as a companion crop with annual legumes to extend the production season and maintain forage quality.

Oat. Photo credits: Ann Blount and UF/IFAS EDIS.

Common Name: Triticale

Scientific Name: *X triticosecale spp.*

Life Cycle: Annual

Morphology: It is a bunch type grass with upright tillers. Leaves are rolled in the whorl. Triticale has a spike with one spikelet per node each containing several florets. The stems grow upright, have hollow internodes, and are smooth. The root system is fibrous.

Reproduction: Seed.

Ecological Adaptation: It is adapted to a wide range of soils and requires only moderate fertility and moisture. It does not tolerate flooding and is only slightly drought resistant.

Uses: Green chop, silage, grazing, and can be used for grain.

Management: Triticale is slightly more susceptible to ergot than wheat. Crop rotation and tillage is recommended to reduce incidence. Bromoxynil (Buctril) is registered for broadleaf weed control in triticale. Stocking rate should be adequate to utilize forage. If cut for hay or silage, the harvest should be made in the boot early heading stage. It could be planted as a companion crop with annual legumes to extend the production season and maintain forage quality.

Triticale. Photo credits: Doug Mayo.

Common Name: Tall Fescue

Scientific Name: *Festuca arundinacea*

Life Cycle: Perennial

Morphology: Tall fescue does produce short rhizomes but has a bunch-type growth habit. It spreads primarily by erect tillers. Individual tillers, or stems, terminate in an inflorescence, reach 3 to 4 feet in height, and have broad, dark green basal leaves. Leaf blades are glossy on the underside and serrated on the margins. The leaf sheath is smooth and the ligule is a short membrane. The inflorescence is a compact panicle, with lanceolate spikelets.

Reproduction: Seed.

Ecological Adaptation: It is adapted to a wide range of soil and climatic conditions, but performs best on well drained clay soils. Tall fescue demonstrates good shade tolerance in the southern region and remains green year-round under irrigated conditions.

Uses: Grazing and hay.

Management: If is endophyte-infected, will tolerate heavy grazing. Red clover or alfalfa can be growth with tall fescue. The first harvest of hay should be cut in the late boot stage for high quality.

Tall Fescue. Photo credits: University of Wyoming, Department of Plant Science.

Common Name: Rye

Scientific Name: *Secale cereale*

Life Cycle: Annual

Morphology: It is an erect bunch grass, with flat leaf blades, and auricles that are not hairy. The leaves are blue-green and it has dense flower spikes. Each large spike consists of many 2-flowered spikelets with long awns. The grain is relatively large, typically around ½ inch long.

Reproduction: Seed

Ecological Adaptation: It is adapted to sandy, or acid soils, as well as on poorly prepared land. It grows better on light loams and sandy soils than on heavy clay soils. Rye grows with pH of 5.6 to 5.8 or higher. It is also able to germinate in relatively dry soils, and is fairly tolerant to droughty conditions.

Uses: Grazing, forage and grain, hay, green chop, grass silage.

Management: Stocking rate should be adequate to utilize forage. If cut for hay or silage, the harvest should be made in the boot early heading stage. It could be planted as a companion crop with annual legumes to extend the production season and maintain forage quality.

Rye. Photo credits: Organic Gardening with a common sense approach.

Common Name: Wheat

Scientific Name: *Triticum aestivum*

Life Cycle: Annual.

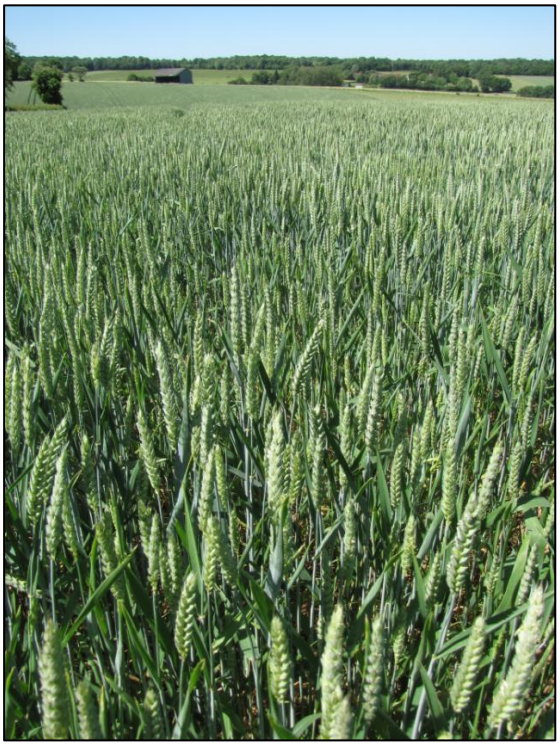
Morphology: Erect bunch grass, with hairy auricles, and the leaf sheet is not hairy. The open leaf sheaths are bluish or grayish green, glabrous, and sometimes glaucous. The ligules are short-membranous while the nodes are swollen and glabrous. The floral spikes are grayish or bluish green with darker markings; they are cylindrical-bristly in appearance. Each floral spike has multiple overlapping spikelets that are appressed against the rachis. Each spikelet consisting of a pair of glumes at the bottom and 2-5 florets with lemmas above. The root system is fibrous.

Reproduction: Seed.

Ecological Adaptation: Requires well drained and fertile soils. Tolerate a wide range of temperature (from 4 to 27°C) and precipitation (from 190 to 2500 mm) and pH of 4.5 to 8.3. Yield response to nitrogen fertilizer is determined by moisture, soil, type of seedbed, and crop stand.

Uses: Grazing, green chop or grain.

Management: Stocking rate should be adequate to utilize forage. If cut for hay or silage, the harvest should be made in the boot early heading stage. It could be planted as a companion crop with annual legumes to extend the production season and maintain forage quality.



Wheat. Photo credits: Feedpedia and UF/IFAS EDIS.

COOL-SEASON LEGUMES

Common Name: Crimson clover

Scientific Name: *Trifolium incarnatum*

Life Cycle: Winter annual.

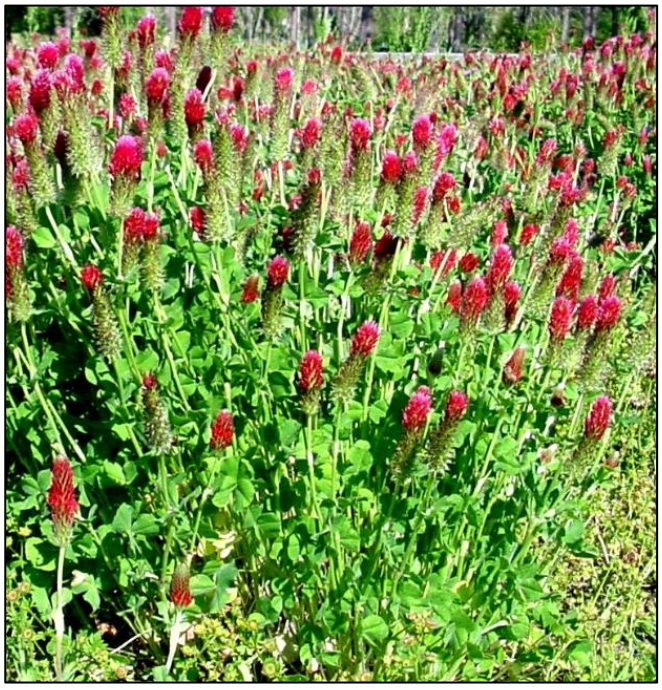
Morphology: Semierect to prostrate, and with a shallow taproot system. The leaves and petioles are dark green and covered with dense hairs. Leaflets with rounded to heart shape. The leaflets do not have leaf water marks. Inflorescence with terminal head with deep crimson red florets.

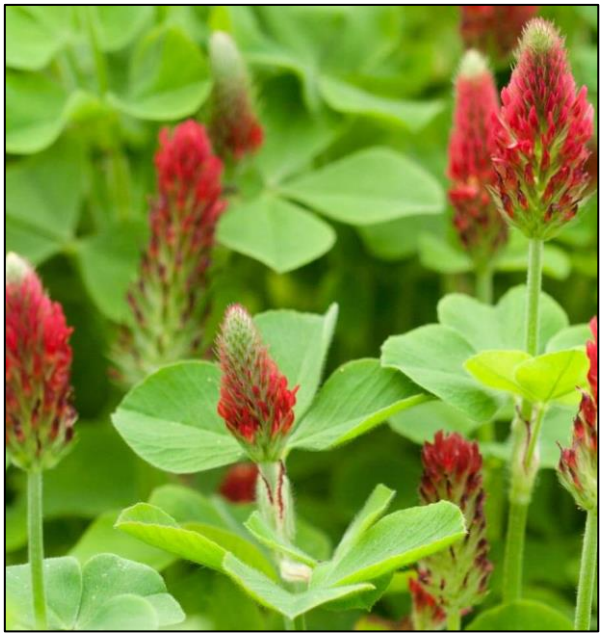
Reproduction: Seed.

Ecological Adaptation: Adapted to the heavier, well-drained soils of Florida, performing poorly on dry, sandy, and poorly drained sites. It adapts to cool humid seasons of subtropics and temperate areas in sand to clay, fertilized soils. Crimson clover grows well in mixtures with small grains, grasses and other clovers.

Uses: Graze and green chop.

Management: Can be grazed throughout winter but, if hay is desired the cattle must be removed by mid-March.





Crimson clover. Photo credits: Doug Mayo and West Coast Seeds.

Common Name: White clover

Scientific Name: *Trifolium repens*

Life Cycle: Perennial, but could be annual under some management situations.

Morphology: It has a prostrate, stoloniferous growth habit. The leaves are composed of three leaflets, which may or may not have a “crescent” or “water mark” on the upper surface. Leaves and roots develop along the stolon at the nodes.

Reproduction: Seed.

Ecological Adaptation: White clover grows best under cool temperatures and on fertile, well-drained soils with good moisture holding capacity. It can be grown in combination with most grasses under good management.

Uses: Grazing, ground cover, soil improvement.

Management: Grass should be planted in wide rows and clover broadcast to reduce competition. Adequate potassium and phosphorus are important for good production. Grazing should be sufficient to maintain forage height at 1 to 4 in.

White clover. Photo credits: UniProt and Outsidepride.com.

Common Name: Alfalfa

Scientific Name: *Medicago sativa*

Life Cycle: Perennial.

Morphology: It is an erect, upright-growing perennial with many leafy stems arising from large crowns at the soil surface. Also, has a long taproot, making it drought tolerant, and it may grow as tall as 24–36 inches.

Reproduction: Seed. Seed rate is 12 to 20 lb/A.

Ecological Adaptation: Alfalfa require more management than clovers, it requires K and P fertilizations after every harvest and favorable moisture conditions. It grows well in moderately- to well-drained sites.

Uses: Hay, haylage, green chop.

Management: For hay production, 4 to 7 cuttings can be made each year. It is recommended to harvest at the early bloom stage to obtain acceptable forage and nutrient yields. Grazing tolerant varieties can be continuously stocked.

Alfalfa. Photo credits: Erick Santos and Doug Mayo.

Common Name: Red clover

Scientific Name: *Trifolium pratense*

Life Cycle: Biannual/short-lived perennial in temperate areas, winter annual in Florida.

Morphology: Semierect growth, with pointed leaflets with water marks. Red clover plants grow from crowns. Plants have hollow, hairy stems and branches. The taproot of red clover is extensively branched. Flowers are borne in compact clusters or heads and are usually rose-pink in color.

Reproduction: Seed.

Ecological Adaptation: Red clover grows best on well-drained loamy soils, but it will also grow on soil that is not as well-drained. Medium and fine textured soils are preferred by the plant over sandy or gravelly soils. It is best adapted to a pH of 6.0 or higher.

Uses: Grazing, green chop, hay and soil improvement.

Management: Hay should be cut in early bloom stage. Red clover will not tolerate continuous close grazing over long periods of time.

Red clover. Photo credits: Agronomator.

Common Name: Ball clover

Scientific Name: *Trifolium nigrescens*

Life Cycle: Annual

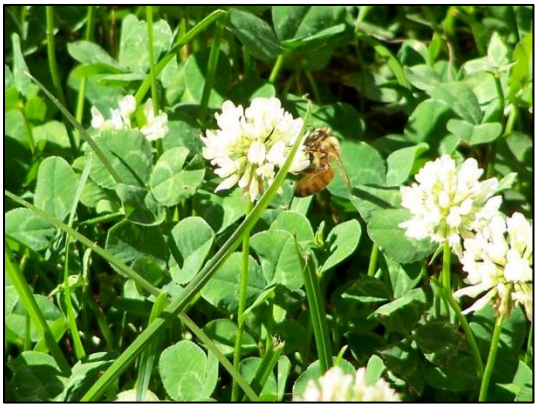
Morphology: Erect growth, similar in appearance to white clover but the blooms are smaller and more rounded. Ball clover has poor seedling vigor but excellent reseeding ability.

Reproduction: Seed.

Ecological Adaptation: Requires pH 6.5 and up and loam to clay-loam soils. Tolerates poor drainage. Prefers moist bottomlands but adapts to fairly dry sites also. Also, requires good moisture conditions, and it is poor drought tolerance.

Uses: grazing, pasture.

Management: Tolerates heavy grazing and will produce seedheads close to the ground.



Ball clover. Phot credits: Mountain Sweet Honey and MBS Seed.

WEEDS

Common Name: Arrowleaf Sida (Teaweed)

Scientific Name: *Sida rhombifolia*

Life Cycle: Annual or perennial

Morphology: Leaves are alternate with a broad lance shape and white hairs underneath. The leaf margin is toothed. Stems are erect, smooth, and usually unbranched. Plants can grow up to 4 feet tall with a long, deep growing taproot. Flowers are yellow in color and have 5 petals.

Reproduction: Seed

Ecological Adaptation: Pinelands, hammocks, and disturbed areas.

Control: Arrowleaf sida is not palatable for livestock and is a very aggressively growing plant. Chaparral, Cimarron Plus or Xtra, Banvel, GrazonNext HL, Metsulfuron, PastureGard HL, and Remedy all offer good control of teaweed.

Common Name: Bagpod

Scientific Name: *Sesbania vesicaria*

Life Cycle: Annual

Morphology: S. vesicaria is a robust, smooth-stemmed annual, growing to 4 m tall. The stem tips have dense white hairs. The leaves are alternately arranged and are once even-pinnately compound. The leaves may be as long as 30 cm. Each leaf may have from 20-52 leaflets. The leaflets have smooth margins and are narrowly oblong to elliptic in shape. The leaflets may be up to 3 cm long and 6 mm wide and very hairy when expanding, becoming smooth at maturity. The stipules are not persistent. The flowers occur in the axils of the leaves. The bracts and bractlets are not persistent. The calyx tube is hairy when young, becoming smooth at maturity, and is 2-3 mm long. The corolla is 6-9 mm long. The petals are yellow and quite variable in color, often tinged with pink or red. The fruit is a dry, smooth, inflated pod, from 3-6 cm long and 1.5-2 cm wide. Each pod usually contains 2 seeds.

Reproduction: Seed

Ecological Adaptation: S. vesicaria occurs in pastures, along fencerows and generally in any disturbed, moist to wet area throughout Florida.

Control: Controlled by a wide variety of 2,4-D containing herbicides when small. Large plants readily controlled with GrazonNext HL.

Bagpod. Photo credits: EDIS SP 37

Common Name: Blackberry

Scientific Name: *Rubus* spp.

Life Cycle: Perennial

Morphology: Upright growing and thicket forming, each plant has a large rhizomatous, lateral-growing root system that sprouts and produces additional plants. The above ground canes are biennial, growing rapidly the first year and producing flowers and fruit the second year.

Reproduction: Seed and rhizomes

Control: Herbicide application is most effective when applied to blooming plants in the late spring and fall, prior to frost. It is important that the plants are not drought stressed at the time of herbicide application. Mowing is effecting in control the spread of blackberry but not for the ultimate eradication of the plant due to the rhizomatous root system. Additionally, resprouting of the cut stems is common. Mowing makes application of the herbicide more effective as it removes the old canes that will not absorb herbicide and can block new growth from herbicide application. Herbicides should not be applied directly following mowing, but after 6 months of active regrowth. Example: Mow in October, apply herbicide in August. Blackberry does not actively grow from November to February. Allow 6 weeks between herbicide application and mowing. There are several herbicides that list blackberry on their label, including metsulfuron, triclopyr ester (Remedy Ultra, others), PastureGard HL, and Telar. However, Velpar, Weedmaster, and 2,4-D are not recommended because individual plants rarely die and thicket density will not be reduced.

Blackberry. Photo credits: http://edis.ifas.ufl.edu/ag238

Common Name: Brackenfern

Scientific Name: *Pteridium aquilinum*

Life Cycle: Perennial

Morphology: Bracken fern has stiff, upright, branching fronds that grow from creeping and forking underground rhizomes. It grows up to 4½' tall and has triangular-shaped fronds.

Reproduction: Ferns reproduce by spores and bracken fern's spores form as clusters along the margins on the underside of leaflets. The spores are dispersed by wind usually after a fire or disturbance. Also spreads by creeping rhizomes.

Ecological Adaptation: This plant grows well in both wet and dry soil, but seems to prefer semi-shaded environments. Bracken fern is most common along tree lines, in forest openings, and around building borders.

Control: Control of bracken fern has been relatively difficult to achieve since the majority of the commonly used pasture herbicides are ineffective. Research conducted at the University of Florida has shown that 2,4-D + dicamba (Weedmaster, others), triclopyr (Remedy Ultra, others), and 2,4-D + aminopyralid (GrazonNext HL) are ineffective (Table 1). These herbicides will often cause treated leaves to die, but resprouting from rhizomes occurs rather quickly. However, metsulfuron (MSM 60, others) and chlorsulfuron (Telar) have proven to be effective. Although metsulfuron and chlorsulfuron were effective, by 8 months after treatment some plants were beginning to resprout. Considering that bracken fern is a perennial plant, multiple applications may be necessary for complete control. Before choosing an herbicide, it should be noted that metsulfuron can be safely applied to bermudagrass, but will result in moderate to severe injury if applied to bahiagrass. Chlorsulfuron can be safely applied to both bermudagrass and bahiagrass.

Brackenfern. Photo credits: EDIS SS-AGR-357.

Common Name: Broomsedge

Scientific Name: Andropogon virginicus

Life Cycle: Perennial

Morphology: Upright growing bunch grass with multiple stems emerging from one basal crown and height ranges from 2 to 4 feet. Leaf sheaths are flat to partly folded and approximately 1/8 inch in width. A fringed ligule is present and the root system is shallow.

Reproduction: Seed

Ecological Adaptation: Found throughout the eastern United States, usually in open areas such as abandoned or overgrazed fields, cut timber sites, and roadsides. Broomsedge prefers loose, sandy, moist soils with low fertility and can serve as an indicator of low soil phosphorus.

Control: Glyphosate herbicides are an effective method of control. If a complete canopy kill is desired, a boom sprayer can be used to apply the herbicide while the plant is actively growing. Wicking or spot treatment is recommended in areas where desirable forage needs to be saved. A second application may be required. Controlled burning alone is not an effective method of plant removal, but a following application of herbicide to the new growth can be successful.

Common Name: Caesar Weed

Scientific Name: *Urena lobata*

Life Cycle: Annual or perennial

Morphology: An upright growing shrub with a single stalk and free-branching stems. The leaves are pubescent and palmately lobed. Flowers are arranged in axillary clusters and are a pinkish-violet color. Fruit is also pubescent with bristles that cling to fur or clothing.

Reproduction: Seed

Ecological Adaptation: Grows well under forest canopies. Found in disturbed areas and pastures.

Control: Shade, such as mulch or ground cover, will deter germination of seeds. Sensitive to common application rates of GrazonNext HL, WeedMaster, 2,4-D, Pasturegard HL, and Remedy. Avoid driving or walking through infested areas and spreading seeds.

Common Name: Castor Bean

Scientific Name: *Ricinus communis*

Life Cycle: Perennial

Morphology: Leaves are simple and alternate and can grow very large; from 15 to 30 inches wide. The green to reddish leaves are lopsidedly peltate, with the petiole attaching to the interior of the blade above the center point. Each leaf has 5 to 11 major veins radiating outward into narrow lobes with jagged margins. In warmer climates, the semi-woody trunk can reach a foot in diameter, whereas in colder climates the plant remains herbaceous and exhibits slower growing habits. Flowers appear in summer and fall on tall spikes up to 18 inches long that grow out of the top of the stems. Male and female flowers appear on the same spike, with the yellow male flowers pollinating the red female flowers. The fruit is a ½- to 1-inch diameter, spiny capsule that turns from yellow to blue-green and then to brown as it matures. Each capsule houses three small, poisonous seeds that resemble dog ticks.**

Reproduction: Seed

Ecological Adaptation: This fast-growing plant is found throughout tropical and subtropical climates on disturbed sites such as edges of roads, old fields, and rocky slopes. Castor bean grows best in full sun and can reach heights of up to 40 feet where frost is not present. In colder climates where temperatures drop below freezing, castor bean functions like an annual plant and only reaches heights of 15 feet.**

Control: Basal bark or cut stump: 10% Garlon 4. Revisit site several times to pull up seedlings or treat seedlings with 5% Roundup. *

* EDIS SP 242, EDIS FOR 244

Common Name: Chinaberry

Scientific Name: *Melia azedarach*

Life Cycle: Perennial

Morphology: Chinaberry is a round, deciduous, shade tree, reaching 30 to 40 feet at maturity and growing 5 to 10 feet during the first and second year after seed germination. Growth slows as the tree reaches 15 or 20 feet tall.

Reproduction: Seed

Ecological Adaptation: It is successfully grown in a wide variety of situations, including alkaline soil where other trees might fail. Truly an urban survivor, chinaberry has become naturalized in much of the South.

Often shrubby and root-suckering, forming thickets. Fruits poisonous to humans and some other mammals. Most abundantly found in north and west Florida but often escaping cultivation in peninsular counties, south to the Keys.*

Uses: urban tolerant

Control: Basal bark: 15%-30% Garlon 4. Addition of 3% Stalker may increase consistency. Trees > 3 inches diameter may require retreatment. Cut stump: 30% Garlon 4. Foliar: low volume 1% Arsenal covering 50% of the foliage.*

* EDIS SP 242

Common Name: Chinese Tallow Tree

Scientific Name: *Sapium sebiferum*

Life Cycle: Perennial

Morphology: Chinese tallow is a deciduous tree with a milky sap that commonly grows to 30 ft. tall. Leaves are simple, alternate, 1–2.5 inches wide, with broadly rounded bases and tapering to a slender point. Leaf stalks are 1–2 inches long. Small yellow flowers that are borne on spikes to 8 inches long occur in spring. The fruit is a 0.5 inch wide, 3-lobed capsule that turns brown at maturity to reveal 3 dull white seeds. The seeds, which often remain attached to the tree through the winter, resemble popcorn, suggesting the other common name of popcorn tree.*

Reproduction: Seed

Ecological Adaptation: Naturalized from North Carolina, south through Central Florida, extending west into Texas and northwest Arkansas (McCormick 2005). Within Florida, Chinese tallow has increased greatly over the last twenty years. In 1993, it was naturalized in 57% of the counties (Jubinsky and Anderson 1996) and found as far south as Dade County (Wunderlin et al. 2003). Today, it is found in almost every county in the state.*

Control: Cut stump: 20%-30% Garlon 4, Garlon 3A, or Renovate, 10% Habitat. Basal bark: 15%-20% Garlon 4 or undiluted Pathfinder II. Addition of 3% Stalker will reduce resprouting on older trees. Foliar: 0.5%-0.75% Arsenal or Habitat. Follow-up treatment may be necessary for root sprouts.**

* EDIS SS-AGR-45, ** EDIS SP 142

Common Name: Coffee Senna

Scientific Name: *Senna occidentalis*

Life Cycle: Annual

Morphology: Slender, upright growing shrub. May have a foul-smelling odor. The compound leaves have leaflets with pointed tips. There is a dark colored gland near the base of the stalk of each leaf. Flowers have 5 yellow petals and are found in small clusters. The fruit is flattened, straight, and slightly sickle-shaped.

Reproduction: Seed

Ecological Adaptation: Found is disturbed areas, grasslands, open woodlands, and roadsides in tropical and subtropical regions.

Control: Early control is ideal, and mature plants should be removed as they are poisonous to livestock. Any herbicide containing 2,4-D will be effective in the control of coffee senna. Herbicides containing aminopyralid (GrazonNext HL or Milestone) are extremely effective.

Common Name: Ragweed (Common ragweed)

Scientific Name: *Ambrosia artemisiifolia*

Life Cycle: Summer annual

Morphology: Upper leaves are alternate, lower leaves are opposite. Leaves are stalked, smooth, and deeply divided into several toothed or lobed portions. The stems are purplish in color, erect, branched, and rough and hairy. The flowers are small with small heads and greenish in color. Flowers are found at the leaf base and upper branches. The plant has a unique odor.

Reproduction: Seeds

Ecological Adaptation: Often found in disturbed habitats such as ditch and canal banks, fields, orchards, roadsides, and waste places.

Control: Easily controlled with most pasture herbicides including GrazonNext HL, WeedMaster, 2,4-D, Pasturegard HL, and Remedy.

Common Name: Cutleaf Geranium (Wild Geranium, Caroline Geranium)

Scientific Name: *Geranium carolinianum*

Life Cycle: winter annual

Morphology: Semi-erect and multi-branched, stems are greenish-pink to red and hairy.

Reproduction: Overwintering rosettes, seeds, and underground rootstocks.

Ecological Adaptation: Found throughout Florida, occurs in disturbed areas, pastures, and roadsides.

Control: Small plants are generally easier to control than plants at flowering. Herbicides such as GrazonNext HL or those containing metsulfuron are effective on this winter annual.

Common Name: Dogfennel

Scientific Name: *Eupatorium capillifolium*

Life Cycle: Perennial

Morphology: A single, non-branching shoot with thin leaves that can reach 8 feet in height. The stem is hairy, succulent, and easily broken. If crushed, the leaves will emit a strong odor.

Reproduction: Overwintering rosettes, seeds, and underground rootstocks.

Ecological Adaptation: Found throughout the southeastern United States, predominantly in unimproved or overgrazed pastures.

Control: Select an herbicide program based on height. Plants less than 20 inches tall can be effectively controlled with 2,4-D or dicamba + 2,4-D. When plants exceed 36 inches in height and dogfennel is the primary target, Pasturegard HL at 1.5 pt/A is effective regardless of plant size and time of application. If other weeds are present, GrazonNext HL at 1/5pt/A in combination if a) Pasturegard HL at 0a.5 pt/A, b) 2,4-D amine at 3 pt/A, or c) 2,4-D + dicamba at 2 pt/A are recommended. If limpograss is present, do not sure 2.4-D between May 1st and November 1st. It is important to also consider environmental conditions during herbicide application, as drought will impede the efficacy of herbicides.

Common Name: Flat Top Goldenrod

Scientific Name: *Euthamia caroliniana*

Life Cycle: Perennial

Morphology: Usually found growing in colonies with individual plants reaching 3 feet in height. At emergence, only a single stem appears, but as the plant matures the stems begins to branch. The stems are slightly angled and almost woody and will develop a reddish coloration of the lower portion of the stem as the plant matures. Leaves are narrow and grow in an alternate pattern, similar in size to dogfennel leaves. Leaves are commonly shed during flowering, which occurs from September to November. The inflorescence is flat-topped and consists of multiple yellow flowers.

Reproduction: Seed and rhizome

Ecological Adaptation: Found in areas of low management, especially in soils with an acid (low) pH.

Control: April applications of 2,4-D, dicamba, dicamba + 2,4-D, or GrazonNext are recommended. Application from April to June is critical for adequate control, with the time frame of April to early May being ideal. After the plant begins to branch, the effectiveness of the herbicide decreases. A second herbicide application will likely be required in 1-2 years.

Common Name: Goatweed (Sweet broom, licorice weed)

Scientific Name: *Scoparia dulcis*

Life Cycle: Perennial

Morphology: Seedlings are small with light green, serrated leaves. Seedling leaf patterns are opposite or whorled, but as plants mature the leaves become linear and may or may not have serrations. There are small glands within the leaves and stems that emit an unpleasant odor when crushed. Stems are predominantly smooth, but will sometimes have soft, fine hairs present that become woody as the plant matures. Flowers are white and found along the leaf axis. Seeds are small and enclosed in a yellow-brown capsule. Mature plants have a spindly appearance and reach 1 to 1.5 feet in height.

Reproduction: Seed

Ecological Adaptation: Found primarily in citrus groves but is becoming a problem in pastures. Drought and shade inhibit seed germination, so goatweed is normally found in overgrazed areas.

Control: In bahiagrass pastures use 4 pints/acre of 2,4-D. In bermudagrass, stargrass, and limpograss use 0.3 oz/acre of metsulfuron or 3 oz/acre of Chaparral. Adding 2 pt/acre of 2,4-D to metsulfuron will increase weed control, but should not be applied to limpograss during the summer growing season. Mowing does not control goatweed, and woody stems inhibit the effectiveness of herbicides.

Common Name: Horsenettle

Scientific Name: *Solanum carolinense*

Life Cycle: Perennial.

Morphology: An erect, spiny plant with can reach heights of 1 m. Stems are spiny and have star-shaped hairs. Leaves are in an alternating pattern with wavy to lobed edges with spines along the midrib. Flowers are white to pale violet and clustered. The fruit is smooth, round, and yellow and contains numerous seeds.

Reproduction: Seed and rhizome.

Ecological Adaptation: Roadsides and sandy openings.

Control: For best results, apply Milestone at 5 oz/acre or GrazonNext at 2 pts/acre when plants are small.

Common Name: Lantana

Scientific Name: *Lantana camara*

Life Cycle: Perennial.

Morphology: A woody shrub with red/yellow flowers that grow in clusters and glossy, dark green leaves.

Reproduction: Seed.

Ecological Adaptation: Well suited to hot, dry conditions. Prefers full sun and well drained soils. Drought and salt tolerant.

Control: Mowing is not a recommended form of mechanical removal because of the perennial rootstock, therefor removing the entire root system would be required. Glyphosate used as a foliar spray in high rates is somewhat effective, but commonly results in substantial grass damage and regrowth is likely. Fluroxypyr is effective when applied in the fall and spring (two applications). Adding aminopyralid will increase effectiveness but may be cost prohibitive.

Common Name: Matchweed (Mat Lippia, Match Head, Frog Fruit)

Scientific Name: *Phyla nodiflora, Lippia nodiflora*

Life Cycle: Perennial

Morphology: Prostate growth pattern resulting in mats. The stems are hairy and freely branched and root at the nodes. Leaves are opposite and have large teeth at the tips. The flower is rose-purple or white

Reproduction: Seed or stolons

Ecological Adaptation: Low moist areas in open woods and turf, common along beaches and marshes, preferring sandy areas.

Control: 2,4-D, Banvel, and Vista XRT are good herbicides. GrazonNext HL is the most effective.

Common Name: Maypop (Passion Flower)

Scientific Name: *Passiflora incarnata*

Life Cycle: Perennial

Morphology: A flowering vine, the height and spread of the plant I dependent on what it climes. The leaves have three lobes and smooth/serrated margins, growing in an alternate pattern. Light weight, ovoid fruits with a spongy white flesh are found on the vines. The flowers are pink and purple, generally 3 to 5 inches in width and found in the summer months

Reproduction: Seed or fragmentation

Ecological Adaptation: Drought tolerant, requires full sun, found in a variety of soils.

Control: Higher rates of 2,4-D, triclopyr, and dicamba can be effective in pasture and hay field settings. If spot spraying is applicable, a 1 to 5% solution of glyphosate is recommended. Maypop has thick, deep rhizomes, tillage often breaks the rhizomes causing them to sprout into new plants. Regrowth is very likely from the creeping root system.

Common Name: Mexican Tea

Scientific Name: *Dysphania ambrosioides*

Life Cycle: Annual or short-lived perennial

Morphology: Leaves grow in an alternate pattern and are often lobed or toothed. Orange glands are located on the underside of the leaves and exude a strong, pungent odor. The stems are branched, smooth, and minutely hairy and grooved. Flowers are green and occur in spike-like clusters. The plant can reach 3 feet in height.

Reproduction: Seed

Ecological Adaptation: Sandy soils in disturbed areas

Control: 2,4-D, Chaparral, Cimarron Plus or Extra, Banvel, GrazonNext HL, and Metsulfuron are recommended herbicides

Common Name: Prickly Pear Cactus

Scientific Name: *Opuntia spp.*

Life Cycle: Perennial

Morphology: Spreading upright growing plant with flat, thick, succulent leaves. Spines vary from brown, grey, or white and flower colors can be orange, red, purple, or white. Berries are red to purple and come to maturity in the mid to late summer.

Reproduction: Seed or fragmentation

Ecological Adaptation: Well suited to hot, dry conditions. Prefers full sun and well drained soils. Drought and salt tolerant. Found in sandy acidic or loamy alkaline soils.

Control: The plant reproduces by fragmentation, so mowing is not recommended. Fluroxypyr, the active ingredient in Vista XRT herbicide is a better alternative. Spot treatments of 0.5 oz. per 1 gal. of water sprayed onto the pads to achieve good coverage but not to the point of runoff are effective. Broadcast applications of Vista XRT at a rate of 22 oz/A applied in the spring or fall or a split application of 11 oz/A in the spring followed by 11 oz/A in the fall are also effective. Trumpcard or Pasturegard may also be utilized as well as spot-treatments of triclopyr.

Common Name: Showy Crotalaria

Scientific Name: *Crotalaria spectabilis*

Life Cycle: Summer annual

Morphology: Leaves are simple, waxy, and large. The yellow flowers are born on a large, upright stalk. The seed pods are short and thick, and rattle when dry. The entire plant is toxic to livestock, even when dry.

Reproduction: Seeds

Ecological Adaptation: Well drained, sandy soils

Control: 2,4-D (2-3 pints/acre), dicamba+2,4-D (2-3 pints/acre), GrazonNext HL (1.6 to 2 pints/acre), triclopyr (2 pints/acre), and PastureGard (1 pint/acre) are herbicides that offer good control of this weed.

Common Name: Sicklepod

Scientific Name: *Senna obtusifolia*

Life Cycle: Annual

Morphology: The cotyledons of sicklepod are rounded and have three to five distinct veins. The stems are erect, branched, lack hairs (glabrous) and can reach heights of 1 - 6 feet. Sicklepod has alternate leaves comprised of 4 - 6 leaflets that are egg-shaped and arranged pinnately compound, which means that the leaflets are opposite one another. The pair of leaflets furthest from the main stem is the largest and the pair closest to the stem is the smallest. The egg-shaped leaflets can be 1 - 3.5 inches long. Sicklepod has a stout taproot. This weed can be easily confused with coffee senna (Cassia occidentalis). However, the leaves of sicklepod are blunt while coffee senna's are pointed.

Reproduction: Seed

Ecological Adaptation: Adapted to the the southeast US; commonly found in agronomic crop fields, pastures, waste places, moist forests and barnyards.

Control: See coffee senna

Sicklepod. Photo credits: https://extension.tennessee.edu/publications/Documents/W125.pdf

Common Name: Smooth Crotalaria

Scientific Name: *Crotalaria pallida*

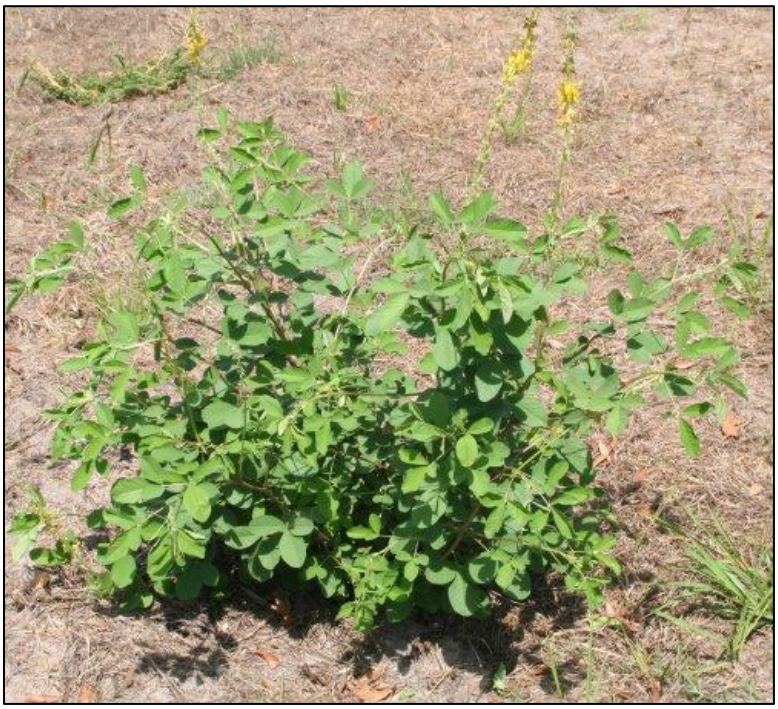
Life Cycle: Perennial

Morphology: Upright, multi-branched stem grows to 9' tall, stem terminates in elongated flower spike, flattened hairs may be seen on stem or leaf, leaflets of three are alternate and 1" - 2¾" long; up to 1½" wide, leaves are oval with a rounded apex (tip) that may end in a sharp point, stipules are usually absent, ½" yellow flowers may have reddish-brown streaks, fruits (seed pods) about 1½" long, with very short hairs*

Reproduction: Seed

Ecological Adaptation: Introduced from Africa and established sporadically across the SE United States

Control: See showy crotolaria



* http://nwdistrict.ifas.ufl.edu/phag/files/2012/10/rattlebox.pdf

Common Name: Soft Rush

Scientific Name: *Juncus effuses*

Life Cycle: Perennial

Morphology: Soft rush, often called bull rush, is a clump-forming perennial plant that frequently infests low-lying areas in Florida pastures (Figure 1). It is usually found in pastures that are seasonally wet with alternating wet and dry seasons. It does not typically grow where water is present year-round, but will be present along the perimeters of ponds, lakes, streams, and canals.

Reproduction: Soft rush is a clump-forming perennial that spreads by both short rhizomes and seed. Soft rush typically flowers in the spring, April through June. Each plant is capable of producing at least 8,500 seeds per year.**

Ecological Adaptation: It inhabits fresh to brackish marshes, swamps, ditches, and moist seasonal wetlands and meadows. Soft rush is tolerant of diverse site conditions, but thrives in direct sun, finely textured soils, salinity less than 14ppt., pH from 4.0 to 6.0, and shallow water (less than 6 inches). Common rush is distributed throughout most of the United States. *

Control: Mowing is one tool that has been suggested for soft-rush management. However, mowing is usually only a temporary solution. Since standing water is typically present for weeks or months each year in areas of soft-rush infestation, mowing is usually limited to one operation per year. At this mowing interval, soft rush will usually regrow. Therefore, mowing for control is typically not a good option. Experiments conducted at the UF/IFAS Range Cattle Research and Education Center in Ona, FL, in 2006 and 2007 evaluated several herbicides for soft-rush control. Herbicides were applied to both clipped and non-clipped soft rush plants within one day of mowing. Products that contain 2,4-D provided the most effective control of soft rush.**

Common Name: Tropical Soda Apple

Scientific Name: *Solanum viarum*

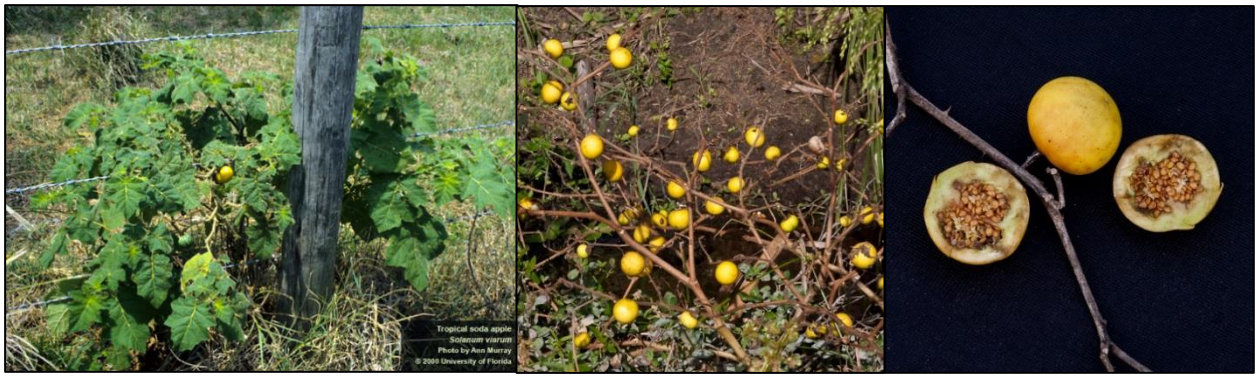
Life Cycle: Perennial

Morphology: Mature plants reach 3 to 6 feet in height with broad-based prickles on leaves and stems. Leaves are 4 to 8 inches long and 3 to 6 inches wide. Flowers have five white recurved petals. Fruit is smooth and round, between ¾ to 1 ¼ inches in diameter. Immature fruit display green and white mottling, while mature fruit are yellow.

Reproduction: Seed

Ecological Adaptation: Native to southeastern Brazil, northeastern Argentina, Paraguay, and Uruguay that has invaded Florida grasslands and natural ecosystems.

Control: Apply a labeled rate of 1.5 to 2.0 pints of GrazonNext HL herbicide per acre or 2.5 to 3.0 ounces of Chapparal herbicide per acre. Application can be made any time of year when foliage is present. Avoid applying near or during a killing frost.



Tropical soda apple: Photo credits: EDIS SS-AGR-77.

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