

Site Weed (Invasive Plant) Management Plan
Submitted to:

Florida Department of Environmental Protection
Florida Greenways and Trails

Second of Three Management Plans

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Helpful Notes:

Surfactant – 0.25% is the standard rate for all foliar herbicide applications, 2 teaspoons per gallon.

Dry time – generally 4-6 hours is adequate, but the longer the better for glyphosate
Pay particular attention to herbicide labels near wetlands or bodies of water.

The use of trade names in these publications is solely for the purpose of providing specific information. UF/IFAS does not guarantee or warranty the products named, and references to them in this publication does not signify our approval to the exclusion of other products of suitable composition. All chemicals should be used in accordance with directions on the manufacturer's label.

Coral Ardisia

***Ardisia crenata* (Sims) Myrsinaceae**

INTRODUCTION

Ardisia crenata, or Coral Ardisia, is a small upright shrub that is used and sold extensively in the horticulture industry as an ornamental plant – often called Christmas berry. *Ardisia*'s native range includes areas of Japan and northern India. *Ardisia* escaped cultivation in 1982, spreading into wooded areas. Currently *ardisia* has established in many counties in northern and central Florida. In the landscape, *ardisia* is known and grown for its persistent red berries, glossy foliage and low maintenance.

DESCRIPTION

Coral *ardisia* is a small upright shrub that can grow up to 6 feet in height. *Ardisia* can be seen growing in clumps, often times multi-stemmed. Leaves are dark green and thick, somewhat glossy, roughly 8 inches long with scalloped margins. The flowers are white or pinkish, borne in axillary clusters. The berries, which are readily eaten by birds, turn a bright coral red color and hang or droop on the plant. *Ardisia* is usually seen in fairly large colonies with its persistent red berries. Recent research has also shown the presence of large seedling clumps in association with larger plants. These seedlings can remain juvenile for quite some time and once removal of the larger, dominant specimens occurs, the seedlings begin to grow.

IMPACTS

Coral *ardisia* has naturalized in many natural areas across Florida, such as hardwood hammocks, becoming a significant pest. The Florida Exotic Pest Plant Council lists Coral *ardisia* as a category I species because of its invasive nature and ability to disrupt native plant communities. *Ardisia* can potentially shade out native seedling and understory plants, preventing their growth and development. Mature plants are prolific seed producers and can be surrounded by many seedlings, also leading to reduced seed germination of valued native species.

Ardisia is capable of resprouting after cutting back or after a fire. Heavy fruit set is produced after 2 years. Viable seed can remain on plants throughout the year, providing a food source for birds and other wildlife. Birds and raccoons have been shown to consume and disperse fruits. Germination rates are fairly high for ardisia, ranging from 84-98%, with germination taking up to 40 days once the fruit has been removed from the plant. Ardisia seeds can germinate in a wide range of soil types from acidic to alkaline and at temperatures of 25 C or higher.

MANAGEMENT

Preventative: The first step in preventative control of ardisia is to limit planting and removal of existing plants within the landscape. If possible, removal should occur before seeds are produced. Since seeds remain on the plant for several months, care must be exercised to prevent seed spread and dispersal during the removal process.

Cultural: Cultural management is difficult once the plant has established, but a healthy ground cover will limit seedling establishment.

Mechanical: Mechanical methods can be grouped into several strategies. With small or isolated infestations, hand-pulling is effective for seedling control. Larger plants can be cut or burned, but regrowth from underground rhizomes and root crowns. Disking can be very effective if the disking operation is frequent and sufficiently deep to cut the rhizome/rootstocks. However, the use of disking is very limited due to the type of areas that ardisia is most problematic – woodlands. It must also be noted that any type of mechanical operation, whether it be disking or burning, should be monitored for at least one year to inspect and remove seedlings and/or resprouts.

Biological: There are no known biological control agents for ardisia.

Chemical: In areas with a dense groundcover of seedlings, a broadcast spray of a glyphosate herbicide is very effective, generally a 2-3% solution. The waxy leaves of ardisia may limit glyphosate uptake, so a surfactant is recommended. Due to the non-selective nature of glyphosate, use precaution to avoid damaging desirable plants. The woody bark of desirable trees may be contacted, but avoid green bark. Triclopyr herbicide is also very effective, especially on larger, more mature specimens. A low-volume basal application mixed with an oil diluent has shown very promising results.

Triclopyr applications containing 10% diesel fuel are also very effective. Ardisia is also susceptible to 2,4-D, but more so at the seedling stage or regrowth after cutting/burning of mature plants.

REFERENCES AND USEFUL LINKS:

Floridata Homepage:

http://www.floridata.com/main_fr.cfm?state=Welcome&viewsrc=welcome.htm

University of Florida Center for Aquatic and Invasive Plants:

<http://aquat1.ifas.ufl.edu/welcome.html>

University of Florida's Cooperative Extension Electronic Data Information Source:

<http://edis.ifas.ufl.edu/index.html>

Langeland, K.A. and K. Craddock Burks. 1998. Identification and Biology of Non-Native Plants in Florida's Natural Areas. IFAS Publication SP 257. University of Florida, Gainesville. 165 pp.

Pacific Island Ecosystems at Risk (PIER). Plant Threats to Pacific Ecosystems:

<http://www.hear.org/pier/threats.htm>

Brazilian Pepper-tree

***Schinus terebinthifolius* (Raddi) Anacardiaceae**

INTRODUCTION

The family Anacardiaceae contains poison ivy, poison oak, poison sumac, and *Schinus terebinthifolius*, or Brazilian pepper-tree. People sensitive to poison ivy, oak or sumac may also be allergic to Brazilian pepper tree because it also has the potential to cause dermatitis to those with sensitive skin. Some people have also expressed respiratory problems associated with the bloom period of pepper tree.

Brazilian pepper tree is native to Argentina, Paraguay, and Brazil. Brazilian pepper tree was brought into Florida in mid-1800 for use as an ornamental plant. Its bright red berries and brilliant green foliage are used frequently as Christmas decorations. Distribution of Brazilian pepper tree throughout Florida is widespread, although limited to the warmer areas due to sensitivity to cold temperatures. Brazilian pepper can be found as far north as Levy and St. Johns Counties, and as far west as Santa Rosa County. It is an aggressive invader of disturbed habitats; this characteristic has led to its placement on the Florida Exotic Pest Plant Council's list of invasive species. Many plant communities such as hammocks, pinelands and mangrove forests are often invaded and dominated by Brazilian pepper tree.

DESCRIPTION

Brazilian pepper-tree is a shrub or small tree that reaches over 30 feet in height, typically with a short trunk hidden in a thicket of branches. Some trees can live over 30 years. The leaves are alternately arranged with 1-2 inch long, elliptic, and finely toothed leaflets. The leaves are also reddish, often possessing a reddish mid-rib. The flower clusters are white and 2-3 inches long with male and female flowers that look very similar. The glossy fruits are borne in clusters that are initially green, becoming bright red when ripe. Seeds are dark brown and 0.3 mm in diameter. Flowering occurs from September through November and fruits are usually mature by December.

Birds and mammals are the primary mechanisms for dispersal, although seeds may be transported via flowing water. Seeds are viable for up to 2 months, losing viability as

time progresses. Germination is improved by scarification. Typically, acids in an animal's digestive tract provide adequate scarification required for germination. The invasiveness of Brazilian pepper tree in Florida can be attributed to its high germination rates and dispersal agents.

IMPACTS

This shrub/tree is one of the most aggressive and wide-spread of the invasive non-indigenous exotic pest plants in the State of Florida. There are over 700,000 acres in Florida infested with Brazilian pepper tree. Brazilian pepper tree produces a dense canopy that shades out all other plants and provides a very poor habitat for native species. This species invades aquatic as well as terrestrial habitats, greatly reducing the quality of native biotic communities in the state.

MANAGEMENT

Preventative: The public should be notified to avoid cultivating, transplanting, or promote proliferation of Brazilian pepper. Care should also be exercised to avoid seed spread through disposal of cut trees. Due to its invasive nature, it is placed by the Florida Department of Environmental Protection under section 62C-52.011 as a Class I - "Prohibited Aquatic Plant." This law prohibits sale and or movement of this species.

Cultural: A well established native cover or plant community is a way to suppress Brazilian pepper-tree. However, the rapid growth and high germination rates make Brazilian pepper-tree difficult to suppress from a cultural weed management standpoint.

Mechanical: When utilizing aggressive mechanical methods, the entire plant, particularly the root system, should be removed. Roots ¼ inch in diameter and larger are able to resprout and produce new plants, so follow-up from this type of control method will be necessary. Pepper-tree seeds cannot tolerate heat and will not germinate following a fire, but the plant has the potential to resprout after a fire from roots.

Biological: Currently there are no known biological control agents used for Brazilian pepper-tree. Over two hundred insects have been identified that feed on Brazilian pepper-tree in its native land. Before any insect is released into the U.S. as a biological control, it must be proven to be specific to the target pest, and non-harmful to native species. A

sawfly and a thrips are currently under investigation at the University of Florida as potential biological control agents for Brazilian pepper-tree. The sawfly causes defoliation and the thrips feeds on new shoots.

Chemical: Chemical methods for Brazilian pepper-tree control can be separated into soil residual, foliar and basal bark/cut stump treatments. Each of these will be discussed in detail in the following sections.

Soil Residual - Bromacil, diuron, and hexazinone are root-absorbed herbicides that can be very effective for the control of Brazilian pepper-tree. However, these are the slowest acting and have the most residual activity. This residual activity is beneficial for long-term control but can pose problems to non-target species. Oaks, maples and other hardwoods are particularly sensitive to these herbicides, so care must be exercised when using these materials.

Foliar Herbicide Application – Foliar applications can also be very effective, but thorough coverage is essential. Due to their large size and often-inaccessible habitat, these types of applications are limited in scope. However, foliar treatments are very good on seedlings. For larger trees, triclopyr or glyphosate herbicides should be applied directly to the tree's foliage and will be translocated to other parts of the tree. The advantage of these materials is low to no soil residual activity. Arsenal is also effective, but has extensive soil activity and may pose problems to non-target vegetation. Another overall disadvantage of foliar applications is non-target damage to desirable species, especially with aerial foliar applications to larger trees.

Basal Bark/Cut Stump Treatments - (The following is taken from Gioeli and Langeland). Brazilian pepper-trees can be effectively controlled by cutting and treating the stumps with herbicide. The trunk should be cut as close to the ground as possible. Within 5 minutes, a herbicide containing glyphosate or triclopyr should be applied as carefully as possible to the thin layer of living tissue, called the cambium, which is just inside the bark of the stump. The best time to cut Brazilian pepper-trees is when they are not fruiting, because seeds contained in the fruits have the capability of producing new Brazilian pepper-trees. If Brazilian pepper-trees that have fruits attached are cut, care should be taken not to spread the fruits to locations where they can cause future problems. Caution: *Avoid touching the tree's cambium. A rash can result. Some*

individuals are very sensitive to touching only the leaves. Use proper protective gear when sawing the tree and applying the herbicides.

Brazilian pepper-trees can also be controlled using basal bark herbicide application. An application of triclopyr ester (Garlon, Remedy – 44% concentration) herbicide is applied to the Brazilian pepper-tree's bark between one half and one foot from the ground. Triclopyr is pre-mixed with a penetrating oil at a concentration of 14% triclopyr. The oil will cause the herbicide to pass through the bark. Therefore, girdling the tree's trunk is not necessary and may, in fact, reduce the effectiveness. Once the basal bark treatment has been completed, it may take several weeks to exhibit symptoms of control. Defoliation and the presence of termites is an indicator that the treatment has been successful.

Basal bark treatments are most effective in the fall when the Brazilian pepper-trees are flowering. This is due to the high level of translocation occurring within the tree. Fruiting occurs during winter, and Brazilian pepper-trees that have been controlled using a basal bark treatment may retain their fruit. This situation will require that the area be checked for seedlings on a regular basis.

REFERENCES AND USEFUL LINKS:

Hall, D.W. 2003. Weeds in Florida, SP 37, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida.

Institute of Pacific Islands Forestry, Pacific Island Ecosystems at Risk:
<http://www.hear.org/pier/index.html>

University of Florida Center for Aquatic and Invasive Plants:
<http://aquat1.ifas.ufl.edu/welcome.html>

University of Florida's Cooperative Extension Electronic Data Information Source:
<http://edis.ifas.ufl.edu/index.html>

Langeland, K.A. and K. Craddock Burks. 1998. Identification and Biology of Non-Native Plants in Florida's Natural Areas. IFAS Publication SP 257. University of Florida, Gainesville. 165 pp.

Gioeli, K. and K. Langeland. 1997. Brazilian Pepper-tree Control. Publication SS-AGR-17. Agronomy Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida.

Francis, J.K. *Schinus terebinthifolius* (Raddi) Brazilian pepper-tree. U.S. Department of Agriculture, Forest Service.. <http://www.fs.fed.us>

Elfers, S.C. FLFO. Element Stewardship Abstract for *Schinus terebinthifolius* Brazilian pepper-tree. The Nature Conservancy. <http://tncweeds.ucdavis.edu/>

Chinese Tallow

Sapium sebiferum (L.) Euphorbiaceae

INTRODUCTION

In China, Chinese tallow (*Sapium sebiferum*) is cultivated for seed oil. During the 1700's, Chinese tallow was introduced to the United States primarily for use as an ornamental tree. It was also introduced for making soap from the seed oil. Not only has Chinese tallow become naturalized in the southern coastal plain from South Carolina south to Texas, it has become naturalized in over half of the counties in Florida. Displacement of native species through vigorous growth and spread are characteristics that helped place Chinese tallow on FLEPPC's List of Invasive species and the State of Florida Noxious Weed List.

Natural areas including Paynes Prairie State Preserve south and east of Gainesville, and state protected lands throughout Florida are being inundated with Chinese tallow. Chinese tallow can be seen in landscapes around the state and until very recently, could be purchased in garden centers or nurseries, aiding its spread throughout Florida.

DESCRIPTION

Characteristics that make Chinese tallow a popular ornamental are its fast growth rate, attractive fall color, and its ability to resist damage from pests. It is a small to medium-sized tree that grows to about 20 feet tall, but some specimens can reach 40-50 feet. It is freely branching with leaves arranged alternately on branches. The leaves have acuminate tips and entire margins, with broadly ovate leaf blades and rounded bases. The flowers of Chinese tallow are attractive to bees and other insects and are borne in spikes roughly 8 inches long. The fruit is a three-lobed capsule (0.5 inches) and seeds are covered with vegetable tallow, a white waxy coating. Fruit ripens from August to November.

Chinese tallow trees are deciduous with a strong, deep taproot. This enables young trees to withstand periods of drought. Seeds are spread by many species of birds, and moving water can also serve as a mechanism for seed dispersal.

IMPACTS

Chinese tallow can invade a variety of habitats ranging from swampy to saline waters, and from full sun to shade situations. It is often found growing along roadsides, coastal areas, and streams. Larger specimens can produce up to 100,000 seeds that may be eaten and dispersed by birds, facilitating the spread of tallow. Regrowth often occurs from cut stumps or roots. Native species are crowded out once Chinese tallow becomes established. The leaves and fruit are toxic to cattle and cause nausea and vomiting in humans.

MANAGEMENT

Preventative: Prevention is an important control tactic for Chinese tallow. Florida landowners should NOT distribute Chinese tallow-trees or seeds (as well as other invasive exotics). Florida residents with Chinese tallow are encouraged to remove them. Removal of seedlings is also important.

Cultural: Homeowners can help mitigate the problem of Chinese tallow trees in Florida's natural areas by removing them from their property. Seedlings should be continually pulled by hand before they reach seed-bearing maturity. Native or noninvasive non-native trees can be planted in areas previously occupied by Chinese tallow. Tree species recommended that are similar in size to Chinese tallow include blackgum, maples, dogwood, and crepe myrtles.

Mechanical: Mature trees should be cut down with a chain saw. The final cut should be made as close to the ground as possible and as level as possible. This will make an herbicide application easier as well as prevent resprouting from the cut. Seedling trees can be mowed or disked when small. Burning is also very effective for both small and larger trees.

Biological: There are no known biological control agents available for the control of Chinese tallow.

Chemical: Foliar applications are effective on smaller trees but cut-stump or basal bark treatments are commonly utilized. For foliar applications, fall treatments before seed shed is the optimum time – this coincides with downward translocation of carbohydrates. However, for basal bark or cut stump treatments the best time to control Chinese tallow is during the spring months. At this time the trees are coming out of

dormancy and seeds are not being produced. Control can be achieved with the use of triclopyr and a mineral or vegetable oil adjuvant for basal applications. For basal bark applications, apply an herbicide directly to the bark around the circumference of the tree up to 15 inches above the ground. For trees with stems less than 6 inches in basal diameter, a solution of 5% triclopyr with oil can be used. For trees over 6 inches in basal diameter a 15-20% triclopyr and oil solution should be used. To control resprouting of freshly cut stumps, a 20% solution of triclopyr is very effective. The root collar area, sides of the stump, and the outer portion of the cut surface should be sprayed until thoroughly wet, but not to the point of runoff. No more than 1/2 hour should elapse between cutting and applying herbicide. Do not attempt a cut stump or basal bark treatment during seed production (August to early September). This can increase the chance of spreading viable seed.

REFERENCES AND USEFUL LINKS:

Institute of Pacific Islands Forestry, Pacific Island Ecosystems at Risk:
<http://www.hear.org/pier/index.html>

University of Florida Center for Aquatic and Invasive Plants:
<http://aquat1.ifas.ufl.edu/welcome.html>

University of Florida's Cooperative Extension Electronic Data Information Source:
<http://edis.ifas.ufl.edu/index.html>

Lantana camara (Fankatavinakoho, Fotatra, lantana, Mandadrieko, Rajejeka, Radredreka, Ramity) (in press) In Goodman S.M. and J.P. Benstead (Eds) The natural history of Madagascar. University of Chicago Press, Chicago.
<http://members.lycos.co.uk/WoodyPlantEcology/docs/mad-lanta.RTF>

Mount Morgan Council Homepage: <http://www.mountmorgan.com/lantana.html>

Langeland, K.A. and K. Craddock Burks. 1998. Identification and Biology of Non-Native Plants in Florida's Natural Areas. IFAS Publication SP 257. University of Florida, Gainesville. 165 pp.

Langeland, K.A. 2003. Natural Area Weeds: Chinese Tallow (*Sapium sebiferum* L.). Publication SS-AGR-45. Agronomy Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. <http://edis.ifas.ufl.edu>.

City of Tallahassee, Florida: <http://talgov.com/citytlh/index.html>

Japanese Honeysuckle
***Lonicera japonica* (Thunb.)Caprifoliaceae**

INTRODUCTION

The family Caprifoliaceae contains an assortment of ornamental plants that are used in the landscape, including *Abelia*, *Kolkwitzia*, *Weigela*, and *Lonicera japonica*. *Abelia*, *Kolkwitzia*, and *Weigela* are shrubs with showy, fragrant flowers that are used for shrub borders, groupings, or mass plantings. Highway designers, wildlife managers, and landscapers use honeysuckle for a variety of reasons. Managers of wildlife areas plant *Lonicera japonica* as it provides winter forage for deer. *Lonicera* is a favorite of gardeners and landscape architects because of its fragrant, beautiful flowers and fast growth. Highway designers use honeysuckle in order to control erosion and stabilize banks. Even though Japanese honeysuckle is a highly desirable, highly utilized ornamental, it has quickly become a problem in the U.S. due to its fast growth rate and ability to displace native plant species. *Lonicera japonica* has been placed on the Florida Exotic Pest Plant Council's list of invasive species because of these characteristics.

In 1906 Japanese honeysuckle was introduced to the United States from Japan for use as an ornamental plant. In central Florida Japanese honeysuckle is found in Orange, Sarasota, Hillsborough, and Dade counties, and readily found in the panhandle and northern regions of the state. *Lonicera japonica* primarily occurs in disturbed habitats, including successional fields, roadsides, forest edges, and fencerows. In forest openings created by disturbance, disease or insect damage, or tree gaps, *Lonicera* is an opportunistic invader that will quickly colonize these areas. An established planting of honeysuckle is capable of engulfing small trees and shrubs, causing their collapse. Shading of plants in the understory can also occur, choking out many native species.

DESCRIPTION

Lonicera japonica is an evergreen, woody, twining vine. Ovate -shaped leaves are opposite, roughly 1 ½ to 3 inches long with variably pubescent petioles. The younger stems are reddish in color and are fuzzy or slightly pubescent. Hollow, older stems are

hollow with brownish bark that peels in long strips. The stems are usually 80-120 feet long.

Lonicera japonica has fragrant, white flowers that fade to yellow and borne in pairs on axillary peduncles. Individual flowers are tubular, with a fused two-lipped corolla. Flower production occurs from late April through July, and sometimes through October. Many varieties available in the nursery trade are easily distinguished by flower color from the invasive honeysuckle. There is also a native honeysuckle that is often confused with the invasive species. *Lonicera sempervirens* (coral honeysuckle), the native honeysuckle, is easily distinguished from the invasive honeysuckle by its upper leaves and berries. Leaves of the native species are connate - forming a single leaf that the stem grows through. *Lonicera japonica* has black berries, while the native species possesses red to orange berries. The fruits are produced September through November. Each contains 2-3 ovate seeds that are 2-3 mm long, dark-brown to black in color.

Birds that consume the fruits and disperse the seed spread Japanese honeysuckle. However, this species is also capable of reproducing vegetatively by underground rhizomes, and aboveground runners. It also has the ability to develop a rather large seed bank after becoming established and seed germinate after soil disturbance. Wide habitat adaptability, wide seed dispersal, rapid growth rate, extended growing season, and lack of natural enemies make *Lonicera japonica* a strong competitor against native species.

IMPACTS

Lonicera japonica is able to displace native species by outcompeting native plants for light, space, water, and nutrients. *Lonicera japonica* grows very rapidly, and will send out runners that will root and grow anywhere. In nature, honeysuckle vines will twine around anything growing in close proximity, eventually covering small trees and shrubs. This can lead to the collapse of the trees and shrubs due to the mere weight of vegetation. Dense thickets of vegetation prevent the germination and growth of many native species, eventually preventing the replacement of understory shrubs and trees. Honeysuckle opens the door for many other invasive species to invade, further decreasing the natural diversity of forests or natural areas.

MANAGEMENT

Preventative: Regular monitoring and rouging of plants can prevent the spread and establishment of Japanese honeysuckle. Programs to educate homeowners on proper plant (honeysuckle) identification will also reduce the spread of this species.

Cultural: Native alternatives to Japanese honeysuckle for use in home landscaping include trumpet creeper (*Campsis radicans*), Virginia creeper (*Parthenocissus quinquefolia*), and trumpet honeysuckle (*Lonicera sempervirens*). Wild ginger (*Asarum canadensis*) is an alternative ground cover in shady areas. Good ground cover will also prevent seed emergence and seedling establishment.

Mechanical: Hand-pulling, grubbing with a hoe or a shovel, and removal of trailing vines is practical for small infestations. Remove and destroy all plant material after cutting to prevent rooting and reinfestation. Periodic mowing can slow vegetative spread but may cause resprouting and increase stem density. Aggressive mechanical tillage is also effective, but may not be an option in many areas. However, soil disturbance may stimulate seed germination from the seed bank.

In fire-dependent natural communities, prescribed burning can control Japanese honeysuckle. Seedlings and young plants are susceptible to fire, however roots and shoots may survive a burn and resprout.

Biological: *Lonicera japonica* has few natural enemies in North America. There are no known biological agents for Japanese honeysuckle. Deer may forage on the plant, but cause limited damage.

Chemical: Timing of application is critical to effective Japanese honeysuckle control. Many herbicide treatments reduce foliage but leave buds and roots undamaged that can produce new growth. A foliar application of 1.5 to 3% glyphosate or 3 to 5% triclopyr shortly after the first frost appears to be the most effective treatment. Monitor treated plants in case a second herbicide application is necessary.

REFERENCES AND USEFUL LINKS:

United States Department of Agriculture Natural Resources Conservation Service Plants Database: <http://plants.usda.gov>

Invasives and Exotic Species of North America: <http://www.invasives.org>

University of Florida Center for Aquatic and Invasive Plants:
<http://aquat1.ifas.ufl.edu/welcome.html>

University of Florida's Cooperative Extension Electronic Data Information Source:
<http://edis.ifas.ufl.edu/index.html>

Langeland, K.A. and K. Craddock Burks. 1998. Identification and Biology of Non-Native Plants in Florida's Natural Areas. IFAS Publication SP 257. University of Florida, Gainesville. 165 pp.

Pacific Island Ecosystems at Risk (PIER). Plant Threats to Pacific Ecosystems:
<http://www.hear.org/pier/threats.htm>

Nuzzo, V. 1997. Element Stewardship Abstracts for *Lonicera japonica* Japanese Honeysuckle. The Nature Conservancy: <http://tncweeds.ucdavis.edu/>

Williams, C.E. Japanese Honeysuckle (*Lonicera japonica* Thunberg). Department of Biology, Clarion University. Virginia's Department of Conservation and Recreation
<http://www.dcr.state.va.us/index.htm>

Lantana

***Lantana camara* (L.) Verbenaceae**

INTRODUCTION

Lantana became a favorite greenhouse plant in the 18th century. This plant was such a desired species that many new varieties were bred, resulting in hundreds of cultivars available for sale in the European market. The newer cultivars were introduced to several countries on a regular basis, assisting in the worldwide distribution of Lantana.

Lantana camara is native to the West Indies. Florida has its own native species of Lantana (*L. depressa*) that is now considered endangered. The native Florida lantana is often confused with the invasive species. Lantana is found in almost every county in Florida but also found in Georgia and Texas. It is a serious pest in California and Hawaii, as well as in other countries including Australia, New Zealand, and China.

Lantana camara is grown as hedge plant and has various medicinal and practical uses. The stalks are used as raw material for paper pulp, which is used for wrapping, writing and printing paper. Lantana bark is astringent and used as a lotion in leprosy ulcers and other eruptions of the skin. *Lantana camara* leaves are boiled and applied for swellings and pain of the body. Alkaloids from lantana have been found to stimulate intestinal movements in experimental animals, lower blood pressure and accelerate deep respiration.

DESCRIPTION

Lantana is a perennial, erect or prostrate shrub growing to 6 feet or more in height. Leaves are ovate in shape, oppositely arranged, commonly 6 inches long and 2 ½ inches wide. To the touch, lantana leaves feel like fine sandpaper or a cat's tongue. Leaf blades are serrate and have an aroma when crushed or rubbed. Flowers of lantana are clustered at the tip of stems. Small, multicolored flowers change color over time from white to pink or lavender, or yellow to orange or red. Typically the more mature flowers are darker in color (lavender and red). Fruit of lantana is tiny (0.2 inches in diameter) and round. Initially green, the seeds will change to a deep purple and eventually black color.

Leaf characteristics can be used to distinguish the native lantana (*L. depressa*) from the invasive lantana (*L. camara*). Native lantana has a tapered leaf base, whereas the invasive lantana has a truncate leaf base. Flower color can also be used to distinguish between species. Native lantana has a yellow flower whereas invasive lantana has a multitude of flower colors. *Lantana camara* has successfully hybridized with native lantana, making identification of the invasive species more difficult.

Lantana reproduces vegetatively and via seed. Flowers are produced year round and are able to self and cross-pollinate. Lantana is an extremely prolific seed producer, with approximately 12,000 fruits per plant. Birds and other animals that consume lantana fruit can spread seed across large distances. Normally seed germination is low, however, when seed is passed through the digestive system of an animal, the germination rate is increased. Vegetative reproduction occurs when lantana stems come into contact with moist soil, initiating root formation at the contact site. Lantana can also regrow from the base of the stem, but does not sucker from damaged or broken roots.

IMPACTS

In Florida lantana can grow in a variety of areas including forests, roadsides, pastures, and citrus groves. It thrives in shaded or sunny, moist or dry locations. Lantana continues to be sold as an ornamental plant in garden centers and nurseries throughout the U.S. Through wide cultivation and establishment in the landscape, lantana is able to spread and survive by escaping from home landscapes.

In Florida citrus groves lantana is a serious economic weed pest. Propagation, reduction of manual weeding, herbicide tolerance, and reduced competition from other weedy species has allowed lantana to proliferate and spread successfully. It also decreases productivity in pastures and is toxic to cattle and other animals when grazed.

Lantana invades disturbed natural ecosystems by establishing in creek banks and roadsides. Native species establishment is inhibited by the dense understory created by lantana. In the homeowner setting, there are reports of children being poisoned by consuming unripened fruit. It is also thought that lantana produces allelopathic substances in shoots and roots which inhibits the growth and development of plants near lantana.

MANAGEMENT

An integrated approach should be taken when attempting to control lantana. Integrated control tactics include manual removal, burning, chemical control, shading, prevention and revegetation. Natural restoration may prove difficult due to the reduction of seeds of native plants.

Preventative: Preventing seed production is a very important step in lantana management. Removing flower heads prior to seed set will greatly reduce the number of seeds released into the seed bank, as well as reduces the number of seeds available for spread by birds or other animals. Homeowners can also help prevent the spread of lantana by removing plants from their landscape, and not purchasing plants from garden centers. An additional consideration is the removal of seeds prior to ripening.

Cultural: Weeds such as lantana generally invade open or disturbed areas – following a burn, clearing mowing, etc., so these areas are particularly vulnerable to invasion. Maintaining a healthy ecosystem with an abundance of native plant species will help deter infestations of lantana. Seeds may be hand picked from shrubs and discarded properly, however this may not be a realistic or cost effective tactic for larger infestations.

Mechanical: Fire, dozing or stickraking, and slashing or cutting can reduce dense infestations. These tactics can make spot treatments with chemicals more economically effective. Part of a management plan to control dense infestations includes the use of fire. A suggested control program is:

- To establish a fuel load exclude stock from the area.
- Only burn when you can get a permit.
- Revegetate areas with native plant species.
- Keep stock out until the pasture is established and seeded.
- Carry out another burn in the hot dry months before rain. Spot spray regrowth when it is vigorously growing between 20 inches and 5 feet tall.

Follow-up controls after each burn, with spot spraying or mechanical methods, are essential for the next few years. Burning without follow-up treatments is ineffective and may increase populations.

Smaller plants may be hand pulled, whereas older individuals should be dug out.

Biological: There are also some biological controls under consideration control of lantana as there are very effective biological control agents available for this species. Over 20 biocontrol agents have been released to control lantana in Hawaii with varying results. The most effective are the defoliating caterpillar *Hypena strigata*; the seed-destroying fly *Ophiomyia lantanae*, and the lace bug *Teleonemia scrupulosa*. Due to popularity of this species in the ornamental industry, the release of biological control agents is controversial.

Chemical: Lantana is susceptible to glyphosate, 2,4-D, and triclopyr at standard rates. Glyphosate is most effective as a foliar spray. It may also be susceptible to residual herbicides, including hexazinone and bromacil at standard rates, but care must be exercised when using around sensitive vegetation such as hardwoods. Metsulfuron may be effective if application is timed before annual droughts. Triclopyr ester applied basal bark is effective but foliar applications of triclopyr are ineffective.

REFERENCES AND USEFUL LINKS:

Institute of Pacific Islands Forestry, Pacific Island Ecosystems at Risk:
<http://www.hear.org/pier/index.html>

University of Florida Center for Aquatic and Invasive Plants:
<http://aquat1.ifas.ufl.edu/welcome.html>

University of Florida's Cooperative Extension Electronic Data Information Source:
<http://edis.ifas.ufl.edu/index.html>

Lantana camara (Fankatavinakoho, Fotatra, lantana, Mandadrieko, Rajejeka, Radredreka, Ramity) (in press) In Goodman S.M. and J.P. Benstead (Eds) The natural history of Madagascar. University of Chicago Press, Chicago.
<http://members.lycos.co.uk/WoodyPlantEcology/docs/mad-lanta.RTF>

Mount Morgan Council Homepage: <http://www.mountmorgan.com/lantana.html>

Langeland, K.A. and K. Craddock Burks. 1998. Identification and Biology of Non-Native Plants in Florida's Natural Areas. IFAS Publication SP 257. University of Florida, Gainesville. 165 pp.

Mexican Petunia

***Ruellia brittoniana* (Leonard) Acanthaceae**

INTRODUCTION

Mexican petunia is another example of plant that is being sold over the internet and in garden centers as a flowering plant or “handy perennial edging plant for flower beds and as colorful groundcovers”. The problem is that the Mexican petunia is highly invasive and is listed as a Category 1 invasive species by the Florida Exotic Pest Plant Council. Mexican petunia received this classification because of its invasion and distribution within native plant communities.

Mexican petunia can thrive in a range of environments, including flatwoods, hardwood hammocks, prairies, rivers and pastures. The cultivars available for sale in the trade have been selected for their flower color or size (tall or dwarf), however there have been very few research projects dedicated to determining the invasive characteristics of the cultivated varieties.

DESCRIPTION

Mexican petunia is a stalk forming perennial that stands up to 3 feet in height. Leaves are dark green; oppositely arranged and lance-shaped, roughly 6-12 inches long and 1/2-3/4 inches wide. Veins are prominent on the underside of the leaf. Leaf margins are can be smooth or wavy. Foliage appears a metallic blue/purple under full sun. Flowers are trumpet shaped (1 1/2 -2 inches in diameter), solitary or borne in clusters at the tips of the stems. There are numerous varieties with a plethora of color to choose from (white, pink, and many shades of blue). Dwarf varieties are also available. Cylindrical fruit containing 4 to 20 seeds are produced. Mexican petunia is capable of reproducing and spreading via seed, rhizomes, stem sprouts and cuttings.

IMPACTS

Mexican petunia is able to tolerate a wide range of environmental conditions including variations in light, temperature, and moisture. Other characteristics that make Mexican petunia a successful invasive are its rapid growth rate, affinity for disturbed

locations, prolific production of seed, and lack of germination requirements such as scarification. Mexican petunia can also resprout from crowns or rootstocks when cut back or killed back by frost.

MANAGEMENT

Preventative: Regular monitoring and rouging of plants can prevent the spread and establishment of Mexican petunia. Programs to educate homeowners on alternative plants to Mexican petunia in landscape settings will also reduce the spread of this species.

Cultural: Native alternatives to Mexican petunia for use in home landscaping include wild petunia (*Ruellia caroliniensis*), blue curls (*Trichostema dichotomum*), butterflyweed (*Asclepias tuberosa*), or swamp milkweed (*Asclepias perennis*).

Mechanical: Hand-pulling and removal of entire plants is practical for small infestations. Aggressive tillage and mowing is effective, but impractical in many situations. Germination from seeds after tillage is likely, so follow-up control will be necessary.

Biological: There are no known biological agents for Mexican petunia.

Chemical: Timing of application is critical to effectiveness. Foliar applications of glyphosate (1-2%) or cut back plants then treat with glyphosate. Evaluations of alternative herbicides for Mexican petunia control are currently being conducted.

REFERENCES AND USEFUL LINKS:

United States Department of Agriculture Natural Resources Conservation Service Plants Database: <http://plants.usda.gov>

Invasives and Exotic Species of North America: <http://www.invasives.org>

University of Florida Center for Aquatic and Invasive Plants:
<http://aquat1.ifas.ufl.edu/welcome.html>

University of Florida's Cooperative Extension Electronic Data Information Source:
<http://edis.ifas.ufl.edu/index.html>

Langeland, K.A. and K. Craddock Burks. 1998. Identification and Biology of Non-Native Plants in Florida's Natural Areas. IFAS Publication SP 257. University of Florida, Gainesville. 165 pp.

Pacific Island Ecosystems at Risk (PIER). Plant Threats to Pacific Ecosystems:
<http://www.hear.org/pier/threats.htm>

Floridata:

http://www.floridata.com/main_fr.cfm?state=Welcome&viewsrc=welcome.htm

The Hillsborough County Invasive Species Task Force
Identification and control of non-native invasive plants in the Tampa Bay Area:
http://www.tbep.org/pdfs/Invasive_Plants.pdf

Krumholz, L.A. and S.B. Wilson. 2002. Varying growth and sexual reproduction across cultivars of *Ruellia brittoniana*. University of Florida, Department of Environmental Horticulture. SNA Research Conference, Vol 47, p. 99.
<http://www.sna.org/research/02proceedings/section0128.html>

Paper Mulberry
***Broussonetia papyrifera* (L.) Moraceae**

INTRODUCTION

Paper mulberry is a tree in the mulberry family (Moraceae) that is used extensively as an ornamental landscape plant in the United States. Native to Japan and Taiwan, paper mulberry was introduced for its use as a fast-growing shade tree. In its native lands, paper mulberry is used in paper making. In Hawaii and other parts of the South Pacific, its bark is used to make cloth. In the United States it is found from Illinois to Massachusetts, south to Florida and west to Texas. Paper mulberry is an invader of open habitats such as forest and field edges. Native species are displaced by paper mulberry because of its vigorous growth.

DESCRIPTION

Paper mulberry is a large shrub or small tree with a mounded appearance, capable of growth over 30 feet in height. The bark is pale brown and smooth or shallowly grooved. The most revealing characteristic of paper mulberry is the highly variable leaves. In size they range from 3 to 10 inches in length, and are arranged alternately on stems. Smaller leaves tend to be simpler, ovate in shape with pointed tips and serrate margins. Larger leaves tend to be cordate (heart) or mitten shaped, some deeply lobed, with three large or sometimes two smaller lobes near the base of the leaf. Soft, pubescent hairs are found on the underside of leaves. Paper mulberry is deciduous and can be identified by bud characteristics, stipule scars, and hairy, reddish brown twigs in winter. If leaves are damaged or removed from the stem, a milky sap exudes from the cut surface.

Paper Mulberry is dioecious, with male and female flowers produced on separate trees. Male trees produce catkins that are long clusters of flowers. Female trees produce ball-shaped flower clusters, which mature into red, globose aggregate fruits. The fruit is generally 0.5 – 1 inch in diameter and reddish-purple in color.

Seed and vegetative growth (sprouting/suckering) are the primary mechanisms of paper mulberry reproduction.

IMPACTS

Paper mulberry is an invasive plant that will quickly invade disturbed areas throughout Florida. In Florida, paper mulberry is found in Dade, Duval, and Santa Rosa Counties, to name a few. Natural areas are extremely susceptible to invasion of paper mulberry because the Florida climate is ideal for this, as well as many other, invasive species. Paper mulberry is spread via fruit with birds and other wildlife able to spread fruit over significant distances. Once established paper mulberry is able to spread vegetatively from its roots, forming dense thickets that inhibit the growth and development of native species. This also negatively impacts wildlife, which are dependent on native vegetation for forage, nesting, and cover.

MANAGEMENT

Preventative: Do not plant paper mulberry. Educate homeowners and others on its invasive nature so it is not planted in landscapes.

Cultural: Alternative native plants that can be planted after paper mulberry has been removed include: red maple (*Acer rubrum*), hackberry (*Celtis occidentalis*), black gum (*Nyssa sylvatica*), and sassafras (*Sassafras albidum*).

Mechanical: In small infestations, seedlings can be pulled by hand. Shrubs can be cut to the ground, repeating as necessary to control any re-growth from sprouts.

Biological: There is limited research and data on biological control of paper mulberry.

Chemical: Chemicals should be applied prior to seed set. Application of the herbicide triclopyr ester (15%-30%) to the bark has been successful. Larger trees may require multiple treatments. A cut stem treatment with 50% triclopyr amine is another chemical option. Foliar applications of glyphosate (1-3%) or triclopyr (2-4%) will be effective on smaller trees where thorough coverage can be obtained. Be sure to use a surfactant (0.25%) with triclopyr.

REFERENCES AND USEFUL LINKS:

Invasive and Exotic Species of North America: www.invasive.org

University of Florida Center for Aquatic and Invasive Plants:
<http://aquat1.ifas.ufl.edu/welcome.html>

University of Florida's Cooperative Extension Electronic Data Information Source:
<http://edis.ifas.ufl.edu/index.html>

Langeland, K.A. and K. Craddock Burks. 1998. Identification and Biology of Non-Native Plants in Florida's Natural Areas. IFAS Publication SP 257. University of Florida, Gainesville. 165 pp.

USDA Natural Resources Conservation Service, Plants Database: <http://plants.usda.gov>

Morgan, E.C. and W.A. Overholt. 2004. Wildland Weeds: Paper Mulberry, *Broussonetia papyrifera*. Publication ENY-702, Entomology and Nematology Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. <http://edis.ifas.ufl.edu/IN498>

Plant Invaders of Mid-Atlantic Natural Areas:
<http://www.nps.gov/plants/alien/pubs/midatlantic/indexsci.htm>

Invasive and Exotic Species of North America:
<http://www.invasive.org/library/FLFSNoxWeeds/papermullberry.html>

Paragrass

Brachiaria mutica (Forssk.) Poaceae

INTRODUCTION

Brachiaria mutica, also known as *Urochloa mutica*, is an invasive grass species native to Africa. In its native lands, *Brachiaria* is cultivated as a forage grass and was brought to the U.S for this purpose. In areas where paragrass is not grazed on by cattle, it has become a serious weed. Upon its introduction to the U.S., naturalization of paragrass has occurred throughout several southern regions of the country, including Florida, in cultivated and disturbed areas. Paragrass is able grow in canals and low, wet areas, displacing native vegetation in marshes and swamps. Florida's Exotic Pest Plant Council has listed *Brachiaria mutica* as a Category 1 invasive plant in Central and Southern Florida because of these invasive characteristics.

DESCRIPTION

Para grass is in the family Poaceae, along with other familiar grasses such as St. Augustinegrass, bermudagrass, centipedegrass and many ornamental grass species. A perennial species, paragrass spreads via creeping stolons, cuttings, and seed. Stems will often root at the base, and can reach up to 8 feet in height, having hairy nodes and sheaths. Leaf blades are 4 to 12 inches long and ½ an inch wide. The panicle is up to 12 inches long, with numerous spreading branches. Spikelets are roughly 0.12 inches long, elliptic, with a purplish rachis. Although there are many flower heads produced by paragrass, seed production is very poor with poor seeds viability.

IMPACTS

Paragrass can form floating mats in drainage ditches or irrigation canals, resulting in the impediment of water flow. This impediment on water flow can also restrict navigation of water vessels in shallow water and prevent recreational use of waterways. Aggressive in nature, paragrass can form large monocultures through fast growth and high productivity. Paragrass is even thought to have allelopathic activity on other plants,

ensuring its success. In 1986 paragrass was found in 207 public water bodies in Florida. Through control and management efforts, this number dropped in 1994 to 183.

MANAGEMENT

Preventative: Do not allow seed set to occur and prevent movement of plant material from into uninfested areas.

Cultural: Cattle grazing on paragrass seems to keep this invasive in check and is used extensively by many producers as a forage. However, education on the problems associated with paragrass should be used to prevent unwanted infestations.

Mechanical: Small infestations can be removed with repeated, aggressive tillage. Burning can be very useful in removing excess biomass, allowing for more effective chemical control.

Biological: There are no known biological control agents for paragrass.

Chemical: For broadcast applications to larger areas, glyphosate at 2 to 4 lbs-ai/acre can be used. Imazapyr can also be very effective at 0.5 to 1 lbs-ai/acre, but adhere strictly to irrigation restricts on the label (Habitat) if applied near water. Imazapyr can also cause non-target damage due to soil residual properties. Always use a good surfactant at 0.25% with imazapyr and with certain glyphosate formulations.

REFERENCES AND USEFUL LINKS:

Floridata Homepage:

http://www.floridata.com/main_fr.cfm?state=Welcome&viewsrc=welcome.htm

University of Florida Center for Aquatic and Invasive Plants:

<http://aquat1.ifas.ufl.edu/welcome.html>

University of Florida's Cooperative Extension Electronic Data Information Source:

<http://edis.ifas.ufl.edu/index.html>

Langeland, K.A. and K. Craddock Burks. 1998. Identification and Biology of Non-Native Plants in Florida's Natural Areas. IFAS Publication SP 257. University of Florida, Gainesville. 165 pp.

Pacific Island Ecosystems at Risk (PIER). Plant Threats to Pacific Ecosystems:
<http://www.hear.org/pier/threats.htm>

Perdue University. Center for New Crops and Plant Products:
http://www.hort.purdue.edu/newcrop/duke_energy/Brachiaria_mutica.html

US Army Corps of Engineers:
<http://www.wes.army.mil/el/pmis/plants/html/urochloa.html>

Rosary Pea
Abrus precatorius (L.) Fabaceae

INTRODUCTION

There are many uses for rosary pea. The seeds have been used in all types of jewelry and can also be used as a contraceptive or to treat diabetes and chronic nephritis. Roots are used to induce abortion and against abdominal discomfort. Interestingly, one of the most deadly plant toxins, abrin, is produced by *Abrus precatorius*. Even though rosary pea seeds are highly toxic, in certain parts of the world the seeds are boiled and eaten. Boiling destroys the toxins contained within the seed, rendering them safe for consumption. Toxins are released only if the seed is chewed and swallowed and the seed is the only part of the plant that is poisonous. As little as 0.00015% of toxin per body weight will cause fatality in humans (a single seed). In case of accidental ingestion, a suggestion to alleviate any ill effects of the toxins is to administer fluids and electrolytes.

DESCRIPTION

Rosary pea is a small, high climbing vine with alternately compound leaves, 2-5 inches long, with 5 to 15 pairs of oblong leaflets. The flowers are small, pale, and violet to pink, clustered in leaf axils. The fruit is characteristic of a legume. The pod is oblong, flat and truncate shaped, roughly 1½ - 2 inches long. This seedpod curls back when it opens, revealing the seeds. The seeds are small, brilliant red with a black spot. These characteristics give the plant another common name of crab's eyes.

Interestingly, birds seem to be unaffected by the deadly toxin because they readily disperse Rosary pea seed. Roots grow very deeply onto the ground and are very difficult to remove. Fire encourages the growth of Rosary pea.

IMPACTS

Rosary pea is found throughout central and southern Florida, including Marion, Lake, Palm Beach, and Manatee counties. All together, rosary pea has been collected from 27 counties throughout Florida. Undisturbed pinelands and hammocks are often

invaded by *Abrus*. The Florida Exotic Pest Plant Council considers rosary pea a category 1 invasive species due to its ability to invade and displace native plant communities. Characteristic of a vining plant, rosary pea can grow over small trees and shrubs.

MANAGEMENT

Preventative: Regular monitoring and rouging of plants can prevent the spread and establishment of rosary pea. Programs to educate homeowners on proper plant identification will also reduce the spread of this species.

Cultural: Native alternatives to rosary pea for use in home landscaping or natural areas include leather flower (*Clematis crispa*) or Carolina jessamine (*Gelsemium sempervirens*).

Mechanical: Hand-pulling and removal of entire plants, particularly the roots, is practical for small infestations. Aggressive tillage is an option and very effective, but impractical in many areas. Fire provides only temporary control.

Biological: There are no known biological agents for rosary pea.

Chemical: Timing of application is critical to effectiveness; with applications in the fall prior to seed set being the most effective. Triclopyr is effective on large woody vines immediately after the vines are cut down. Triclopyr amine or glyphosate can be applied to the foliage at 3-5% or 1-3%, respectively.

REFERENCES AND USEFUL LINKS:

United States Department of Agriculture Natural Resources Conservation Service Plants Database: <http://plants.usda.gov>

Invasives and Exotic Species of North America: <http://www.invasives.org>

University of Florida Center for Aquatic and Invasive Plants:
<http://aquat1.ifas.ufl.edu/welcome.html>

University of Florida's Cooperative Extension Electronic Data Information Source:
<http://edis.ifas.ufl.edu/index.html>

Langeland, K.A. and K. Craddock Burks. 1998. Identification and Biology of Non-Native Plants in Florida's Natural Areas. IFAS Publication SP 257. University of Florida, Gainesville. 165 pp.

Pacific Island Ecosystems at Risk (PIER). Plant Threats to Pacific Ecosystems:
<http://www.hear.org/pier/threats.htm>

Floridata:

http://www.floridata.com/main_fr.cfm?state=Welcome&viewsrc=welcome.htm

The Hillsborough County Invasive Species Task Force

Identification and control of non-native invasive plants in the Tampa Bay Area:

http://www.tbep.org/pdfs/Invasive_Plants.pdf

Silverthorn

Elaeagnus pungens (Thunb.) Elaeagnaceae

INTRODUCTION

In the early 1800's *Elaeagnus pungens*, or silverthorn, was introduced from China and Japan as an ornamental plant. Silverthorn is used in the United States as a landscape plant, often grown as an evergreen hedge and barrier and is regularly planted along highways. Unfortunately, many Florida nurseries and homeowners are not aware the Florida Exotic Pest Plant Council considers this plant a Category II invasive exotic species. This means silverthorn has the potential to cause ecological damage by altering naive plant communities by hybridizing with native *Elaeagnus* species, displacing native species, and changing community structures or ecological functions.

DESCRIPTION

Elaeagnus pungens is an evergreen shrub that is able to grow 3 to 25 feet in height. Although silverthorn is primarily considered a shrub, it also can take the form of a climbing plant, growing over and shading out other plants. Take caution when handling this plant. Its common name, silverthorn, comes from the thorns on its branches.

Leaves are lanceolate with entire to wavy margins arranged alternately on the stem approximately 2 to 4 inches long (0.2 to 2 inches wide). Upper leaf surfaces are waxy green and scaly. Lower leaf surfaces are silvery and scaly, as is the petiole. To the touch, leaves are rough and grainy. The bark is reddish brown in color, having lenticels (small spots) when older, smooth when young.

Flowers are 1/2 to 5/8 inch long, pale yellow to white, bell shaped with a sweet smelling fragrance. These are borne in axillary clusters of one to three flowers in the fall. The fruit are drupes, round and red in color with silver scales.

IMPACTS

Silverthorn is a fast-growing, weedy ornamental. It is able to grow and thrive in a variety of conditions, and can tolerant shade, drought, and salt. Animals and birds disperse seed, widening its area of distribution. Reproduction also occurs via stem

sprouts. When silverthorn is in the climbing form, it can climb into trees, leading to the displacement of native vegetation.

MANAGEMENT

Preventative: Remove all silverthorn plantings to prevent the spread and dispersal of seed. Educate the public on the potential dangers of invasive plants to prevent future plantings.

Cultural: Remove plants prior to seed production. Revegetate natural areas with native species.

Mechanical: Aggressive tillage and/or mowing is an option whenever possible. Repeat as needed to control regrowth.

Biological: Silverthorn has very few pests or diseases in landscapes. There are no known biological agents.

Chemical: Foliar applications of imazapyr or glyphosate with a surfactant in water have been used to treat silverthorn. Triclopyr as a 20% solution in a petroleum base with a penetrant can be used for upper stem treatments, as well as to young bark as a basal spray. Large stems can be cut and stumps treated immediately with imazapyr (10% solution), triclopyr (50% solution) or glyphosate (20% solution) in water with a surfactant.

REFERENCES AND USEFUL LINKS:

Invasive and Exotic Species of North America: www.invasive.org

University of Florida Center for Aquatic and Invasive Plants:
<http://aquat1.ifas.ufl.edu/welcome.html>

University of Florida's Cooperative Extension Electronic Data Information Source:
<http://edis.ifas.ufl.edu/index.html>

Langeland, K.A. and K. Craddock Burks. 1998. Identification and Biology of Non-Native Plants in Florida's Natural Areas. IFAS Publication SP 257. University of Florida, Gainesville. 165 pp.

USDA Natural Resources Conservation Service, Plants Database: <http://plants.usda.gov>

Morgan, E.C. and W.A. Overholt. 2004. Wildland Weeds: Paper Mulberry, *Broussonetia papyrifera*. Publication ENY-702, Entomology and Nematology Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. <http://edis.ifas.ufl.edu/IN498>

Plant Invaders of Mid-Atlantic Natural Areas:
<http://www.nps.gov/plants/alien/pubs/midatlantic/indexsci.htm>