

Brazilian Peppertree Control¹

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Common Name: Brazilian peppertree
Scientific Name: *Schinus terebinthifolia*
Family Name: Anacardiaceae (cashew or sumac family)

The invasion of many non-native species is harming Florida's natural ecosystems. Invasive plants are a major component of this phenomenon. Brazilian peppertree is one of the worst offenders (Cuda et al. 2006). This plant is encroaching upon nearly all terrestrial ecosystems in central and south Florida. Brazilian peppertree is the most widely distributed and abundant invasive species in the Florida Everglades, occupying 30,379 ha (Rodgers, Pernas, and Hill 2014). Brazilian peppertree is native to Brazil, Argentina, and Paraguay (Langeland et al 2008). It is thought to have been introduced to Florida in the 1840s as an ornamental plant (Figure 1) (Barkley 1944).



Figure 1. Brazilian peppertree with berries.
 Credits: C. Minter, UF/IFAS

Habitat

Brazilian peppertree is sensitive to cold temperatures, so it is more abundant in south Florida and protected areas of central and north Florida. Brazilian peppertree colonizes native tree hammocks, pine flatlands, and mangrove forest communities. It has also colonized the margins of countless roads, rights of way, levees, and canals throughout south and central Florida.

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Identification

The cotyledons (embryonic leaves) are simple; both the apex and the base have an obtuse outline. The margin is generally curved inward on one side. The first true leaves are simple with a toothed margin (Figure 2). The later leaves are compound.

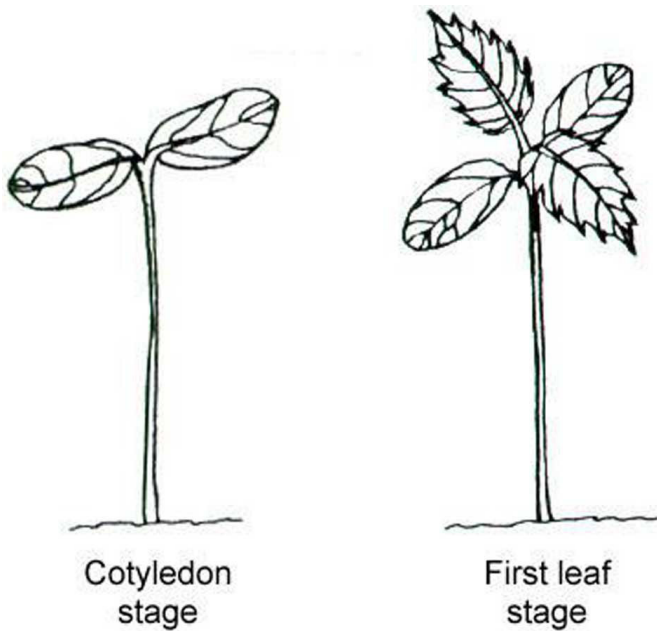


Figure 2. Brazilian peppertree seedlings.
Credits: UF/IFAS Center for Aquatic and Invasive Plants

Mature Plant

Brazilian peppertree is a shrub or small tree that grows to 10 m (33 ft) tall with a short trunk which is usually hidden in a dense head of contorted, intertwining branches. The leaves have a reddish and sometimes winged midrib (Figure 3), and three to 13 sessile, oblong or elliptic, finely toothed leaflets, 2.5 to 5 cm (1 to 2 in) long. Leaves smell of turpentine when crushed. The plants have separate male or female flowers. Each sex occurs on separate plants (Figure 5). The male and female flowers are white (Figure 4) and consist of five parts with male flowers having 10 stamens in two rows of five (Figure 5). Petals are 1.5 mm (0.6 in) long. The male flowers also have a lobed disc within the stamens. The fruits are found on female plants in clusters. These fruits are glossy, green, and juicy at first. They become bright red on ripening and grow to 6 mm (2.4 in) wide. The mature fruit is a small, bright red, spherical drupe (Langeland et al. 2008). Seeds measure 0.3 mm in diameter and are dark brown in color (UF/IFAS Center for Aquatic and Invasive Plants 2018).



Figure 3. Brazilian peppertree winged midrib.
Credits: C. Minteer, UF/IFAS



Figure 4. White flowers of the Brazilian peppertree.
Credits: C. Minteer, UF/IFAS



Figure 5. Brazilian peppertree fruiting and flowering.
Credits: UF/IFAS Center for Aquatic and Invasive Plants

Biology

Flowering occurs predominantly from September through November in Florida. Fruits are usually mature by December. Birds and mammals are the primary means of seed dispersal. The removal of the pulp around the seed by the digestive tract of birds increases the seed's germination rate (Dlamini, Zachariades, and Downs 2018). Brazilian peppertree's high seed viability combined with animal dispersal may help explain widespread colonization.

Chemical Control

Using Herbicides

Herbicides that aid in the control of Brazilian peppertrees are available (Table 1). Only herbicides recommended for Brazilian peppertree control should be used. It is illegal to use an herbicide in a manner inconsistent with the label's instructions; therefore, read the label carefully and follow the instructions. For more information on the individual plant treatments listed below, see EDIS document SS-AGR-260, *Herbicide Application Techniques for Woody Plant Control* (<http://edis.ifas.ufl.edu/ag245>).

Cut Stump Application

Cutting down Brazilian peppertrees and treating the tops of the stumps with herbicide comprise one method of control. A saw should be used to cut the trunk as close to the ground as possible. Within five minutes, an herbicide containing the active ingredient glyphosate or triclopyr should be applied carefully 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 peppertrees is when they are not fruiting. Seeds in the fruits can produce new Brazilian peppertrees. If fruiting Brazilian peppertrees are cut, care should be taken not to spread the fruits to locations where they might become established.

Caution: Brazilian peppertree produces a sap that may result in contact dermatitis in some people. When cutting trees, avoid the sap if possible. Individuals who are highly sensitive to the sap may also be affected simply by touching the leaves. Use proper protective gear when cutting the tree and applying the herbicides.

Basal Bark Herbicide Application

Brazilian peppertrees can be controlled using basal bark herbicide application. In this method, an application of an herbicide product containing the active ingredient triclopyr

ester is applied to the lower part of the trunk in a 12- to 18-in band around the circumference of the tree. Further research is needed to confirm positive control results. It may take several weeks before the herbicide's effects become apparent. Defoliation, a lack of new shoots, and the presence of termites are indicators that the treatment has been successful.

Basal bark treatments are most effective in the fall when Brazilian peppertrees are flowering due to the high level of translocation occurring within the trees. Fruiting occurs during winter, and Brazilian peppertrees that have been treated using a basal bark application may retain their fruit. The herbicide will move downward to the roots with the sap flow. In this situation, the area will need to be checked for seedlings on a regular basis.

Foliar Herbicide Application

Foliar herbicide application can be used on Brazilian peppertree seedlings and saplings. An herbicide containing triclopyr or glyphosate is applied directly to the foliage. Spray to wet, but not to the point of runoff. Good coverage is essential. Although both herbicides translocate throughout the plant, coverage on only one side of a tree with glyphosate or triclopyr will not completely kill it. Keep in mind that foliar applications require considerably more herbicide to control Brazilian peppertree. Take precautions to prevent herbicide drift injury to nearby plants.

Biological Control

For biological control agents to be approved for release in Florida, scientists must show that those agents are specific to Brazilian peppertree. Scientists have identified four insect species that may prove to be effective biological control agents: one thrips and three species of leaf-galling insects in the family Calophyidae. Both the thrips and the leaf galls feed on new shoots. The Technical Advisory Group for Biological Control of Weeds recommended the thrips (*Pseudophilothrips ichini*) and one of the galling species (*Calophya latiforceps*) for release in 2016. Scientists from UF/IFAS expect authorization to release these insects in the future. As of June 2018, release permits for both of these species were in the process of being approved. Both of these species are host-specific to Brazilian peppertree and have been shown to damage the plant in laboratory studies (Prade et al. 2016; Manrique et al. 2014).

For more information, consult the following EDIS publications:

EENY689: *Yellow Brazilian Pepper-Tree Leaf Galler (Suggested Common Name)* *Calophya latiforceps* Burckhardt (Insecta: Hemiptera: Calophyidae: Calophyinae)—<http://edis.ifas.ufl.edu/in1186>

ENY-820: *Classical Biological Control of Brazilian Peppertree (Schinus terebinthifolia) in Florida*—<http://edis.ifas.ufl.edu/in114>

EENY270: *Brazilian Peppertree Seed Wasp, Megastigmus transvaalensis* (Hymenoptera: Torymidae)—<http://edis.ifas.ufl.edu/in453>

the digital aerial sketch mapping technique.” *Invasive Plant Science and Management* 7: 360–74.

UF/IFAS Center for Aquatic and Invasive Plants. 2018. “*Schinus terebinthifolia*.” *Plant Directory*. Accessed on October 31, 2018. <https://plants.ifas.ufl.edu/plant-directory/schinus-terebinthifolia/#desc>

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Dlamini, P., C. Zachariades, and C. Downs. 2018. “The effect of frugivorous birds on seed dispersal and germination of the invasive Brazilian pepper tree (*Schinus terebinthifolius*) and Indian laurel (*Litsea glutinosa*).” *S. Afr. J. Bot.* 114: 61–8.

Langeland, K. A., H. M. Cherry, C. M. McCormick, and K. A. Craddock Burks. 2008. *Identification & Biology of Non-Native Plants in Florida’s Natural Areas, 2nd Edition*. Gainesville, FL: University of Florida Institute of Food and Agricultural Sciences.

Manrique, V., R. Diaz, L. Erazo, N. Reddi, G. S. Wheeler, D. Williams, and W. A. Overholt. 2014. “Comparison of two populations of *Pseudophilothrips ichini* (Thysanoptera: Phlaeothripidae) as candidates for biological control of the invasive weed *Schinus terebinthifolia* (Sapindales: Anacardiaceae).” *Biocontrol Sci. Technol.* 24: 518–35.

Prade, P., R. Diaz, M. D. Vitorino, J. P. Cuda, P. Kumar, B. Gruber, and W. A. Overholt. 2016. “Galls induced by *Calophya latiforceps* (Hemiptera: Calophyidae) reduce leaf performance and growth of Brazilian peppertree.” *Biocontrol Sci. Technol.* 26: 23–34.

Rodgers, L., T. Pernas, and S. D. Hill. 2014. “Mapping invasive plant distributions in the Florida Everglades using

Table 1. Herbicides and application methods for Brazilian peppertree control.

Active Ingredient ¹	Application Methods	Comments
Glyphosate	Cut stump, foliar	Use a glyphosate product that contains 41% active ingredient or higher. Avoid RTU (ready-to-use) formulations because they will not be effective.
Imazapyr (2 lb/gallon)	Cut stump, foliar (low volume), basal bark	Not for use near desirable trees and shrubs.
Triclopyr amine	Cut stump, foliar	Some products available in small containers from retail garden suppliers.
Triclopyr ester	Cut stump, foliar, basal bark	Available from agricultural suppliers. Do not apply directly to water.

¹ Based on the acid.