

Evaluation of Herbicides to Control Carrotwood (*Cupaniopsis anacardioides*) and Response of Time of Herbicide Application After Felling

Figure 1. Carrotwood is easily recognized when mature fruit is present.

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Introduction

Carrotwood is native to Australia, where it occurs on the north and east coasts on rocky beaches, sand dunes, hilly scrub, and riverine and monsoon forests (Reynolds 1985). When fruits are present it is easily recognized by the copious amounts of woody capsules, light green in color, to one inch across, with distinctly ridged segments, which occur in branched clusters. Fruits turn yellow-orange when ripe (April/May), dry to brown, and slit open to expose 3 shiny oval black seeds covered by a yellow-red crust (aryl) (Figure 1). Other identifying characteristics include dark gray outer bark and often orange-colored inner bark; compound, alternate, usually even-pinnate leaves with petioles swollen at the base; 4-12 stalked leaflets, which are oblong, leathery, shiny yellowish-green, to 8 inches long and 3 inches wide, with untoothed margins,

and tips rounded or slightly indented; and numerous white to greenish yellow flowers that occur January and February.

Carrotwood was introduced commercially to Florida in 1968 and quickly became a popular landscape planting for residential landscapes, as well as parking lots and street plantings (Coile 1997). Unfortunately for natural areas, carrotwood seeds are consumed by birds and dispersed far from parent plants (Lockhart *et al.* 1999, Coile 1997). Consumption by fish crows is particularly important because seeds are carried from inland feeding sites to coastal islands where they are deposited and germinate, threatening mangrove communities (Lockhart *et al.* 1997). By 1990, seedlings were found established in various habitats, disturbed and undisturbed, on both Florida coasts (Oliver 1990). Habitats that have been invaded by carrotwood include spoil islands, beach dunes, marshes, tropical hammocks, pinelands, mangrove and cypress swamps, scrub, and coastal strands (Lockhart *et al.* 1997). It is especially a problem in low moist areas, is salt tolerant, and has become a pest to mangrove ecosystems (Coile 1997). Natural areas of 14 coastal counties in central and south Florida have been

impacted by carrotwood (Langeland and Burks 1998).

Carrotwood was listed in Category I of FLEPPC's "1995 List of Florida's Most Invasive Plant Species." In 1999, it was added to the Florida Noxious Weed List (5b-57.007 FAC) by the Florida Department of Agriculture and Consumer Services. Plants on the Florida Noxious Weed List may not be introduced, possessed, moved, or released without a permit.

As part of the Comprehensive Everglades Restoration Project, the South Florida Water Management District purchased Griffin Tree Farm (Broward County, FL) in 1998. The tree farm inventory included a large number of invasive plant species including mature carrotwood trees. Because the District had made a decision to destroy all invasives on the property, an excellent research opportunity presented itself. Not often are invasive plant species available in nice neat rows for conducting herbicide research. The University of Florida Institute of Food and Agricultural Sciences and the South Florida Water Management District cooperated on a study to identify herbicides and application methods that were effective for controlling carrotwood. In addition to testing three herbicide products for cut-stump

applications, the test was designed to determine the effect of applying the herbicides at various times elapsed following felling the trees.

Materials and Methods

Ortho Brush-B-Gon (8.0% triclopyr amine), Rodeo (53.8% glyphosate), and Pathfinder II (13.6% triclopyr ester) were applied to ten trees each at 3, 30, 60, and 180 minutes after felling. Herbicides were directed just inside the bark where active vascular tissue occurs, using paint brushes (Figure 2). Ten trees were felled and the stumps left untreated as checks. Pathfinder II or Garlon 4 (61.6% triclopyr ester) diluted to 10%, 20%, or 30% in either JLB Oil Plus or Pro-Mate Impel were applied as basal bark treatments to 50



Figure 2. Application of herbicide to stump of felled carrotwood tree, concentrating herbicide just inside the bark where active vascular tissue occurs.

trees each. Basal bark treatments were applied using backpack sprayers. Trees ranged from 8 to 12 inches DBH. All applications were made in March 1999. All cut stumps were evaluated three and six months post treatment for sprouting and basal bark treatments for morbidity.

Results and Discussion

Good news — carrotwood is apparently very susceptible to herbicides. All



Figure 4. Carrotwood trees effectively controlled by basal bark herbicide applications.

herbicides applied (Table 1) at all times elapsed post felling were effective, evidenced by no resprouting of treated stumps, as compared to resprouting of all untreated stumps (Figure 3). All basal bark treatments (Table 1) were effective, evidenced by necrosis of all foliage (Figure 4), drying and cracking of bark (Figure 5), and lack of basal resprouting.

It is always recommended that herbicides, especially products that contain water soluble active ingredients such as triclopyr amine, be applied as soon as possible (e.g. within fifteen minutes) after felling of trees. Results in this study should not be construed as contrary to those recommendations. Under other circumstances and with other species, timing may be of more critical importance and applying herbicide soon after felling will always provide greater confidence in anticipated control.

Brush-B-Gon was evaluated because it is readily available in small quantities from retail garden supplies to homeowners who may have only one



Figure 5. Drying and cracking of carrotwood tree bark 6 months following basal bark herbicide application.

or several trees to remove. Rodeo was included because it is registered for use in aquatic sites. In addition to the products tested in this study, other products that contain the same active ingredients should also be effective for controlling carrotwood. Lower rates of herbicides used in this study may also be effective.

Carrotwood is a relative newcomer and not yet as widespread compared to other invasives, such as melaleuca and Brazilian pepper. With an immediate and aggressive public information and control program, we may be able to keep carrotwood at bay. Look for a "Carrotwood Management Plan" from the FLEPPC Carrotwood

Table 1. Herbicides found effective for control of carrotwood at the SFWMD Griffin Tree Farm.

Herbicide	Application Method	Dilution
Brush-B-Gon	Cut-stump	Undiluted
Rodeo	Cut-stump	Undiluted
Pathfinder II	Cut-stump, basal bark	Undiluted
Garlon 4	Basal bark	10%-30% in oil



Figure 3. Resprouting of untreated carrotwood stump.

Task Force in the near future. A fact sheet pertaining to carrotwood and its control can be printed for public distribution from the IFAS EDIS Web site: <http://edis.ifas.ufl.edu> (search natural area weeds).

Literature Cited

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