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Biology and Management of Chamberbitter (*Phyllanthus urinaria*) in Ornamental Crop Production and Landscapes[1]

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Introduction

Chamberbitter (*Phyllanthus urinaria*) is an annual weed common in landscapes, turfgrass, container nursery production, and agricultural fields, among other areas. It can be a difficult weed to control due to its ability to spread via seed and thrive in a variety of environmental conditions, including sunny or shaded locations, wet or dry soils, and a range of soil pH and nutritional levels (Kiragu, n.d.). This publication is intended for use by nursery and landscape professionals, home gardeners, landowners, Master Gardener Volunteers, Extension agents, and others to aid in the identification and management of chamberbitter in ornamental crop production and in landscapes.

Species Description

Class

Dicotyledonous plant

Family

Euphorbiaceae

Other Common Names

Leaf-flower, gripeweed, shatterstone, stonebreaker, niruri

Life Span

Summer annual or short-lived perennial

Habitat

Chamberbitter occurs in many different habitats, such as disturbed areas, orchards, roadsides, wetlands, gardens, greenhouses, and nurseries (Figure 1). It is often found in warm tropical and subtropical locations. Chamberbitter grows best under full sunlight, whereas shade that reduces light intensity by more than 26% inhibits its growth (Wehtje et al. 2017). This versatility, along with its rapid growth and prolific seed production, makes chamberbitter a persistent and challenging weed to manage in both cultivated and natural settings (Figure 1).



Figure 1. Chamberbitter growing around an irrigation riser.
Credit: Maria A. Rodriguez, UF/IFAS.

Distribution

Chamberbitter is native to Asia but has expanded its range over many years. It has been introduced across numerous parts of the world, including Africa, Oceania, and the North, South, and Central Americas (Gavilán 2022). In the United States, it is most common in the Southeast, from Florida to North Carolina and as far west as Texas (Kelch 2016).

Growth Habit

This species has an erect, upright growth habit and is commonly found growing 12 to 24 inches in height in ideal conditions (Figure 2). In turfgrass, it can tolerate close mowing and may be found at heights of 3 inches or less. Chamberbitter has a rapid growth rate, leading to its designation as an invasive species in some parts of the world.



Figure 2. Chamberbitter's upright growth habit.
Credit: Annette Chandler, UF/IFAS.

Seedlings

The seedlings grow very fast in warm, humid conditions with full exposure to sunlight. They resemble small mimosa trees, both while in the seedling stage and after reaching maturity (Figure 3). The plant propagates through seeds found inside green fruit capsules, which are attached to the undersides of stems (Sylvia 2018).



Figure 3. Chamberbitter seedling.
Credit: Maria A. Rodriguez, UF/IFAS.

Shoot

Leaves are thin, green, and oblong in shape and are approximately 1/2 to 3/4 of an inch in length. They are alternately arranged along the stems. Chamberbitter grows from one main vertical stem and has many side branches.

Roots

Chamberbitter has a dense and competitive root system with a taproot that can extend deep (6 inches or more) into the soil when the plant is mature and established (Myers and Fiallos 2020).

Inflorescence

Its flowers are small, inconspicuous, white to greenish or yellowish in color, and located on the undersides of stems (Figure 4). Both male and female flowers are present on the same plant (Gavilán 2022).



Figure 4. Chamberbitter flowers located on the undersides of the plant's stems.
Credit: Annette Chandler, UF/IFAS.

Fruit and Seeds

The fruit are globe-shaped capsules attached to the undersides of the plant stems (Figure 5). They are green when first formed but later turn red to brownish in color. Each fruit has three divided parts and a surface with raised, wart-like scales. Seeds are approximately 1 mm in length.



Figure 5. Chamberbitter fruit located on the undersides of the stems.
Credit: Maria A. Rodriguez, UF/IFAS.

Similar Species

Chamberbitter (*Phyllanthus urinaria*) is similar in appearance to another species called long-stalked phyllanthus (*Phyllanthus tenellus*). Both are summer annual weeds that reproduce by seed and are common in landscapes and ornamental production nurseries. Both have small, oval leaves arranged alternately along slender branchlets, which make the branches look like compound leaves. Both also produce small, round seed capsules that split open explosively, scattering seed beyond the parent plant. Despite these similarities, the two species differ in growth habit. Long-stalked phyllanthus has a more upright habit and can grow taller than chamberbitter, which tends to be more spreading. The fruit is the most useful distinguishing feature. Chamberbitter bears its flowers and fruit along the undersides of the branchlets, and its capsules are small, round, and warty (tuberculate), sitting directly against the stem on very short stalks. Long-stalked phyllanthus does not have flowers or fruit on the undersides of its stems. Instead, smooth capsules hang from long, slender stalks (pedicels) at the leaf axils, which is how it gets its common name. More information on long-stalked phyllanthus identification and control can be found in Ask IFAS publication ENH1257, "Biology and Management of Long-Stalked Phyllanthus in Ornamental Crop Production."

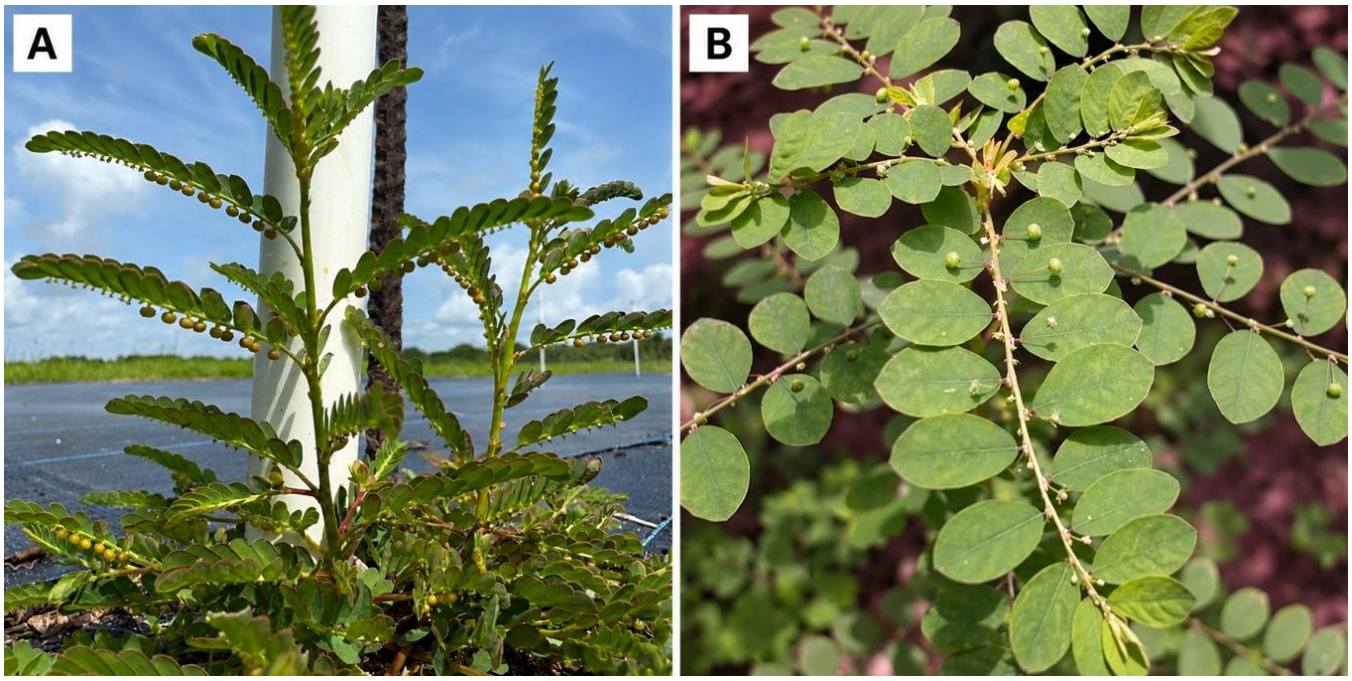

Figure 6. Chamberbitter (A) versus long-stalked phyllanthus (B).
Credit: Maria A. Rodriguez and Annette Chandler, UF/IFAS.

Plant Biology

As a fast-growing summer annual plant, chamberbitter grows most commonly during the warm summer months and especially during the rainy season in Florida. It typically begins to germinate in May to June when soil temperatures are regularly over 70°F (Price and Czarnota 2013), but it can be found almost year-round in central and south Florida and in nursery production areas, such as greenhouses, which are somewhat protected from cooler temperatures. It reproduces by seeds, which are found in the green, warty-like fruit attached to the undersides of its stems (Burgess and Williamson 2021). Once this plant starts producing seeds, it will continue to do so until the first frost, when the plant dies.

Management

Physical and Cultural Control

Like most annual weeds, hand pulling is effective but usually much easier when the plants are young and in the seedling stage before seed production (SKB Industries, n.d.; DeBoer 2024). Hoeing, tilling, and other physical controls will be effective but should be done prior to seed development to prevent reestablishment. In landscape beds, applying 2 to 3 inches of mulch can prevent the germination of seeds left over from previous seasons and stop seedling emergence. Implementing these strategies consistently can significantly reduce the presence of chamberbitter in landscaped areas, and mulch can also be effective in containers in nursery production.

Chemical Control

Preemergence

For preemergence herbicides to be effective, they should be applied prior to seed germination. Applications should be made in spring or early summer when daytime temperatures begin to exceed 75°F. Table 1 includes herbicides labeled for use in landscape beds and container nurseries to control chamberbitter preemergence. As with any pesticide, it is important to fully read and understand the label instructions prior to application.

Postemergence

Chamberbitter is best controlled as early as possible in its growth cycle. The optimal time to apply a postemergent herbicide is when the plant is small and young, as it is more susceptible to chemical control. Once this weed has emerged, control becomes more challenging due to its rapid growth and prolific seed production. Most non-selective herbicides labeled for use in and around landscape ornamentals are effective for controlling young chamberbitter plants. These include products containing diquat, glufosinate, pelargonic acid, and many others. For larger plants, opting for a systemic herbicide such as glyphosate may be necessary.

Table 1. Preemergence herbicides labeled for use in ornamental plant production and landscapes to control chamberbitter.

Common name (active ingredient)	Trade name and formulation	WSSA Herbicide Group[1]	Container production	Field production	Greenhouse or fully enclosed structure	Landscape
oxadiazon	Ronstar® 2G	14	YES	YES	NO	YES
flumioxazin	BroadStar™ 0.25G	14	YES	YES	NO	YES
	SureGuard® 51WDG	14	YES[2]	YES[2]	NO	YES[3]
dimethenamid-p	Tower® 6EC	15	YES	YES	NO	YES
indaziflam	Marengo® 0.622 SC	29	NO[4]	YES	YES[5]	NO[6]
	Marengo® 0.0224G	29	YES	YES	NO	NO[6]
pendimethalin + dimethenamid-p	FreeHand® 1.75G	3 + 15	YES	YES	NO	YES
prodiamine + isoxaben	Gemini™ 3.7SC and G	3 + 21	YES	YES	NO	NO
dithiopyr + isoxaben	Fortress® 0.75G	3 + 21	YES	YES	NO	NO
oxyfluorfen + pendimethalin	OH2® 3G	14 + 3	YES	YES	NO	YES
oxyfluorfen + prodiamine	Biathlon® 2.75G	14 + 3	YES	YES	NO	YES

[1] Herbicide groups are based on primary sites of action according to the Weed Science Society of America (WSSA) and can be used to select herbicides that have differing sites of action.

[2] Can only be used in selected conifer and deciduous tree species. Check manufacturer's label for a complete list of species and recommended application methods.

[3] Can be applied as a directed application around established woody landscape ornamentals.

[4] Marengo® SC can only be used as a directed application on pot-in-pot ornamentals with a limited number of crops allowing for over-the-top application.

[5] Labeled for use on greenhouse floors or under benches.

[6] Note that Marengo® is not labeled for use in landscapes, but indaziflam is available for landscape use as the trade name Specticle®.

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Use pesticides safely. Read and follow directions on the manufacturer's label.

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