

# Biology and Management of Long-Stalked Phyllanthus in Ornamental Crop Production<sup>1</sup>

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## Species Description

**Class:** Dicotyledonous plant

**Family:** *Euphorbiaceae* (*Phyllanthaceae*)

**Other Common Names:** Mascarene Island leaf-flower, long-stalked leaf-flower, phyllanthus

**Life Span:** Summer annual or short-lived perennial

**Habitat:** Occurs in disturbed areas, greenhouses, turf areas, landscape beds, and nursery containers. It is found most often in sunny locations that are irrigated or remain moist. Once established, long-stalked phyllanthus can become more drought tolerant and survive in drier locations.

**Distribution:** Long-stalked phyllanthus is native to tropical regions in Africa and Asia but has naturalized throughout Hawaii, the southeastern U.S., and parts of Europe (Crisafulli, Picone, and Zaccane 2011; USDA NRCS 2015).

**Growth Habit:** Erect (upright) growing up to 2 feet tall but typically seen at 3 to 12 inches in height. Long-stalked phyllanthus typically produces a single main stem that may branch toward the stem apex (top) (Figure 1).



Figure 1. Several long-stalked phyllanthus weeds growing in a tear in nursery cloth. Note upright growth habit.

Credit: Chris Marble, UF/IFAS

**Seedling:** Cotyledons are pale green with opposite, spatulate (spatula-shaped) leaves with smooth margins. First true leaves are typically darker green. Stems are reddish to pink in color (Figure 2).



Figure 2. Long-stalked phyllanthus seedlings. Note the spatulate shape of leaves and reddish to pink stems.

Credit: Annette Chandler, UF/IFAS

**Shoot:** Stems are thin, round, and reddish to brown in color. Leaves are small (1 cm), green, elliptic in shape with netted venation, and alternately arranged. The small size of the leaves make them appear as though they are compound and resemble those of legumes. Stipules are present and about 1 to 2 mm long. No milky sap is present when stems are broken.

**Roots:** Dense fibrous root system.

**Inflorescence:** Inconspicuous, star-shaped, pedicellate white flowers (approximately 2 mm long) are found in the leaf axils (Figure 3). Flowers are monocious, with male and female flowers found on the same plant.



Figure 3. Long-stalked phyllanthus in flower.

Credit: Annette Chandler, UF/IFAS

**Fruit and Seeds:** Round fruits are produced on long stalks, approximately 0.5–1 cm, and covered with rounded bumps (Figure 4). Seeds are very small (1 mm) and dark to light brown or tan in color. Fruits are explosively dehiscent and expel seeds over 3 feet when ripe.



Figure 4. Close-up of long-stalked phyllanthus fruit. Notice the round shape and long petiole that attaches the fruit to the stem.

Credit: Theresa Chormanski

**Similar Species:** *Phyllanthus urinaria* (gripeweed, leafflower, or chamberbitter) is very similar in appearance to *P. tenellus* (Figure 5). Both appear as small, leafy herbs with an upright growth habit and multiple thin branches concentrated toward the terminal apex with fruits/flowers hanging below the leaves. The primary difference is that *P. tenellus* has seed capsules on long stalks, whereas *P. urinaria* has sessile seed capsules that lack stalks (Wunderlin and Hansen 2003; Bryson and DeFelice 2009) (Figure 6). In addition, *P. tenellus* leaves are chartaceous (papery) and stems are wiry, whereas *P. urinaria* leaves are somewhat coriaceous (thickened) with fleshier stems. Both species thrive in the same environments and have similar biology.



Figure 5. Photos of *P. tenellus* on left vs. *P. urinaria* (chamberbitter) on right.

Credit: Annette Chandler, UF/IFAS



Figure 6. Fruit of *P. tenellus* on left vs. *P. urinaria* on right. Note that *P. urinaria* fruit are attached directly on the stem and have no petiole.

Credit: Annette Chandler, UF/IFAS



## Plant Biology

Long-stalked phyllanthus is a summer annual weed, but can be seen throughout the year in Florida and may occur as a short-lived perennial in southern Florida if frost does not occur. Long-stalked phyllanthus seedlings typically emerge in late spring and throughout the fall and may begin flowering and producing seed when only a few inches tall (Neal and Derr 2005). Seedlings can develop under mature plants, but high germination rates are common if seeds are exposed to full sun (Wehtje, Gilliam, and Reeder 1992). Studies on the similar species *Phyllanthus urinaria* (chamberbitter) showed that warmer temperatures (77 to 95°F) and twelve hours of light resulted in germination rates of 82 percent (Wehtje, Gilliam, and Reeder 1992). Germination is inhibited by dry conditions, so these species typically are more of a problem in irrigated areas or during periods of frequent rainfall (Wehtje, Gilliam, and Reeder 1992).

## Management

### Physical and Cultural Control

Long-stalked phyllanthus commonly grows in the potting media of container-grown ornamentals and often through drainage holes in nursery containers or through tears in nursery fabric close to irrigation risers. It is a problem in greenhouses, propagation houses, non-crop areas, and landscapes including both turf areas and landscape beds. As long-stalked phyllanthus germination increases in moist environments, reducing irrigation can be effective, but may not be practical in container production nurseries. Group plants by water requirement and ensure irrigation systems are well-maintained and are applying irrigation uniformly. Hand pull long-stalked phyllanthus as soon as it is seen. Once established, both *Phyllanthus* species can be difficult to hand weed due to their extensive root systems. Due to the high light requirements needed for germination, mulching can be effective. In a study on *P. urinaria* germination, deep shade and mulching reduced germination to as little as 2 percent (Wehtje, Gilliam, and Reeder 1992).

### Chemical Control

#### Preemergence

Long-stalked phyllanthus can be difficult to control. In addition to normal sanitation practices that should always be followed for any weed species (Norcini, Bolques, and Stamps 2010), preemergence herbicides containing proflam (Barricade®), isoxaben (Gallery®, and as a component of Snapshot®, Gemini®, and others), oryzalin (Surflan® and as a component of XL® 2G, Rout®, and others), oxadiazon (Ronstar® and as a component of Jewel™, RegalStar®, and others), oxyfluorfen (Goal® and as a component of Rout®, Double O™ E-Pro, OH2®, Biathlon®, and others) and dithiopyr (Dimension®, and others) have been shown to be effective in container trials

(Norcini and Aldrich 1992, 1993; Norcini, Stamps, and Aldrich 1995). However, previous studies typically have shown variable results (Norcini, Stamps, and Aldrich 1995). Other active ingredients that are effective include flumioxazin (Broadstar®, SureGuard®) and indaziflam (Marengo®). A partial list of preemergence herbicide labeled for use in and around ornamentals for control of long-stalked phyllanthus is given in Table 1. It should be noted that control can be variable with this species. Additional products are available that also may be effective.

#### Postemergence

Many postemergence herbicides are effective for phyllanthus control, but most have to be applied as a directed application (no contact with desirable plant foliage). Some of the effective active ingredients that can be used in and around nurseries and landscapes include glyphosate (RoundUp®), glufosinate (Finale®), diquat (Reward®), and pelargonic acid (Scythe®). Postemergence herbicides are classified as either contact or systemic. Contact herbicides (diquat or pelargonic acid) kill or injure the plant tissue that comes in contact with the herbicide but are not translocated throughout the plant and will not kill roots, so very large phyllanthus may be able to recover. Contact herbicides must be applied to fully cover the weed to provide control and are most effective on smaller weeds. Translocated herbicides (glyphosate, glufosinate) move from the contact/absorption site throughout the plant to other tissues. All postemergence herbicides are most effective on weeds that are actively growing. Ensure that you read and understand the pesticide or herbicide label in its entirety before buying or applying any product. Always consult the manufacturer's label before application and follow all precautions and directions. Anyone possessing, handling, or applying a herbicide or pesticide can be held liable for damages, losses, or consequences from not following label instructions.

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Table 1. Partial list of preemergence herbicides labeled for use in ornamental plant production and landscapes for control of long-stalked phyllanthus.

Common Name (active ingredient)	Example trade name and formulation	WSSA Herbicide Group <sup>1</sup>	Efficacy <sup>2</sup>	Container production	Field production	Greenhouse or fully enclosed structures	Landscape
dithiopyr	Dimension® 2EW	3	S	YES	YES	NO	YES
pendimethalin	Pendulum® 2G	3	P-S	YES	YES	NO	YES
	Pendulum® 3.3EC, 3.8AC			YES	YES	NO	YES
prodiamine	Barricade® 4FL, 65WG	3	S-C	YES	YES	NO	YES
flumioxazin	Broadstar™ 0.25G	14	C	YES	YES	NO	YES
	SureGuard® 51WDG			YES <sup>3</sup>	YES <sup>3</sup>	NO	YES <sup>4</sup>
oxadiazon	Ronstar® 2G	14	S-C	YES	YES	NO	YES
dimethenamid-p	Tower® 6EC	15	S-C	YES	YES	NO	YES
s-metolachlor	Pennant Magnum® 7.6 EC	15	P-S	YES	YES	NO	YES
isoxaben	Gallery® 75DF, 4.16SC	21	S-C	YES	YES	NO	YES
indaziflam	Marengo® 0.622 SC	29	C	NO <sup>5</sup>	YES	YES <sup>6</sup>	NO
	Marengo® 0.0224G			YES	YES	NO	NO
pendimethalin + dimethenamid-p	FreeHand® 1.75G	3 + 15	C	YES	YES	NO	YES
trifluralin + isoxaben	Snapshot® 2.5TG	3 + 21	S-C	YES	YES	NO	YES
oxyfluorfen + oryzalin	Rout® 3G	14 + 3	C	YES	YES	NO	YES
oxyfluorfen + pendimethalin	OH2® 3G	14 + 3	C	YES	YES	NO	YES
oxyfluorfen + prodiamine	Biathlon® 2.75G	14 + 3	C	YES	YES	NO	YES

<sup>1</sup> Herbicide groups are based according to primary sites of action and can be used to select herbicides that have differing sites of action (*Weed Technology* 17:605–619 [2003]) so as to minimize the potential for the development of herbicide-resistant weeds.

<sup>2</sup> S = suppression, C = good control. Efficacy may vary (better or worse) depending on environmental conditions and weed pressure at a given location.

<sup>3</sup> 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.

<sup>4</sup> Can be applied as a directed application around established woody landscape ornamentals.

<sup>5</sup> Marengo 0.622 SC can be used in pot-in-pot container ornamentals as a directed application only. Specticle™ is labeled for use in landscapes.

<sup>6</sup> Labeled for use on greenhouse floors prior to plant production. Plants can be placed back inside greenhouse 24 hours after application.

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