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Biology and Management of Doveweed (*Murdannia nudiflora*) in Ornamental Crop Production[1]

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Murdannia keisak

View Assessment

North, Central, South

High Invasion Risk

Predicted to be invasive and not recommended by IFAS. Will be reassessed every 10 years. In particular cases, this species may be considered for use under specific management practices that have been approved by the IFAS Invasive Plant Working Group.

Murdannia nudiflora

View Assessment

North, Central, South

Caution

Caution - manage to prevent escape. May be recommended by IFAS. Will be reassessed in two years.

Introduction

Doveweed is a common grass-like warm-season annual weed in Florida landscapes, container nurseries, and other agricultural production systems. This article is written for green industry professionals and others to aid in the identification and management of doveweed in and around ornamental plants. Information on doveweed management in warm-season turfgrass species can be found at Doveweed (*Murdannia nudiflora*) Control in Warm-Season Turfgrass Species - Ask IFAS.

Species Description

Class

Monocot

Family

Commelinaceae—Spiderwort family

Other Common Names

Doveweed, nakedstem dewflower

Life Span

Warm-season annual

Habitat

Doveweed is a well-documented problem in landscape beds, turfgrass, and many agricultural crops. In container nurseries, doveweed grows in the potting soil of container-grown ornamentals, in drainage holes, or in walkways, aisles, ditches, and other areas that stay wet, such as low-lying areas or poorly drained soils.

Distribution

Doveweed is native to southern Asia and tropical Pacific regions but has been naturalized in tropical and subtropical regions of North America (Wagner et al. 1999). Doveweed has also naturalized in many areas of Africa, Oceania, Central and South America, and the West Indies. In the United States, doveweed can be found from North Carolina west to Texas and south to Florida (USDA-NRCS 2019). Occurrence of doveweed has been documented in 39 of 67 Florida counties (USDA-NRCS 2019; Wunderlin et al. 2019).

Growth Habit

Doveweed is usually a low-growing, creeping annual with leafy or succulent branches. Stems may be either erect (upright) or semi-erect up to 12 inches tall, but doveweed

usually does not reach this height (Figure 1). Doveweed forms dense mats by rooting along its nodes when the nodes are in contact with the soil.



Figure 1. Doveweed plant growing through torn weed fabric.
Credit: Annette Chandler, UF/IFAS

Seedling

Germination begins during the onset of warm and wet weather, typically around April or May in Florida, and continues throughout the summer. The leaves of young plants grow in a circular arrangement (rosette). The creeping stems are succulent, root along the nodes, and are grass-like (Figure 2).



Figure 2. Grass-like doveweed seedling.
Credit: Annette Chandler, UF/IFAS

Shoots

The stems of the plant may not be visible, especially when growing in a dense mat. However, the stems are succulent, round, and smooth, and they root extensively along the nodes. The stems may be purplish to reddish in color (Figure 3). The leaves have parallel venation and are 2 to 5 inches long, 0.25 to 0.5 inches wide, narrow, pointed, spirally arranged, and clasp the stem (Figure 4). When young, doveweed is often misidentified as a grass. Leaf sheaths have soft hairs on the upper margins. Doveweed shoots often have a shiny appearance compared to other weed species.



Figure 3. Doveweed stems. Note—the creeping stems resemble a grass.
Credit: Annette Chandler, UF/IFAS



Figure 4. Doveweed leaves.
Credit: Annette Chandler, UF/IFAS

Roots

Doveweed has a fibrous root system composed of thin roots that are white to brown in color. The roots emerge from the nodes and may be hairy (Figure 5).



Figure 5. Doveweed roots. Note—roots are growing on nodes.
Credit: Rebekah D. Wallace, University of Georgia, Bugwood.org

Inflorescence

The flowers are stalked and form in small clusters from midsummer throughout the fall. They are short-lived, in terminal or axillary long-stalked inflorescences (Figure 6). Flowers are blue or purple in color with 3 sepals and 3 petals that are 0.2 to 0.5 inches long. They have three to four sterile stamens (pollen-bearing organ of a flower) with long bearded filaments and bluish-colored anthers.



Figure 6. Doveweed flowers.
Credit: Annette Chandler, UF/IFAS

Fruit and Seeds

The fruit is a condensed capsule that is glabrous and tapered at the end. The fruit is spherical or egg-shaped (ovoid-globose) and 0.1 to 0.2 inches wide. Fruit has 3 locules (segments) with one to two seeds in each segment. Seeds are dark brown, smooth to coarse in texture, subtriangular, and covered with tubercles (wart-like pieces). Seeds are mainly dispersed by wind, water, animals grazing, and fecal droppings of animals or during tillage. It reproduces by both seed and by forming roots along the shoots.

Similar Species

Murdannia nudiflora is similar in appearance to the Asiatic dewflower (*Murdannia spirata*)and can be mistakenly identified as the common dayflower(*Commelina diffusa*) (CABI 2019). Both of these species typically have much larger inflorescences and wider leaf blades than doveweed. In addition, these species grow much larger, and common dayflower is typically more vigorous (Soerjani et al. 1987). Marsh dayflower (*Murdannia keisak*) is another similar species but is less common in nurseries. Marsh dayflower is also larger and more vigorous than doveweed (Neal and Derr 2005).

Plant Biology

Seeds usually germinate when soil temperatures reach 65°F to 70°F late in the spring, with peak germination usually occurring when temperatures reach over 80°F (Wilson et al. 2006) during late April and May in Florida as temperatures and rainfall increase. Light is required for germination, and germination may be reduced by over 90% when seeds are covered by 1 inch or more in the soil (Ahmed et al. 2017). When mature, each plant can produce 500 to 2000 seeds, which are immediately viable but may remain dormant until the following year when conditions are ideal for germination. The plant flowers and dies following frost in the fall/winter. Doveweed is categorized as one of the world's worst weeds (Holm et al. 1977) due to its ability to root easily along the nodes and adapt and survive in a wide range of soil types and environments.

Management

Physical and Cultural Control

Doveweed is becoming a more common weed in container nurseries and has been a problematic species in landscapes and other cropping systems in the southeastern United States for many years (Walker et al. 2010). It thrives in wet areas, so correcting drainage issues and irrigating properly can help prevent the spread of doveweed (Leon and Unruh 2015). Mulch applied at depths of 1 to 3 inches can be used in container-grown ornamentals or in landscape beds to prevent or reduce doveweed growth and germination. It is usually easy to hand-pull, but small stem fragments left behind have the ability to regrow. Because doveweed is a low-growing plant, mowing is usually not an effective management approach, but hand-weeding can be effective.

Chemical Control

Preemergence

Doveweed is typically much easier to manage with preemergence herbicides compared to postemergence herbicides (Stamps and Chandler 1999; Walker et al. 2010). In nurseries, granular herbicides, including flumioxazin (Broadstar®), pendimethalin + dimethenamid-P (FreeHand®), or indaziflam (Marengo® G), or spray-applied herbicides, such as dimethenamid-P (Tower®) or *S*-metolachlor (Pennant Magnum®), can be used for preemergence control of doveweed and can be applied over the top of labeled ornamental species to control doveweed in containers. These herbicides can also be used in landscape beds; however, Specticle® G is the trade name for indaziflam labeled for use in landscapes. In bareground areas or in situations where a directed application is needed (applied to avoid contact with the crop), spray-applied herbicides such as SureGuard® (flumioxazin) or Marengo® SC/Specticle® FLO (indaziflam) can be used. Efficacy rankings and labeled uses for other preemergence herbicides are included in Table 1.

Postemergence

Most postemergence herbicides recommended for controlling doveweed are not labeled for use in container nurseries or in landscape planting beds. Nonselective herbicides such as glyphosate (many trade names available) or glufosinate (Finale®) can be used as a directed or spot application (avoiding ornamental plant foliage, stems, etc.) in planting beds, but multiple applications may be required depending upon plant size. Contact herbicides such as diquat (Reward®) or Scythe® (pelargonic acid) can also be used to control small doveweed plants.

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

Common name (active ingredient)	Example trade name and formulation	WSSA Herbicide Group[1]	Efficacy[2]	Container production	Field production	Greenhouse or fully enclosed structures	Land-scape
dithiopyr	Dimension® 2EW	3	P	YES	YES	NO	YES
pendimethalin	Pendulum® 2G	3	P	YES	YES	NO	YES
	Pendulum® 3.3EC, 3.8AC			YES	YES	NO	YES
prodiamine	Barricade® 4FL, 65 WG	3	P	YES	YES	NO	YES
trifluralin	Treflan® 5G	3	P	YES	YES	NO	YES
simazine	Simazine 4L	5	C	YES	YES	NO	YES
flumioxazin	Broadstar™ 0.25G	14	C	YES	YES	NO	YES
	SureGuard® 51WDG			YES[3]	YES[3]	YES[4]	YES[5]
dimethenamid-p	Tower® 6EC	15	C	YES	YES	NO	YES
S-metolachlor	Pennant Magnum® 7.6 EC	15	C	YES	YES	NO	YES
isoxaben	Gallery® 75DF, 4.16SC	21	P	YES	YES	NO	YES
indaziflam	Specticle® 0.622 FLO	29	C	NO	NO	NO	YES
	Specticle® 0.0224G			NO	NO	NO	YES
	Marengo® 0.622SC			NO[6]	YES	YES[7]	NO
	Marengo® 0.0224G			YES	YES	NO	NO
pendimethalin + dimethenamid-p	FreeHand® 1.75G	3 + 15	S-C	YES	YES	NO	YES
trifluralin + isoxaben	Snapshot® 2.5TG	3 + 21	P	YES	YES	NO	YES
prodiamine + isoxaben	Gemini™ 3.7SC	3 + 21	P	YES	YES	NO	NO
oxyfluorfen + oryzalin	Rout® 3G	14 + 3	S	YES	YES	NO	YES
oxyfluorfen + pendimethalin	OH2® 3G	14 + 3	S	YES	YES	NO	YES
oxyfluorfen + prodiamine	Biathlon® 2.75G	14 + 3	S	YES	YES	NO	YES

[1] 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]) to minimize the potential for the development of herbicide-resistant weeds.

[2] P = poor control; S = suppression, C = good control based on product labels or experimental data evaluating the highest recommended label rate.

[3] 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.

[4] Can be applied if no ornamentals are present. Plants can be placed back inside the greenhouse 24 hours after application and after product has been incorporated by water.

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

[6] Marengo 0.622SC can be used in pot-in-pot container ornamentals as a directed application only. Specticle™ is the same active ingredient but labeled for use in landscapes.

[7] Labeled for use on greenhouse floors, under benches, and other noncrop areas (not to be used on or in ornamentals).

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