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Biology and Management of Tasselflower (*Emilia* spp.) in Ornamental Crop Production[1]

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Introduction

The name tasselflower refers to two similar and closely related species of genus *Emilia*, *Emilia sonchifolia* (red tasselflower or lilac tasselflower) and *Emilia fosbergii* (Florida tasselflower). Both species are very similar in appearance but can be distinguished by small differences in their leaves and flower structures. These species are very common in Florida nurseries, greenhouses, and landscapes. This article was developed to help nursery growers, landscape professionals, and the general public identify tasselflower species, understand their biology, and provide information on ways to manage this weed.

Species Description

Class

Dicotyledonous plant

Family

Asteraceae

Other Common Names

Both species are commonly refered to as tasselflower. Other common names include red tasselflower, lilac tasselflower, Florida tasselflower, consumption weed, cupid's paintbrush, cupid's shaving brush, Flora's paintbrush, and purple sow thistle.

Life Span

Both species are annual herbs.

Habitat

Tasselflowers are fast-growing weeds and thrive under a wide range of conditions. They can grow in most soil types and may be found growing in full sun or partly shaded conditions. Both species are commonly found in nurseries, greenhouses, disturbed areas, gardens, abandoned farmland, forest edges, pastures, roadsides, and riverbanks (Figure 1).

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Figure 1. *Emilia sonchifolia* plant growing through a nursery weed mat.
Credits: Annette Chandler, UF/IFAS

Distribution

E. sonchifolia is native to India, China, and Southeast Asia. It has widely spread and naturalized in North America, South America, Africa, and other tropical regions (USDA-ARS 2014b). The origin of *E. fosbergii* is uncertain, but it has been believed to originate from Africa or Asia. It is found in almost all the warm regions of the world (USDA-ARS 2014a). Both the species are nonnative to Florida and can be seen growing throughout the year and throughout the entire state, but they are most commonly found in central and south Florida (Wunderlin 2020).

Growth Habit

Both species are annual herbs that grow upright (erect) and have multiple branches reaching 8 to over 24 inches in height. The growth habit of both species is classified as a basal rosette of leaves and then has upright stems (Neal and Derr 2005).

Seedling

In Florida, germination can occur at any time throughout the year when temperatures are above 70°F and soil is not excessively dry (Lessa et al. 2013) (Figure 2). During their juvenile stage, the leaves grow in a circular arrangement (rosette), and then stems elongate. The stems on young plants are hairy but tend to lose hair as they age.

Shoot

The stems of both species are smooth or sparsely hairy (pubescent) with soft and slender purplish-green branches (Figures 3 and 4). The leaves are arranged alternately in both species. In *E. sonchifolia* the lower leaves are round and kidney-shaped or triangular-ovate (egg-like) with narrowly winged petioles (stem-like leaf attachments), while the upper leaves are lanceolate (narrow oval shape tapering to a point) with their bases encircling the stem (Figure 4). The lower leaves grow 1.5 to 6 inches long and 0.3 to 3 inches wide. The leaves of *E. fosbergii* are fiddle-shaped, ovate to oblanceolate (narrow to oval-shaped), often tapering to a winged petiole. The leaf margins are slightly serrated (toothed), 2 to 4 inches long, and 0.7 to 2 inches wide. In both species, the leaves are dark green on the top surface and lighter green underneath, and more or less irregularly coarsely toothed. The leaves on the upper stems are usually smaller than the leaves on the lower stems.

Roots

Both species have a branched taproot system.

Figure 2. *Emilia sonchifolia* seedling.
Credits: Annette Chandler, UF/IFAS

Figure 3. *Emilia fosbergii* stem.
Credits: Annette Chandler, UF/IFAS

Figure 4. *Emilia sonchifolia* stem and leaves.
Credits: Annette Chandler, UF/IFAS

Inflorescence

The inflorescence or flower in *E. sonchifolia* is terminal and flat-topped with 3–6 stalked flower heads. The flower head is urn-shaped and consists of 30–60 florets per head. It is 0.4 to 0.5 inches long and 0.1 to 0.2 inches wide. The flowers range between orange, purple, pink, and white in color (Figure 5).

Figure 5. *Emilia sonchifolia* flowers.
Credits: Annette Chandler, UF/IFAS

E. fosbergii has one to several loose heads. The inflorescence is terminally or laterally in the axils of upper stems. The flower head is bell-shaped and consists of 15–30 florets per head. The color of the flower ranges between pink, light purple, and red (Figure 6). *E. fosbergii* does not have ray florets.

Figure 6. *Emilia fosbergii* flowers.
Credits: Annette Chandler, UF/IFAS

Fruit and Seeds

The fruit in both species is a dry achene (hard fruit), reddish brown to off-white in color, and approximately 0.2 inches long. The fruit has a pappus of abundant white hairs, which are up to 0.3 inches long (Figure 7). The pappus of white hairs helps to disperse the seed in the wind.

Figure 7. *Emilia sonchifolia* seeds.
Credits: Annette Chandler, UF/IFAS

Similar Species

The genus *Emilia* comprises approximately 100 species distributed in tropical regions. *Emilia sonchifolia, Emilia fosbergii,* and *Emilia coccinea* are three closely related and very similar species in terms of their appearance and biology. They can be distinguished by their color and shape of leaves (CABI 2019a, b). *E. coccinea* has bright orange to red-colored flowers, and its leaves are not feather-shaped like the other two Emilia species. *E. coccinea* has not been documented in Florida (Wunderlin et al. 2020).

Plant Biology

Both species are fast growing and are capable of producing more than 5,000 seeds per plant in as few as 8 weeks after germination (CABI 2019a, b). They mostly bloom year-round but more frequently from late summer or early fall until spring (August to April) in Florida. Most of the seeds germinate at or near surface with a temperature above 70°F. They grow best in full sunlight and complete their life cycle in about 90 days. The plants are known to attract bees and butterflies (Figure 8) but are mostly pollinated by wind. Both species spread predominately by seed, which is easily spread by wind.

Figure 8. *Emilia fosbergii* flower attracting a butterfly.
Credits: Annette Chandler, UF/IFAS

Management

Physical and Cultural Control

Due to its high seed production and how easily weeds are spread by wind, tasselflower should be hand-weeded as soon as possible in nursery containers to prevent spread throughout the nursery. Nursery growers can prevent spread by having proper sanitation practices implemented throughout the nursery (using clean pots, using weed-free liners, keeping bark piles on concrete slabs, etc.). Tasselflower seed production is significantly reduced or eliminated if it is mowed frequently. Keeping walkways, aisles, and the area surrounding the nursery mowed can prevent spread into the crop. In the landscape, tasselflowers can be hand-weeded if they are growing in close proximity to ornamentals and can also be controlled by tilling prior to planting.

Chemical Control

PREEMERGENCE TREATMENTS

Tasselflowers are difficult to control with preemergence herbicides. In nurseries and landscapes, consistent control can be achieved with applications of indaziflam (Marengo® and Marengo® G) and flumioxazin (Broadstar® and SureGuard®) (Stamps et al. 1999; Stamps and Chandler 2013). Broadstar® and Marengo® G are granular formulations and can be applied over the top of labeled ornamentals. Marengo® and SureGuard® cannot be applied over the top but can be applied as a directed application away from plant foliage and stems. In the landscape, it should be noted indaziflam is labeled as Specticle and Specticle G. Other preemergence herbicides that offer suppression of tasselflower include dimethenamid-P (Tower® and as a component of FreeHand®) and oxyfluorfen combinations such as Biathlon, OH2, and others. A complete list of preemergence herbicides in which efficacy data is available for control of tasselflower is included in Table 1.

POSTEMERGENCE TREATMENT

Most broadleaf and nonselective herbicides labeled for use in nurseries and landscapes provide control of tasselflower. For larger plants, glyphosate may be the most effective option. In the landscape, clopyralid (Lontrel®) is another option and can be applied over the top of certain ornamental plants listed on the label. Other herbicides such as glufosinate (Finale®), diquat (Reward®), pelargonic acid (Scythe®), and other nonselective herbicides are also typically effective, but large plants or heavy infestations may require multiple applications because they are not translocated.

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This table lists registered pesticides that should be integrated with other pest management methods. Additional information on integrated pest management methods can be requested from UF/IFAS Extension horticulture or agriculture Extension agents. A list of local UF/IFAS Extension offices is at available at http://sfyl.ifas.ufl.edu/find-your-local-office/.

Table 1. Preemergence herbicides labeled for use in ornamental plant production and landscapes to control tasselflower (*Emilia* spp.). Weed Specialist: Chris Marble, Ph.D., UF/IFAS Mid-Florida REC/Environmental Horticulture.

Common name (active ingredient)	Example trade name and formulation	WSSA Herbicide Group[1]	Efficacy[2]	Container production	Field production	Greenhouse or fully enclosed structures	Landscape
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
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	S	YES	YES	NO	YES
isoxaben	Gallery® 75DF, 4.16SC	21	P-S	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	S	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]) so as 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 hr after application and after product has been watered in.
[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 the ornamentals).