






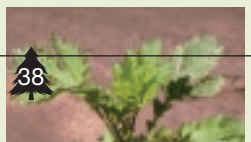

Weed Biology & Management

Biology and Management of Field Bindweed *(Convolvulus arvensis)* in Christmas Tree Production

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Field bindweed is native to the Mediterranean region and Western Asia. It is presumed to have been brought and introduced to the United States in 1739 (Sosnoskie, 2018). This is a perennial plant in the Convolvulaceae family. Morning glories (Ipomoea spp.), dodder (Cuscuta spp.), and alkaliweed (Cressa truxillensis) also belong to this family. Field bindweed is one of the major problematic weed species in Christmas tree production.

Figure 1. *Arrow shaped leaves of field bindweed. Photo credits: MSU Plant & Pest Diagnostics.*

Biology of field bindweed

Field bindweed is commonly found growing in fence row thickets or growing on fences and hedges. It is a weed of most agronomic and horticultural crops, Christmas tree productions, and of landscapes and turf. It grows prostrate along the ground until it comes in contact with other plants or structures and then it grows up and over anything that comes in its path. The root system of field bindweed is unique as it has both deep vertical and shallow horizontal lateral roots. Seventy percent of the total mass of the root structure occupies the top 2 feet of soil but the vertical roots can reach depths of about 30 feet or more. The lateral roots are no deeper than 1 foot. Some research has shown that field bindweed root and rhizome growth can attain a weight of 2 ½ to 5 tons per acre (Integrated Pest Management for Home Gardeners and Landscape Professionals, 2011).

Stems are smooth to slightly hairy and generally trail along the ground or climb on other vegetation and objects in its path. Young stem when broken, can exude a milky sap. Leaves are 1.5-2 inches long, arrow shaped, and are alternate (Fig 1). The lobes point away from the petiole at the leaf base. Field bindweed flowers from June through September. Flowers are solitary or 2-flowered (occasionally to 5) in the leaf axils. Flowers are trumpet shaped, 0.5-1 inch long and usually white to pinkish/purple in color (Fig 2). They open in presence of light (daytime) and close tightly in darkness into a twisted tube (Sosnoskie, 2018).

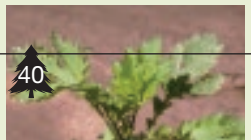
The fruit is rounded capsule to an egg-shaped with 4 seeds. Seeds are large, rough textured, dull gray to brown or black in color with 1 rounded side and 2 flattened sides. Field bindweed infestations can produce between 20,000 and 20,000,000 seeds per acre (Sosnoskie, 2018). The viability of freshly produced seed is highest 20-30 days after pollination.

Figure 2. *Trumpet shaped flowers of field bindweed which is whitish to pinkish in color. Photo credits: MSU Plant & Pest Diagnostics.*







However, changes in the seed moisture content and the permeability of the seed coat can result in dormancy, which may require scarification to overcome. The viability of seeds generally reduces with time, however there are reports that field bindweed seeds can remain viable in soil up to 40-60 years.

Similar Species

Hedge bindweed *(Calystegia sepium)* is a similar species to field bindweed and often people can get confused and lead to misidentification. Hedge bindweed has larger leaves than field bindweed, and they have a pointed apex rather than a rounded one. Flowers of hedge bindweed are larger (1-2 inches long) and have large bracts that conceals the sepals. Wild buckwheat *(Polygonum convolvulus)* is another similar species as it is a vining annual with similar leaves. Wild buckwheat can be distinguished from field bindweed as the lobes at the base of the leaf point toward the petiole, and it has small inconspicuous flowers in axillary and terminal clusters.

Management of Field Bindweed

1) **Non-chemical Control:**

Prevention practices must be undertaken by Christmas tree growers which can include removal of any seedlings before they become mature and establish as perennial plants and prevent any plants from producing seeds. If topsoil is introduced to a site, it should be clean and free of roots, rhizomes, seeds and other bindweed propagules (Integrated Pest Management for Home Gardeners and Landscape Professionals, 2011). Regular scouting for this weed need to be done by the growers in their fields, and immediate hand removal is encouraged as later mowing in between the Christmas tree rows can spread the seeds and rhizomes easily.

2) **Chemical Control:**

Preemergence Herbicides: Not many preemergence herbicides have shown good control over field bindweed in established Christmas trees. Isoxaben (Gallery® 75 DF), simazine (Princep® 4L) and flumioxazin (Sureguard® 51WDG) have shown fair control. However, the application timing of these preemergence herbicides need to be checked by the growers to avoid potential phytotoxicity to their Christmas tree.

Postemergence Herbicides: Postemergence herbicides that have shown good control over field bindweed includes 2,4-D (Defy® amine 4) and triclopyr (Garlon® 3A). Some fair control of field bindweed has been observed with clopyralid (Stinger® 3L) in established Christmas tree production system. Again, growers need to be careful with the application timings of these postemergence herbicides to avoid potential injury to Christmas trees.

REFERENCES

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