FIELD BINDWEED
(Convolvulus arvensis)

SEEDLING DESCRIPTION

Seedlings of field bindweed are erect and sturdy, especially when grown in full sunlight. The seedling stem (hypocotyl) is 1 to 2 inches (2.5 to 5 cm) long and about 1/16 inch (1.5 mm) thick. The stem is smooth, shiny, green, and often purple-tinged. The stem bulges slightly where the seed leaves (cotyledons) branch off. When the plant is about 6 inches (15 cm) tall, it bends over and begins its vine-like growth.

Cotyledons are square or rectangular, ½ to ¼ inch (12 to 20 mm) long, and have rounded corners and a slight indentation at the tip. The upper surface of the seed leaf is a dark waxy green, with veins visible as pale green lines. The lower surface is pale green, with veins visible as distinct light green ridges. Leaf stalks (petioles) are about the same length as the leaves.

True leaves are arranged alternately along the stem. Shaped like a blunt arrowhead, they have smooth margins, a rounded tip, and two pointed lobes at the base. Leaves grow to 2 inches long, about 1 inch wide, and are smooth on both surfaces.

When field bindweed plants emerge from root buds rather than seeds, cotyledons never develop and true leaves appear immediately.

BIOLOGY

A vinelike perennial, field bindweed belongs to the Morningglory family (Convolvulaceae). Its slender stems can form dense tangled mats up to 10 feet (3 m) across, and climb by wrapping around nearby plants and objects.

Field bindweed blooms from spring through late summer; peak flowering occurs in June. Flowers usually appear singly (occasionally in twos or threes) on stalks that are borne in the crooks, or axils, of leaves. Flower stalks are about 1 inch long, and each stalk has a pair of small green leaflike bracts. The bracts are about ⅛ inch (3 mm) long and are positioned halfway between flower and stem. Funnel-shaped flowers are about 1 inch across and consist of five white or pink petals fused together along the edges. The petals usually have dark pink streaks along the midveins. On sunny days the flowers open in the morning and close at dusk, but when skies are overcast, the blossoms remain closed.

Three to four weeks after flowering, seeds form in egg-shaped capsules that hold one to four seeds each. About 60 percent of the flowers produce seeds. One plant can produce as many as 550 seeds with 90 percent viability. About 25 percent of the seeds can germinate without a dormant period; the rest have an impermeable seed coat and require an overwintering period to break dormancy. Seeds can remain viable in soil for up to twenty years, so seedlings may appear long after an infestation has been controlled. Seeds germinate from early spring until fall, peaking in late spring and again in midsummer.

The extensive root system plays a greater role than seeds in propagation. A six-week-old plant can produce new shoots from root buds.

1. Seedling showing cotyledons.
2. Leaves have pointed basal lobes.
3. Note small green bracts on leaf petiole.
4. Field bindweed forms a dense tangled mat.

It has as many as six lateral roots and a taproot extending down to 2 feet (60 cm). The lateral roots grow outward from the parent plant 1 to 3 feet (30 to 90 cm) and then turn downward, in effect becoming taproots. Buds near the top of the vertical roots send rhizomes to the surface, initiating new shoots.

The rhizomes develop roots, enabling new shoots to survive when severed from the parent plant. Because new vertical roots develop their own system of lateral roots, field bindweed can spread outward 10 feet in one growing season. Left unchecked for three seasons, a single plant can cover an area 18 feet (5.4 m) across and can penetrate to a depth of 20 feet (6 m).

Until midsummer, top growth draws on the root reserves for much of its nutrition. This process reverses in late summer and early fall, when nutrients begin to translocate or move from the top growth down into the roots. Translocation causes starch and sugars to accumulate in the roots, building up root energy reserves until *air* temperature reaches 20° F (-5° C). At this temperature, the top growth and most of the lateral roots die. Vertical roots can survive *soil* temperatures as low as 20° F. New spring shoots that emerge from the buds on these roots are more vigorous than seedlings.

SIMILAR SPECIES

Field bindweed is sometimes confused with hedge bindweed, wild buckwheat, tall morningglory, and ivy-leaf morningglory.

Hedge bindweed *(Convolvulus sepium)* is closely related to field bindweed and is similar in growth and appearance. However, hedge bindweed has green leafy bracts nearly 1 inch long that are directly attached to the base of each flower, while field bindweed has two small bracts about ⅛ inch long halfway between the flower and the base of the stalk. The lobes at the base of hedge bindweed leaves have squared off ends; those of field bindweed are pointed. Hedge bindweed is often called "larger bindweed," because its leaves and flowers are twice the size of field bindweed's leaves and flowers.

Wild buckwheat *(Polygonum convolvulus)*, a member of the Buckwheat family, is often mistaken for bindweed because of its vining growth habit and similar leaves. However, wild buckwheat is a shallow rooted annual that reproduces only by seed, whereas field bindweed is a persistent perennial that is more difficult to eradicate once established. Wild buckwheat has small greenish flowers tucked along the stem at the leaf axils, while bindweed has large white or pink trumpet-shaped flowers. All members of the Buckwheat family have a papery sheath, called an ochrea, at the base of each leaf stem. Bindweeds lack this characteristic.

Tall morningglory *(Ipomeoa purpurea)* and ivy-leaf morningglory *(I. hederacea)* are climbing plants in the same family as the bindweeds. Because their trumpet-shaped flowers are so similar to those of bindweed, these two morningglories are often mistaken for bindweed. Unlike bindweed, however, the morningglories are annuals. Bindweeds and morningglories can be distinguished by leaf shape: bindweed leaves are arrowhead-shaped, tall morningglory leaves are heart-shaped with rounded lobes and a sharply pointed tip, and ivy-leaf morningglory has three-lobed leaves.

NATURAL HISTORY

A native of Eurasia, field bindweed was probably introduced to the United States in the 1700s by the early colonists of Virginia. By 1900 it had spread throughout the West and is now considered a noxious weed in forty-five states.

In the United States, field bindweed is a principal weed in corn, sugar beets, wheat, and vineyards. In temperate countries, it infests these and dozens of other crops. Field bindweed is a serious problem in dry regions, since its roots can reduce soil moisture below the wilting point of many crop plants. In fact, it prefers dry soil and is rarely a problem in wet land or heavily irrigated crops. It grows best in rich fertile soil but adapts well to poor, gravelly ground, especially noncultivated land and waste areas.

Besides competing for nutrients and water, field bindweed can pull plants to the ground and smother them completely. Vines often become tangled in harvesting equipment.

Field bindweed is also called combine, lesser bindweed, barbine, creeping jenny, and devil's guts. *Convolvulus* is a Latin word meaning "to turn around," and the species name *arvensis* means "field."

CONTROL

Field bindweed is sensitive to shade. Therefore, fast growing crops that establish an early canopy help suppress its growth. Control by shading is especially effective during the first year of a bindweed infestation, before the root system becomes well established. Once established, field bindweed is difficult to control because its roots contain enough stored energy to sustain the top growth through long periods of stress.

Field bindweed rarely produces seed in its first growing season. Therefore, second-year growth in a newly infested area is probably from roots rather than seed.

If soil moisture is adequate, crops may grow fast enough to overcome this weed. During dry periods, however, almost no crop can successfully compete with field bindweed.

Programs that combine heavy cultivation with crop shading have eliminated field bindweed over a period of several years without the use of herbicides. But the most effective program for controlling field bindweed is a combination of well-timed cultivation, crop rotation, and application of recommended herbicides.

- Properly timed cultivation can minimize the number of tillage treatments. After cultivation, bindweed sprouts should regrow just long enough to deplete the root reserves, but not long enough to begin to build them back up again. When top growth is damaged, the roots send up new shoots that can begin to translocate sugars to the roots in as little as two weeks. The best time to cultivate is sixteen days after shoot emergence and, if the crop allows, at three- to four-week intervals thereafter. Including a 10-foot border will accommodate the spreading root system.
- Rotations should include crops that will shade emerging weeds and allow the use of appropriate herbicides. For example, winter grains can provide early competition and shading, and summer-planted crops that grow vigorously can shade field bindweed when it would normally be growing rapidly. Alfalfa is one of the best smother crops for this purpose. Other good choices are foxtail millet, buckwheat, rye, sorghum, and sudangrass.
- Postemergence applications of contact herbicides give fast but only temporary control because they kill the top growth without affecting the root system. More effective are systemic herbicides, applied when the weed is actively translocating materials to the roots. The best time to apply systemics is when the plant is in bud or early bloom stage, for at this point root reserves are lowest and translocation to the roots is most active. Systemic chemicals should not be applied during drought because at these times field bindweed becomes dormant and translocation is minimal. A variety of chemicals is recommended for use in corn and soybeans, although some resistance to 2,4-D has been reported. Regardless of the herbicide chosen, chemical control yields the best results when combined with cultivation and crop rotation.

For specific recommendations, consult your county extension agent or the most recent *Weed Control Manual and Herbicide Guide*, available through Meister Publishing Company, 37841 Euclid Avenue, Willoughby, Ohio 44094. Follow label instructions for all herbicides and observe restrictions on grazing and harvesting procedures.

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