



## Texas Agricultural Extension Service

# Field Bindweed Control in the Texas High Plains

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Field bindweed (*Convolvulus arvensis* L.), sometimes called possession vine, is a viny, deep rooted, persistent, perennial weed that is a member of the morning-glory family. Field bindweed is easily recognized by its arrow-shaped leaves and its profuse  $\frac{3}{4}$  to 1-inch white to pink trumpet-shaped flowers. The seeds are brownish-black with a roughened surface, three-angled usually with one convex side and two flattened sides with the points and edges rounded off. Bindweed is native to Europe and western Asia and was first reported in the U.S. in 1739. The weed later was introduced to the Plains states between 1870 and 1875 in seed wheat brought to Kansas. Since introduction to the Plains it has become one of our most troublesome weeds.



### How It Is Spread

Bindweed is spread both by seed and roots. Vigilance is required to keep fields clean and prevent introduction of bindweed to new areas. Bindweed is usually spread to fields in contaminated seed grain from dirty combines. Samples of seed grain have contained up to 26,000 bindweed seeds per bushel. Seed are also scattered in manure by animals grazing on bindweed-infested land. Combines should be carefully cleaned and clean seed used for planting. Cattle that may have grazed on infested areas should be contained in a small area for at least 2 days before being allowed to graze on uninfested fields.

Once introduced to a field, new plants are produced from buds on

lateral roots and, within one season, a single plant may spread up to 10 feet in diameter. Roots of mature plants are fleshy, full of stored food, profusely branched and penetrate the soil to 6 feet or more. The underground stems (rhizomes) can vary in length from a few inches to several feet. These may produce lateral roots and if detached from the main root, may develop into separate plants. Cultivation can

give rise to new plants from roots or rhizomes, if rain falls shortly after plowing.

The seed are extremely hard, impervious to water, and can remain dormant and viable in the soil for more than 30 years. Seedlings quickly develop and may have a perennial growth habit 6 weeks after emergence.

### Economics

Field bindweed covers about 600,000 acres of farm land in Texas and decreases crop yield 50 percent. In the Panhandle area, dryland and irrigated farmers gross \$50.00 to \$300.00 per acre, respectively. Therefore, losses from bindweed are \$25.00 to \$150.00 per acre. Assuming that

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Photo courtesy of Kansas Agricultural Experiment Station.



50 percent of the area is irrigated, average loss is \$88.50 per acre. Total loss from the 600,000 acres is over 50 million dollars annually. Bindweed reduces gross income and erodes the profit of infested fields.

The extent of lost productivity will determine the most expedient method of control. In addition to direct yield losses, bindweed can influence crop management by forcing farmers to plant a more competitive crop or fallow land to suppress bindweed.

## Competition

Field bindweed is extremely competitive with many crops grown in Texas. Bindweed competes aggressively with crops for moisture and nutrients, and to a lesser degree for light. Severe infestations of bindweed can reduce cereal crop yields by 20 to 50 percent and row crop yields by 50 to 80 percent. Well managed alfalfa stands will compete well with bindweed, but as alfalfa stands thin with age, the weed takes over. Many vegetable, vineyard and orchard growers consider field bindweed their most troublesome weed.

## Control Practices

### Prevention and Containment

Comprehensive efforts are needed to control field bindweed. Once bindweed becomes established, intensive efforts are required to eradicate it. Therefore, preventing the weed from being introduced in a field should receive the highest priority.

Farm machinery should be thoroughly cleaned before moving from infested to clean fields. Care

should be taken to insure that planting seed is not contaminated with bindweed. If a spot of land is infested with bindweed, use a soil sterilant to prevent the spread of the bindweed. Avoid sweep plowing through the infested spots that have produced seed because vines catch on sweep shanks and seed are shaken from the vines.

## Cultural and Mechanical Control

Because of deep, well established roots and low growing vines, bindweed competes best under limited soil moisture, but does not do well when shaded by tall crops. As a result, intensive tillage followed by forage sorghum or sudangrass solid seeded in mid-June competes well with bindweed in irrigated fields or areas with adequate moisture for crop growth. Low growing horticultural crops or dryland summer field crops planted in wide rows compete poorly with bindweed.

Sweep plowing at 2- to 3-week intervals in the growing season will eradicate bindweed in 3 to 4 years. Sweep plowing at 3-week intervals depletes the food supply stored in the roots. It is important to cut all of the shoots each time the field is plowed. There is little advantage in plowing any deeper than 3 to 4 inches. Continuous sweep plowing is generally considered impractical since a minimum of three crop seasons is required to eradicate bindweed. No crops could be produced and soil erosion potential would be high.

A cropping system which includes fallow periods is the most practical cultural practice that can be utilized for control of bindweed. During fallow periods the weed should be plowed at 3-week intervals to suppress and weaken the bindweed stand. The assault on bindweed may include a wide range of herbicides as well as sweep tillage. The most effective cropping systems are wheat-

fallow-wheat or wheat-sorghum-fallow rotation. Timing of suggested herbicide treatments and tillage operations for each cropping system are discussed in Tables 1 and 2.

## Chemical Control

Several herbicides are now available that will control field bindweed. These range from herbicides that act as soil sterilants to selective herbicides for use in crops. The effectiveness of herbicides often varies depending on plant and environmental conditions. Plants growing under hot, dry conditions will be stressed. As plant stress increases, growth slows down, resulting in less herbicide being taken up by the plant and less movement to the roots. Consequently, under stressed conditions, bindweed control with herbicides is less effective than under good growing conditions. Only under rare conditions will field bindweed be eliminated with a single application of a non-soil sterilant herbicide.

## Small Patch Treatments

Field bindweed in small patches should be eliminated before spreading and infesting large areas. The most economical control of scattered patches of bindweed is application of a nonselective treatment. The herbicides in Table 3 have effectively controlled bindweed in Texas research, but are not the only choices. These herbicides may prevent crop production in the treated area for 2 to 4 years. In some cases, it may take several weeks for the bindweed to die following herbicide application. Weeds that persist 1 year after initial treatment should be spot treated as needed annually for 3 years. After treatment, and the herbicide begins to degrade, areas should be plowed normally to prevent re-establishment of seedlings.



**Table 1. Suggested practices to control field bindweed in a wheat-sorghum-fallow rotation.<sup>a)</sup>**

1. Immediately following wheat harvest begin plowing every 3 weeks or if it is too wet to plow, wait 2 more weeks and apply 1 to 2 pt 2,4-D. This may reduce the total number of plowings needed. Plow 3 to 7 days after 2,4-D treatment. Following 2,4-D application, continue plowing every 3 weeks as needed. Stop plowing September 1.
2. Apply 1 to 2 qt Banvel in mid-October. Bindweed should have 6- to 10-inch runners.
3. The field may need to be plowed in April to control winter weeds. Apply 1 to 2 pt 2,4-D in mid-May 7 to 14 days prior to sorghum planting. Plowing to prepare seedbed may begin 3 to 7 days following 2,4-D application.
4. Control bindweed in 6- to 12-inch sorghum with 1 pt 2,4-D.
5. If a freeze has not occurred by harvest, apply 1 to 2 pt 2,4-D or 0.5 to 1.0 qt Banvel, or 1 pt 2,4-D + 1 pt Tordon 22K.
6. Plow in April if needed and continue to plow every 3 weeks during the fallow period or apply 2,4-D if it is wet enough to cause vigorous growth of bindweed.
7. Plant wheat.

<sup>a)</sup> Recommendations of 2,4-D rates are based on low-volatile ester 2,4-D 4 lb a.e./gal.

Note: Landmaster BW may be used in the place of 2,4-D during fallow periods. Landmaster BW will control bindweed, grasses, volunteer wheat and sorghum.

**Table 2. Suggested practices to control field bindweed in a wheat-fallow-wheat rotation and continuous wheat.<sup>a)</sup>**

#### Wheat-Fallow-Wheat

1. Immediately following wheat harvest begin plowing every 3 weeks or if it is too wet to plow, wait 2 more weeks and apply 1 to 2 pt 2,4-D. This may reduce the total number of plowings needed. Plow 3 to 7 days after 2,4-D treatment. Continue plowing every 3 weeks as needed. Stop plowing September 1.
2. Apply 1 to 2 qt Banvel or 0.5 to 1.0 pt Tordon 22K + 1 to 2 pt 2,4-D in mid-October. Bindweed should have 6- to 10-inch long runners.
3. Plowing may be required in mid-March to April 1 to control grasses and volunteer wheat.
4. From May 15 till wheat planting, plow every 3 weeks or apply 1 to 2 pt 2,4-D as discussed above.

#### Continuous Wheat

1. Immediately following wheat harvest apply 1 pt Tordon 22K + 1 to 2 pt 2,4-D. Plow 3 to 7 days after 2,4-D treatment. Continue plowing every 3 weeks as needed.

<sup>a)</sup> Recommendations of 2,4-D rates are based on low-volatile ester 2,4-D 4 lb a.e./gal.

Note: Landmaster BW may be substituted for 2,4-D to control grasses and volunteer wheat.

## Large Patch Treatments

In fields where large areas are infested with bindweed it may be necessary to combine herbicide treatments with sweep plowing at 3-week intervals to allow crops to be planted soon after application. Table 4 lists several herbicide treatments that may be used for bindweed control and the cropping restrictions for each treatment. In most cases, bindweed will have to be retreated for several years to obtain complete control.

### Read the Label

Before using a herbicide it is very important to read the label and follow directions. Check labels to be sure that your intended use is approved by the manufacturer. Labels contain all information necessary for safe and effective use of herbicides. Labels change constantly and should be routinely reviewed.

**Table 3. Suggested herbicides for controlling small areas of bindweed.**

Herbicide <sup>a)</sup>	Rate per acre	Application time	Expected control after 1 year	Remarks
Arsenal	1-2 pt	post <sup>b)</sup>	excellent	Non-crop only. For spot treatment mix 1.3 oz in 2 gal H <sub>2</sub> O.
Tordon 22K	1-1.5 gal	pre or post	excellent	For spot treatment mix 2.5 oz in 2 gal H <sub>2</sub> O.
Banvel	4-6 qt	pre or post	good	Apply Banvel anytime following crop harvest, but prior to a killing frost. Barley, oats, corn, sorghum (milo), annual or perennial grass crops may be planted 1 year after application, but unacceptable crop injury may result.

<sup>a)</sup> See herbicide label for further instructions.

<sup>b)</sup> Apply postemergence treatments when bindweed runners are 6 to 10 inches long and actively growing.



**Table 4. Herbicide treatments for large infested areas in cropland.**

Herbicide	Rate per acre	Expected Control after 1 year	Comments <sup>a</sup>
Banvel	1-2 qt	Good	Best control is obtained when applied to 6- to 10-inch bindweed in September or October. Corn and sorghum may be planted in the spring following applications made during the previous year. Wheat may be planted in the fall following application. To prevent wheat injury, the interval between application and planting should be 45 days per pint of Banvel applied. See label for rotation to other crops.
Banvel + Tordon 22K	0.5-1.0 pt + 0.5-1.0 pt	Good	Apply following crop harvest in the fall or in June or July during a fallow period. Wheat may be injured when planted at varying periods following applications. Only use when the next planted crop will be a small grain.
2,4-D <sup>a</sup> ) Tordon 22K	1-2 pt + 0.5-1.0 pt	Good	
Tordon 22K	1 pt	Good	
Weedmaster (Premix of Banvel + 2,4-D)	2 qt	Fair	Application may be made to fallow land, wheat stubble or land to be rotated to wheat. Wheat injury may occur if the interval between application and planting is less than 10 days for each pint per acre used.
2,4-D <sup>a</sup> )	1-2 pt	Fair	Apply to vigorously growing bindweed at the 6- to 10-inch runner stage. Apply at rates no higher than 2 pt/A if used in crops such as wheat, sorghum or corn to avoid crop injury. See label for the stage of growth crop should be in before applying 2,4-D.
Roundup	4-5 qt	Good	Apply when bindweed is actively growing at the 6-inch to bud stage. For best results apply only when growth is vigorous. Plow 3 to 7 days after spraying. The addition of surfactant and 17 pounds of ammonium sulfate per 100 gallons of water may increase control. Care should be taken to insure the ammonium sulfate dissolves to prevent clogging of nozzles. Roundup and Landmaster are both nonselective herbicides and will kill or injure any vegetation treated including crops. Restrictions which apply to Roundup also apply to Landmaster.
Landmaster BW	54 oz	Good	

<sup>a</sup>) Low-volatile ester 4 lb a.e./gal.

<sup>b</sup>) Refer to individual herbicide label for more detailed information on herbicide rates, time of application, and cropping restrictions.

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