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5-1959

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Recommended Citation

Derscheid, L. A. and Wallace, K. E., "Control and Elimination of Field Bindweed" (1959). *Agricultural Experiment Station Circulars*. Paper 144.
http://openprairie.sdstate.edu/agexperimentsta_circ/144

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CONTROL AND ELIMINATION OF

field bindweed

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Field bindweed (*Convolvulus arvensis* L.), sometimes called creeping jenny, is a deep-rooted perennial that spreads by underground parts and by seed.

One seedling, when not competing with other plants, is able to produce in one season a root system that penetrates 4 feet deep and spreads out about 2½ feet in each direction. In three growing seasons, the roots may go down 18 to 20 feet and spread out to form a circle 17 or 18 feet in diameter.

The yield of crops is normally reduced 30 to 50% by a bindweed infestation. Yield was reduced an average of 42% in eight South Dakota wheat fields and 33% in 12 South Dakota oats fields. In Kansas, barley yield was reduced 65% and sorghum yield 48%.

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Field bindweed emerges later in the spring than leafy spurge, Russian knapweed, or hoary cress and is less difficult to eliminate. It emerges about the same time as Canada thistle or perennial sowthistle. To control or eliminate field bindweed, use intensive cultivation, soil sterilant chemicals, certain competitive crops, selective herbicides, or combinations of these.

INTENSIVE CULTIVATION

Intensive cultivation from spring until freeze-up will kill a high percentage of bindweed plants. However, cultivation from immediately after harvest of small grain one year until freeze-up the next year is more effective.

A duckfoot field cultivator is the most satisfactory implement; however, a one-way disk is also fairly effective. If there is considerable plant residue on the area to be cultivated, it is frequently desirable to use the moldboard plow for the first operation. Equip the duckfoot cultivator with wide sweeps (12 to 24 inches) that overlap 3 or 4 inches. Keep them sharp; be sure they are kept flat when in the soil and operating at a depth of 4 to 5 inches. The same is true for the one-way disk. Keep the disks sharp and operate at a depth of 4 to 5 inches. It is essential that each bindweed root be cut by each cultivation.

It takes 7 to 10 days for new shoots to emerge after the roots have been cut. Another 7 to 10 days elapse before there are enough leaves to produce more food than is needed for growth. Therefore, little plant food is stored in the roots and the root reserves are being used for plant growth for a period of 14 to 20 days. Each cultivation has a similar effect.

Cultivate every 2 weeks during good growing conditions and every 3 weeks during periods of dry, hot

weather when plants are growing less rapidly. This generally means that cultivations should be done at 2-week intervals during June and July and at 3-week intervals during August, September, and October.

Combining intensive cultivation for part of the season with the production of a crop and with chemical application is generally more practical than an entire season of cultivation. Income from the crop is obtained and hazards from erosion, resulting from a full season of cultivating, are greatly reduced.

SPRAYING

Field bindweed is generally more effectively controlled with 2,4-D than with 2,4,5-T or MCPA. An amine form of 2,4-D is generally more effective than an ester form in eastern South Dakota where bindweed grows more rapidly. The ester forms frequently kill the tops without killing the roots, though they are usually more effective under poor growing conditions.

Use one-third to one-half pound of 2,4-D acid per acre to kill seedlings and prevent seed production by mature plants. Three-fourths pound is usually required to kill some old plants and weaken others so that later treatments kill them. However, one-half pound is sometimes enough if they are growing rapidly in a crop under conditions of good soil moisture and warm weather. Under dry growing conditions, 1 pound is sometimes needed.

Best results can be obtained from 2,4-D by applying it when the bindweed plants are growing rapidly. Such growth conditions usually occur when the plants are budding or starting to flower or, with adequate soil moisture, during the fall. Complete elimination generally requires several retreatments with 2,4-D or the use of competitive crops and cultivation.

TBA (2,3,6-trichlorobenzoic acid) is also effective for eliminating bindweed. Twenty pounds of TBA acid equivalent per acre will generally give 90 to 100% elimination. Two brands—"Benzac 1281" and "Trysben 200"—were available to South Dakota farmers in 1958. Each contains 2 pounds of TBA acid per gallon, consequently 10 gallons per acre are needed.

Another TBA (polychlorobenzoic acid) is sold under the brand names of "Zobar" and "Benzac 354." Each brand contains 4 pounds of TBA acid per gallon. Forty pounds of TBA acid (10 gallons) are required to give 80 to 100% elimination.

The residual effect of this chemical generally prevents or reduces crop production for 1 or more years.

CULTIVATION, CROPS, CHEMICALS

Small grains. A high percentage of field bindweed can be eliminated in 3 years by spraying in the grain crop with one-half to three-fourths pound of 2,4-D acid per acre and cultivating three or four times after harvest each year. In areas where erosion is a problem, winter grains have an advantage in that they provide cover over winter. They have a disadvantage of being near the boot stage of growth at the same time the bindweed should be sprayed.

Less satisfactory results are obtained when 2,4-D is applied in the stubble as a substitute for cultivation. Likewise, fewer bindweed plants are eliminated when a row crop, such as corn or sorghum, is grown during any of the 3 years.

Winter wheat or rye or spring-sown barley are effective for controlling field bindweed when used in conjunction with cultivation. Winter wheat is less satisfactory in areas where it winter kills, and barley is less satisfactory in areas subject to erosion because the soil is left uncovered over winter.

The best method is to plow shortly after weeds emerge in the spring and cultivate at 2- or 3-week intervals until September when winter wheat or rye is seeded. If barley is used, the cultivation should be continued another month in the fall. A high percentage of bindweed can be eliminated in 1 year, but complete elimination can be achieved by raising one of the three crops for 3 years. Cultivations should be done each year between the time that one crop is harvested and the next one is seeded.

Fallow. In areas where the land is fallowed for a year, satisfactory results have been obtained by combining the use of fallow and 2,4-D. One satisfactory method is to cultivate every 2 weeks until about August 1, and spray with 2,4-D about 3 weeks later when the bindweed has emerged. Another satisfactory method is to spray when the bindweed is budding in June. The cultivation can then be started when regrowth appears and continued for the remainder of the season. Complete elimination probably will not be achieved, but a high percentage of plants can generally be killed.

Summer crops. Forage sorghum, sudangrass, and soybeans are effective aids in eliminating bindweed. The area should be plowed shortly after the bindweed plants emerge and cultivated at 2- or 3-week intervals.

If there is sufficient moisture available about July 1, the crop best adapted to the location should be seeded at a heavy rate with a grain drill. The crop can be harvested for forage and the area should be plowed after harvest and cultivated until freeze-up. Although 60 to 75% of the bindweed can be killed in 1 year, 3 years are generally required to give 95% elimination.

If there is not sufficient moisture on July 1 to warrant seeding a crop, there are four alternatives: (1) Cultivate until August 1 and apply 2,4-D 3 weeks later; (2) Continue cultivation until August 15, when a perennial forage crop can be seeded; (3) Cultivate until September, when a winter grain can be planted; (4) Cultivate until freeze-up.

Forage crops. Alfalfa or an alfalfa-grass mixture cut for hay or grazed each year will generally give 95 to 100% elimination of bindweed in 4 years. Cultivate the area intensively from the time that the bindweed emerges until the crop is seeded. If there is ample soil moisture, seed the crop about August 15. If there is insufficient moisture to warrant seeding the crop, continue cultivation until freeze-up and seed the crop early the following spring. A heavy stand is essential. Perennial grasses such as bromegrass, crested wheatgrass, Ree wheatgrass, or Western wheatgrass are satisfactory when grown in a mixture with alfalfa.

These grasses are not satisfactory when grown alone unless they are sprayed with 2,4-D. Over 90% elimination can generally be obtained without cultivating for a season if 2,4-D is applied each of 3 years when the bindweed is budding. Apply one-half pound of 2,4-D acid per acre the spring that the crop is seeded, but apply three-fourths pound in all other treatments. If there is a healthy fall regrowth, it is advisable to spray it.

GRAZING

Field bindweed can be controlled by grazing with sheep. One satisfactory system is to plant winter wheat or rye and pasture it early the next spring. During early June, transfer the sheep to other pasture and plow deeply.

After this, one of two practices may be followed. If there is adequate soil moisture, seed sudangrass and graze from the time it attains a height of 15 to 18 inches until September. If there is not enough moisture to warrant seeding the sudangrass, the area may be cultivated intensively until September. A second crop of winter wheat or rye may be seeded. It can then be grazed or combined. In either case, plow during July and cultivate until fall.

Sheep have also been successful in eliminating bindweed when bromegrass was used as the crop. After the bromegrass is seeded, it may be necessary to spray with 2,4-D to aid in establishing a stand. After the stand is established, two seasons of grazing will generally kill over 90% of the bindweed.

SOIL STERILANTS

Numerous soil sterilants can be used to eliminate patches of field bindweed. Most of the chemicals give best results when applied between September 1 and December 1; however, good results are often obtained from summer applications. Apply the chemical to a band 6 to 8 feet wide around the outside of the patch to kill roots that extend beyond the patch.

The following chemicals are usually effective in giving 95% elimination when applied at the rates designated for each square rod. The lower rates are satisfactory for fall treatments but the higher rates are sometimes needed for summer applications.

Atlacide	6 to 8 pounds
Chlorax	10 to 12 pounds
Concentrated	
Borasco	12 to 15 pounds
Polybor-chlorate ...	10 to 12 pounds
Sodium chlorate	5 to 6 pounds