Field Bindweed

Control in Field Crops and Fallow

A creeping, deep-rooted perennial weed, field bindweed (*Convolvulus arvensis* L.) is native to Europe and western Asia. It was first found in North America in Virginia in 1739 and probably was brought to Kansas in infested wheat seed from the Ukrainian region of Russia between 1870 and 1875. Field bindweed was reported in Kansas near Topeka in 1877 and in Nebraska in 1888. It spread rapidly, and had infested nearly 200,000 acres in Kansas by 1937 and approximately 1.2 million acres statewide in 1988.

Crop Losses From Field Bindweed

Field bindweed competes aggressively with crop plants for water, nutrients, and light. It reduces crop yield and quality, reduces land value, interferes with harvesting by entwining crop plants, limits farmers to certain crops and rotations, and increases pro-

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duction costs associated with control practices and the need to clean infested small grain seed Research at the Fort Hays Branch Experiment Station over a 12-year period indicated that dense stands of field bindweed reduced cereal crop yields by 20 to 50 percent and row crop yields by 50 to 80 percent. Thick alfalfa stands have been able to compete with the weed, but as the alfalfa stand thinned with age, field bindweed fluorished.

The Kansas Noxious Weed Law

Field bindweed was de clared a noxious weed in Kansas in 1937 and now is one of 11 weeds listed as noxious in the Kansas Noxious Weed Law. A copy of the law can be obtained from the Weed and Pesticide Division, Kansas State Board of Agriculture, Topeka, KS 66612 or from a county noxious weed office.

Plant Growth and Development

Description

Several morphologically distinct biotypes of field bindweed have been identified and more than one biotype often exist in the same infested area. Although biotypes may vary in appearance and growth habit, most are low-growing, drought-tolerant plants with vigorous,twining stems up to 6 feet long. Field bindweed leaves are relatively small and arrowhead-shaped with pointed basal lobes. Leaf shape and size vary among plants, and to some extent on the same plant. The plants have a long central taproot capable of reaching depths of 20 feet or more. Numerous lateral roots develop along the taproot, mostly in the top 2 feet of soil. Buds formed along lateral roots are capable of developing into shoots which, upon reaching the surface, become new plants. The flowers are bell-shaped, 3/4 to 1 inch in diameter (about half the size of tall morningglory), and vary from white to pink. Each flower produces a nearly round seedpod containing one to four dark brown or black three-sided seeds about 1/8 inch long. Two sides of the seed are flat, the third size is convex, and the seed coat is covered with tiny raised dots. The seeds are extremely hard, impervious to water, and can remain dormant and viable in the soil for more than 30 years.

The seedlings have two heart-shaped cotyledonary leaves. Seedlings quickly develop a deep taproot, and numerous lateral roots develop about 6 weeks after emergence. Once lateral roots develop, the plant has a perennial growth habit.

Period of Growth

Field bindweed usually emerges in early to mid-April in Kansas and continues growing until November or until the temperature drops to 20°F or lower. Bindweed growth may be retarded at freezing temperatures above 20°F, but the vines do not die. Topgrowth will cease or die during severe drought, but new topgrowth will appear after adequate rainfall.

Growth of Bindweed

Seed of field bindweed will germinate near the soil surface throughout the growing season following rainfall, with most germination occurring in the spring. When not competing with other plants, a bindweed seedling may develop a root system that will penetrate to a depth of 4 feet. Roots can have a lateral spread of approximately 10 feet in one season, and may penetrate to a depth of 18 to 20 feet. In two or three growing seasons roots may extend to a diameter of 17 to 18 feet.

The rounded leaves of the seedlings, left, give way to arrowhead-shaped leaves a few days after emergence. Leaf shape may vary, even on the same plant.

Root penetration is influenced by such factors as soil moisture, permeability of the subsoil, and bindweed biotype. In areas where annual rainfall averages 30 inches or more, bindweed roots have been found 30 feet below the surface. On upland soils near Hays, where annual rainfall averages 23 inches, few roots were found below 6 feet and more than 60 percent of the total weight of roots was in the surface 2 feet of soil.

Heaviest bloom in west-central Kansas is from May 15 to June 15 and seed usually matures from June 15 to July 15, often before small grain. Under favorable conditions, field bindweed may continue to bloom and produce seed during July and August. It may become dormant during extended drought periods, but resumes growth after adequate rainfall.

How Bindweed Spreads

Field bindweed spreads both vegetatively and by seeds. Root segments containing buds, spread by tillage implements, are capable of starting new plants if the soil is moist or if rain follows soon after tillage. Spreading by seed occurs when seeds drop from vines wrapped around tools and when vines pass through harvesting equipment. Seed may also be collected with harvested grain. Then, because the seeds are difficult to remove from seeds of cereal crops, they often are planted along with crop seed. Field bindweed seed in grain or hay fed to livestock will pass through animals largely undigested, thus spreading the seed with manure. Seed also is carried by drainage water, birds, on feet of animals, and on wheels of machinery and vehicles. Both seeds and root segments are spread by road maintenance equipment.

Bindweed Control Practices

Preventive Control

All crop seed should be cleaned before seeding to remove bindweed and other weed seeds. Feeding hay or grain contaminated with field

Field bindweed looks similar to the less-destructive hedge bindweed. The flowe r of the hedge bindweed, left, is much larger than the field bindweed flower.

bindweed should be avoided, if possible. Livestock fed contaminated grain or hay should be confined, or restricted to areas already infested, until the bindweed seed passes through the animals. Manure containing field bindweed should be spread only on bindweed-infested land. Harvesting, tillage, and other machinery should be thoroughly cleaned before moving from infested to non-infested fields. New infestations that start in waterways, roadside ditches, shelter belts, fence rows, and along railroad rights-of-way should be controlled immediately.

Seed Dormancy and Seedling Control

Bindweed seed is extremely hard and can lie dormant in the soil for 30 years or more. Seeds brought near the soil surface by tillage, rodents, or other means will germinate under favorable conditions, resulting in new bindweed infestations. Under favorable conditions, 6-week-old seedlings are capable of re-establishment after topgrowth removal. Seedlings emerging between crops are easily controlled with timely tillage. Several soil-applied herbicides commonly used to control annual weeds in crops also effectively control field bindweed seedlings. In situations where pre-emergence herbicides are not used or are ineffective, applications of 2,4-D or Banvel (dicamba) at 0.25 to 0.5 pounds active ingredient per acre can be used to control the seedlings in crops tolerant to the herbicides. Also, 2,4-D, Banvel (or combinations) and non-selective herbicides such as Landmaster BW or Cyclone can be used instead of tillage when the land is fallow. Field bindweed seedlings between rows of broadleaf crops such as soybeans, sunflowers, melons, and many vegetables can be controlled with cultivation. Seedlings within rows will likely become established perennial plants unless removed by hand.

Each flower produces a rounded seedpod, usually containing four seeds. The seeds can remain dormant in the soil and begin a new infestation after more than 30 years.

Field Bindweed Control in

Competitive Crops. Field bindweed is an excellent competitor for limited soil moisture, but cannot tolerate

shading from tall competitive crops. Forage sorghum or sundangrass seeded in narrow rows about mid-June, after a period of intensive tillage or use of a herbicide, are excellent competitors with field bindweed in areas where adequate soil moisture fa vors rapid crop growth Narrow row grain sorghum may also be used as a competitive crop, but grain sorghum usually is not as effective as taller forage crops. The effectiveness of competitive crops depends on herbicidal control or intensive cultivation curing fallow periods when the bindweed is actively growing.

Relatively good continuous wheat can be produced with favorable soil moisture and field bindweed stands greatly reduced (but seldom eliminated) by early October and by tilling every 12 to 16 days after bindweed emerges between harvest and seeding. Substituting a herbicide for a late tillage operation may delay bindweed emergence in the crop next spring and hasten control of thick stands.

Timely Tillage. Tillage is the most common way to destroy topgrowth and is most effective when performed with sweep-type implements that sever shoots from the roots about 4 inches below the soil surface. As perennial plants regenerate topgrowth, food reserves from roots are transported to the newly emerging shoots. About 12 days after leaves are formed, they manufacture food in sufficient quantities for the plant to start rebuilding root reserves.

Figure 1 shows the effect of single and multiple tillage operations on food reserves in previously uncontrolled field bindweed roots. After a single cultivation (solid line), the percentage of carbohydrates in bindweed roots decreased until 16 days after the bindweed shoots re-emerged, and then increased, indicating that the bindweed plant was producing more carbohydrates than were needed for growth and was storing the surplus in roots. Thus, repeated destruction of topgrowth every 12 to 16 days after shoot-re-emergence (dashed line) weakens the plants by depleting carbohydrate reserves in the roots and stimulates dormant bindweed seeds to germinate.

Chemical Control. Several herbicides effectively control field bindweed, although a single herbicide application will rarely eliminate established stands. Rather, several herbicide applications over several yea rs are usually necessary to reduce dense stands of field bindweed and keep it suppressed. Control may be enhanced by combining herbicide treatments with closely drilled, vigorously growing crops.

Currently, 2,4 -D, Banvel, Roundup, Landmaster II, Landmaster BW, and Tordon are labeled individually and in various combinations for the supppression or control of field bindweed in crops or fallow.

Figure 1

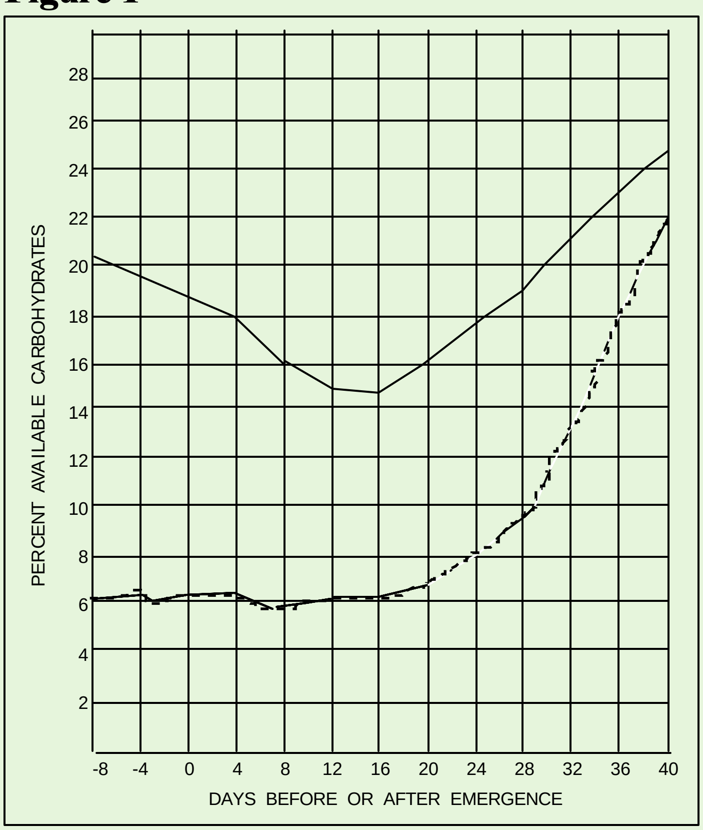

Figure 1. *Carbohydrate reserves in field bindweed roots as affected by tillage. The solid line represents carbohydrate reserves before and after a single tillage operation during a 2-month fallow period; the dashed line represents carbohydrate reserves in roots from areas tilled at 2 to 3-week intervals during the fallow period.*

At the time of printing, herbicides names in this publication were registered for uses suggested. **Apply each herbicide or herbicide mixture according to all directions, warnings, and precautions on the product label(s). Tordon is a Restricted Use Pesticide.** Fallow Master is a commercial package mixture of glyphosate (Roundup) and dicamba (Banvel) for control or suppression of emerged weeds in fallow and reduced tillage croppping systems. However, field bindweed is not listed as one of the weeds suppressed or controlled at the labeled use rates for Fallow Master. These herbicides vary in mode of action, relative tolerance to plant stress, se lectivity, soil persistence, and susceptibility to off-site movement.

Variable response of field bindweed to herbicides is common and ma y be related to plant age, biotype, and environmental conditions. Leaf cuticles are fully formed soon after the leaf attains maximum size, but the cuticle cracks and the wax content of the cuticle gradually decreases with age through exposure to wind, rainfall, and scarification by wind-blown sand and dust. Thus, herbicide uptake may be greater in older plants that are actively growing than in younger plants. Plants growing u nder moisture or heat stress and exposed to full sunlight usually have smaller leaves with more cuticular wax and slower biological processes than shaded plants and plants growing in favorable conditions. As plant stress increases, herbicide uptake and translocation usually decrease. Consequently most herbicides control field bindweed less effectively in mid-summer than in the spring or fall. Some herbicides are more affected by drought condidtions than others. The following herbicides are arranged from least to greatest relative sensitivity to drought conditions: Tordon < Banvel < 2,4 -D = Roundup.

Another possible explanation of variable field bindweed response to herbicides involves biotypes. Research has indicated field bindweed biotypes differ in susceptibility to 2,4 -D and Roundup; therefore, differences are likely to occur for other herbicides too.

Flower color and leaf shape may vary on the same plant.

Review of Field Bindweed Control Data

Summaries of several field bindweed control studies conducted throughout the Great Plains are discussed below. No attemp t was made to identify bindweed biotypes resistant to a particular herbicide. All herbicide rates are given as the active ingredient.

In west-central Kansas, 5 months after treatment, spring applications of oil-soluble amine or low volatile ester formulations of 2,4--D at 2.0 lb/A or Banvel at 4.0 lb/A controlled slightly more than 60 percent of fi eld bindweed. This is compared to 44 percent control for the dimethylamine formulation of 2,4--D at 2 lb/A and 36 percent control for a tank mixture of 2,4--D amine plus Banvel at 1.5 + 0.5 lb/A.

Table 1
Control of field bindweed 5 and 7 months after herbicide application in the spring, Hays, Kansas, 1963-1977.

Herbicides	Rate	Control, months after treatment[a] 5	17
	(lb ai/A)	----(Percent)----	
2,4--D oil-soluble amine	2.0	62 (3)	44 (3)
2,4--D amine[b]	2.0	44 (4)	------
2,4--d ester	2.0	61 (10)	42 (3)
Banvel	4.0	62 (9)	51 (3)
Roundup	4.0	75 (5)	68 (3)[c]
Banvel + 2,4--D amine	0.5 + 1.5	36 (3)	------

[a]Numbers in parentheses indicate the number of te sts included in the mean.
[b]amine = dimethylamine formulation; ester = low volatile ester formulation.
[c]12 months after treatment.

The most effective spring treatment was Roundup at 4.0 lb/A, which gave 75 percent control. Control for most treatments had decreased by 10 to 20 percent by the end of the second growing season (17 months after treatment). Applications of 2,4--D low volatile ester at 1.5 lb/A in the fall were only slightly more effective than applications of 1.0 or 2.0 lb/A (Table 2). Control with Roundup increased from 54 to 69 percent as the rate was increased from 2 to 4 lb/A. Roundup or 2,4--D applied individually in the spring tended to be more effective at the end of one growing season (5 months) than equivalent treatments applied in the fall (12 months).

The cost of applications of Banvel or Roundup at rates used in these studies would be prohibitive for widespread use and are not recomended for other than spot treatment. Equal or greater bindweed control with lower rates of Banvel has been reported in other states. Landmaster BW, a package mixture of glyphosate and 2,4--D amine, has given effective, economical control of field bindweed. These studies are discussed elsewhere in this publication.

Studies in the Texas Panhandle showed trends in bindweed control similar to Kansas results for fall applications of 2,4--D and Roundup. These studies clearly demonstrated the effects of drought stress on the efficacy of several herbicides. Roundup at 2.9 lb/A was the most effective spring-applied treatment (Table 3) after one year (83 percent) and two years (67 percent). The second most effective treatment after one (65 percent) and two years (46 percent) was 2,4-D at 1.0 lb/A. Fall applications of Banvel and tank mixtures of Tordon plus 2,4 -D, dicamba, or Roundup were more effective than spring applications of 2,4--D low volatile ester (Table 3). Field bindweed control for fall-applied Banvel at 1.0 lb/A was 71 and 34 percent one and two years after treatment. Control for fall-applied tank mixtures of Tordon plus 2,4 -D, Banvel, or Roundup one year after treatment ranges from 79 to 87 percent.

Field bindweed growing conditions at the time of treatment greatly affected herbicide efficacy in the Texas studies. Drought stress dramatically reduced the effectiveness of spring and fall-applied

Table 2
Control of field bindweed 12 months after herbicide application in the fall, Hays, Kanas, 1963-1977.

Herbicides	Rate	No. of tests	Control
	(lb ai/A)		(Percent)
2,4--D ester[a]	1.0	4	42
2,4--D ester	1.5	7	50
2,4--D ester	2.0	4	45
Roundup	2.0	5	54
Roundup	3.0	19	63
Roundup	4.0	4	69

[a]ester = low volatile ester formulation.

Table 3
Control of field bindweed one and two years after postemergent herbicide application near Bushland in the Texas Panhandle, 1976-1982[a].

		Season of Herbicide application[b]		
Herbicides	Rate	Spring	Summer	Fall
	(lb ai/A)	----(Percent controlled 1 yt after treatment----)		
Roundup	2.9	83 (5)	77 (8)	60 (9)
Banvel	1.0	56 (5)	41 (8)	71 (9)
2,4--D ester	1.0	65 (5)	49 (8)	55 (9)
Tordon + 2,4--D	0.25 + .05	55 (2)	56 (6)	84 (4)
Tordon + Banvel	0.25 + 0.25	47 (2)	73 (4)	87 (5)
Tordon + Roundup	.020 + 1.6	52 (2)	73 (5)	79 (2)
		----Percent controlled 2 yrs after teratment)----		
Roundup	2.9	67 (5)	63 (5)	32 (6)
Banvel	1.0	31 (5)	37 (5)	34 (6)
2,4--D ester	1.0	46 (5)	42 (5)	10 (6)

[a]Numbers in parentheses indicate the number of tests included in the mean.
[b]Spring = April or May; Summer = June, July, or August; Fall = September or October.

Table 4
Effect of plant condition at the time of post-emergent herbicide application on the control of field bindweed one year after treatment near Bushland in the Texas Panhandle, 1976-1982[a].

Herbicides	Rate	Months applied	Plant Condition Good-Excellent	Plant Condition Poor-Fair
	(lb ai/A)		----(Percent)----	
Roundup	2.9	May-June	85 (4)	77 (2)
		Sept.-October	72 (3)	36 (4)
Banvel	1.0	May-June	71 (4)	29 (2)
		Sept.-October	60 (3)	79 (4)
2,4--D ester	1.0	May-June	78 (4)	47 (2)
		Sept.-October	67 (4)	46 (4)
Tordon + 2,4--D	0.25 + 0.5	May-June	63 (1)	-----
		Sept.-October	78 (1)	90 (3)

[a]Numbers in parenthesis indicate the number of tests included in the mean.

Table 5
Control of field bindweed 10 to 12 months after herbicide application in June, August, or September, North Dakota and South Dakota, 1978-1982.

Herbicides	Rate	Month of herbicide application June	August	September
	(lb ai/A)	------------(Percent)------------		
Banvel	1.0	40	30	83
Banvel	2.0	56	33	94
Banvel + Roundup	0.5 + 1.5	81	3	96
Banvel + 2,4--D	1.0 + 3.0	60	3	94

Table 6
Control of field bindweed approximately 10 and 12 months after postemergent herbicide application in southeastern Wyoming, 1985-1987.

Herbicides	Rate	No. of Studies	Months after treatment 10	12
	(lb ai/A)		----(Percent)----	
Tordon + 2,4--D amine	0.12 + 1.0	2	89	81
Tordon + 2,4--D amine	0.25 + 2.0	3	98	92
2,4--D amine + Roundup	0.56 + 1.1	2	67	26
2,4--D amine	1.0	2	57	18

2,4--D, spring-applied Banvel, and fall-applied Round up (Table 4). However, fall applications of Banvel at 1.0 lb/A or Tordon plus 2,4--Day at 0.25 + 0.5 lb/A were equally effective on stressed or non-stessed bindweed.

Control of field bindweed in the northern Great Plains also was better when Banvel was applied alone or in combination with Roundup or 2,4--D in the fall than in the spring (Table 5). Banvel tended to be more effec tive when applied after one or more hard freezes than before a freeze, but there was little or no difference in control between pre-freeze and post-freeze applications of Banvel plus Roundup or 2,4--D (data not presented).

Banvel, Roundup, and 2,4--D applied alone or in combinations were least effective on field bindweed when applied during July or August, regardless of location. Also, mid-summer applications of Tordon plus 2,4--D (0.25 + 0.5 lb/A) or Banvel (0.25 + 0.25 lb/A) in Texas were less effective than equivalent treatments applied in the fall (Table 3). However, in southeastern Wyoming, tank mixtures of Tordon at 0.125 or 0.25 lb/A plus 2,4--D amine at 1.0 lb/A applied in mid-summer controlled 81 and 92 percent of field bindweed, respectively, approximately 12 months after treatment (Table 6). In comparison, control with 2,4--D amine alone or in combination with glyphosate (Roundup), either as a tank mixture or package mixture (Landmaster BW), was 57 and 67 percent approximately 10 months after treatment. Control had decreased to 26 and 18 percent aproximately 12 months after treatment.

Table 7
Control of field bindweed in no-till and conventional-till production systems 20 and 60 days after treatment near Hays, Kanas, 1985[a].

Herbicides[b]	Rate	No-till 20 DAT	No-till 60 DAT	Conventional 20 DAT	Conventional 60 DAT
	(lb ai/A)	------------(Percent)------------			
2,4--D + S	2.0 + 0.5% v/v	100	80	64	25
2,4--D + Banvel + S	2.0 + 1.0 + 0.5% v/v	100	74	64	40
2,4--D/glyphosate/ S	0.5/0.38	93	82	73	10
Dicamba/ glyphosphate/S	0.5/0.2	94	91	62	23

[a]Data are the mean of four studies; DAT = days after treatment.
[b]2,4--D = amine formulation; S = surfactant; 2,4--D/glyphosate/S = Landmaster BW, 54 fl oz/A; dicamba/glyphosphate/S = Fallow Master, 42 fl oz/A.

Control in Conventional and No-Till Systems

Although many perennial weeds are known to increase in no-till production systems, field bindweed is an exception. A 10-year study at the Fort Hays Experiment Station in west-central Kansas indicated that field bindweed was controlled as well or better with herbicides in no-till than in conventional production systems of continuous wheat, wheat-fallow, and wheat-grain sorghum-fallow (data not presented). Dense stands of field bindweed were reduced more rapidly in wheat-fallow and wheat-grain sorghum-fallow rotations. Control was maintained in all rotations when combinations of herbicides and tillage were used to control bindweed as compared to tillage only.

Other studies in western Kansas indicated that 2,4--D amine plus surfactant, Banvel plus 2,4--D amine and surfactant, Landmaster BW, and Fallow Master applied in the spring controlled field bindweed significantly better in no-till than in tilled production systems 20 and 60 days after treatment (Table 7). Increased initial control in no-till may have been due to more uniform bindweed emergence and lush, vigorous growth. Control 60 days after treatment for conventional tillage decreased from initial control by 24 to 63 percent, depending on herbicide treatment. The dramatic reduction in control may have been due to post-treatment tillage stimulating emergence of new bindweed shoots from buds along underground rhizomes.

Field Bindweed Control in Crops

Wheat, Oats, and Barley

Spring applications of Banvel and 2,4--D are registered for selective control of winter annual and summer annual broadleaf weeds, but field bindweed usually does not emerge in spring until after spraying small grains. A preharvest application of 2,4 -D ester can be used to control field bindweed and other susceptible weeds after small grains have reached the soft dough stage. Roundup or Landmaster products can be used for spot treatment of field bindweed, but crop plants in the treated area will be killed.

Row Crops

No herbicides currently registered selectively control field bindweed in broad-leaved row crops, alfalfa, or other legumes. Banvel and 2,4--D may be applied postemergence to corn and grain sorghum for control of field bindweed and susceptible anual weeds. Crop tolerance to these herbicides may vary depending on hybrid, environmental conditions and growth stage at the time of application. Consult the seed dealer for information on the relative tolerance of particular hybrids to post-emergent appli cations of 2,4 -D or Banvel. Read and follow the herbicide label for the recommended use rate and time of application. Roundup or Landmaster products can be used for spot treatment of field bindweed, but crop plants in the treated area will be killed.

Conservation Reserve, Pastures, and Rangeland

Banvel, Tordon, and 2,4--D, alone or in combinations, may be applied to established grass stands. They should not be applied to newly seeded grasses, such as in Conservation Reserve acres, until after the grass has developed secondary roots. Some grass species may not germinate and become sufficiently developed to tolerate a herbicide application until late summer. This may limit herbicide application the year of seeding. A concerted effort to control field bindweed on land to be seeded to grass should be made in the year prior to grass seeding. However, application of Tordon during the season prior to seeding is not recommended because of possible herbicide carry-over that can injure or kill germinating grass seedlings. Grass may be seeded 90 days (excluding days when soil is frozen) after an application of Banvel at 0.5 lb/A or 180 days after applications at 1.0 lb/A. Applications of 2,4-D, Roundup, or Landmaster BW can be made to field bindweed in the fall with little danger of herbicide carry-over affecting germinating grasses seeded the following spring.

There is no waiting period for grazing non-lactating animals on pasture or rangeland treated with Banvel, but animals should be removed from treated areas 30 days prior to slaughter. Consult the Banvel label for time restrictions on grazing or feeding Banvel-treated hay to lactating dairy animals. If more than 0.5 lb/A of Tordon is applied, do not cut the grass for feed or graze lactating dairy animals on treated areas within 2 weeks after treatment. Non-lactating animals should be removed from treated areas at least 3 days prior to slaughter. Do not allow animals to graze areas treated with 2,4-D within 7 days after treatment.

Control in Fallow Preceding Wheat

Control of field bindweed, as indicated, is least effective when most herbicides are applied in mid-summer (or after wheat harvest). A herbicide application or tillage immediately after harvest, however, may reduce the production of viable seeds and weaken the plant. This could increase the effectiveness of follow-up herbicide applications in the fall or spring.

Tank mixtures of 2,4-D plus Banvel or Tordon and 2,4-D alone are widely used for controlling field bindweed during the fallow period prior to seeding winter wheat. In recent years, the use of Landmaster II or Landmaster BW has increased for the control of annual weeds and suppression of field bindweed in fallow. When possible, treatments should be made when bindweed is actively growing with runners 8 to 12 inches long and in mid to full bloom. Tordon plus 2,4-D at 0.12 to 0.25 + 0.5 to 1.0 lb/A should be applied at least 60 days prior to seeding winter wheat to avoid possible crop injury. Similarly, Banvel plus 2,4-D at 0.5 + 1.0 lb/A should be applied at least 45 days prior to seeding. Winter wheat can be safely seeded 2 weeks after rainfall of .5 inch or more following an application of 2,4-D or Landmaster products. Bindweed control is reduced when treated areas are tilled anytime after a Landmaster application.

Although wheat is a better competitive crop than a summer-planted crop, field bindweed infestations can reduce wheat yields by 20 to 50 percent.

Preventive control measures, along with tillage and herbicide applications, are most effective for controlling field bindweed.

Summary and Recommendations For Control of Field Bindweed

1. Uncontrolled field bindweed is a deep-rooted perennial weed that severely reduces crop yields and land value.
2. The most effective control program includes preventive measures over several years in conjunction with timely tillage and herbicide applications. Closely drilled, vigorous, competitive crops such as winter wheat or forage sorghum may also aid control.
3. Banvel, Tordon, 2,4-D, Roundup, and Landmaster products alone or in various combinations are registered for suppression or control of field bindweed in fallow and/or in certain crops, pastures, and rangeland. Apply each herbicide or herbicide mixture according to directions, warnings, and precautions on the product label(s). Single herbicide applications rarely eliminate established bindweed stands.
4. Applications of 2,4-D, Roundup, and Landmaster products are most effective when spring-applied to vigorously growing field bindweed in mid to full bloom. However, Banvel and Tordon applications are most effective when applied in the fall. Most herbicide treatments are least effective when applied in mid-summer or when bindweed plants are stressed.
5. Tillage sooner than 3 weeks after treatment may reduce bindweed control with some herbicides. Tillage after Landmaster products are applied may reduce their suppression of field bindweed.
6. Preharvest applications of 2,4-D may be made to winter wheat to prevent or reduce bindweed seed production. The most effective post-harvest applications include combinations of Tordon, Banvel, or 2,4-D.

References

1. DeGennaro, F. P. and S. C. Weller. 1984. Differential susceptibility of field bindweed *(Convolvulus arvensis)* biotypes to glyphosate. Weed Science 32:472-476.
2. Derscheid, L. A., J. F. Stritzke, and W. G. Wright. 1970. Field bindweed control with cultivation, cropping, and chemicals. Weed Science 18:590-596.
3. Miller, S. D., T. Whitson, M. Farrell, and K. J. Fornstrom. 1986. Research in Weed Science: 1986 Progress Report. B-886, Wyoming Agricultural Experiment Station. 162 pp.
4. Miller, S. D., K. J. Fornstrom, J. M. Krall, T. Whitson, and M. Ferrell. 1987. Research in Weed Science: 1987 Progress Report. B-906, Wyoming Agricultural Experiment Station. 172 pp.
5. Phillips, W. M. 1961. Control of Field Bindweed by Cultural and Chemical Methods. Technical Bulletin 1249. United State s Department of Agriculture. 30 pp.
6. Special Session on Field Bindweed. 1978. North Central Weed Control Conference Proceedings 33:140-158.
7. Schweizer, E. E., J. F. Swink, and P. E. Heikes. 1978. Field bindweed *(Convolvulus arvensis)* control in corn *(Zea mays)* and sorghum *(Sorghum bicolor)* with dicamba and 2,4-D. Weed Science 26:665-668.
8. Tichota, J. and J. Foster. 1981. Controlling field bindweed with dicamba and tankmixes of glyphosate or 2,4-D with evaluations on sunflowers and cereal crops. North Central Weed Control Conference Proceedings 36:50-52.
9. Timmons, F. L. 1941. Results of Bindweed Control Experiments at the Fort Hays Branch Experiment Station, Hays, Kansas, 1935 to 1940. Kansas Agricultural Experiment Station Bulletin No. 296. 50 pp.
10. Weise, A. F. and D. E. Lavake. 1985. Control of field bindweed *(Convolvulus arvensis)* with postemergence herbicides. Weed Science 34:77-80.
11. Whitworth, J. W. and T. J. Muzik. 1967. Differential response of selected clones of field bindweed. Weeds 15:275-280.

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Mention of product tradenames is done to help identify the herbicides. No endorsement is intended, nor is any criticism implied of similar products not mentioned.

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