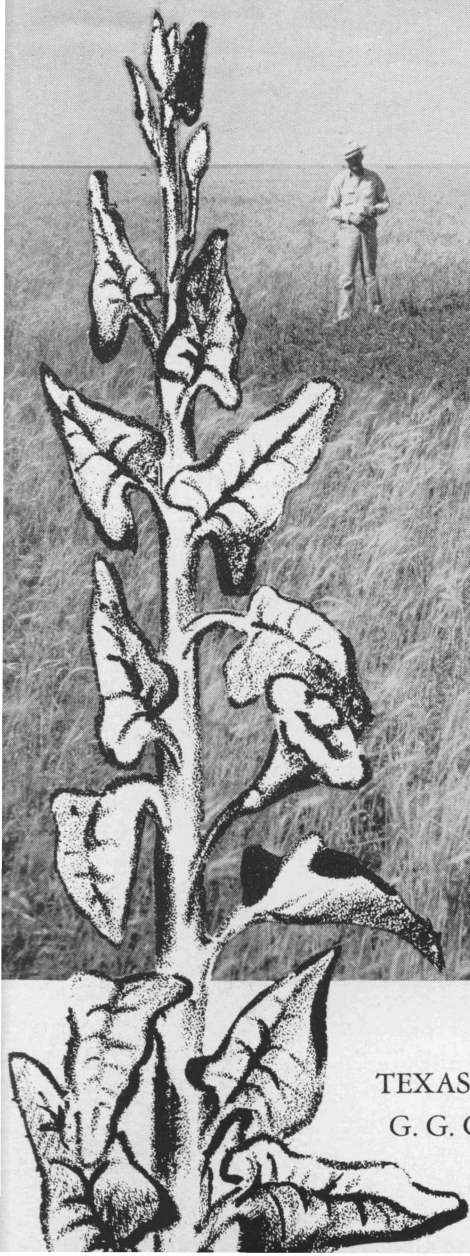


Field

BINDWEED



TEXAS AGRICULTURAL EXTENSION SERVICE
G. G. GIBSON, DIRECTOR, COLLEGE STATION, TEXAS

[Blank Page in Original Bulletin]

Field Bindweed

A. F. WIESE, H. E. REA, and M. K. THORNTON*
Texas A. & M. College System

Characteristics

FIELD BINDWEED is a long-lived herbaceous perennial vine usually well-suited for vigorous survival and spread. It produces an abundance of seed throughout the summer which have great viability, surviving in the soil for long periods. The size and shape of the seed make them difficult to separate from wheat, oats, barley, sorghum, sudan and many other agricultural seeds. The young plants establish readily and are difficult to kill after they are 6 weeks old.

In many localities this weed is called "possession vine" because of its aggressiveness and persistence. It may take possession of the land and eventually cause abandonment if control is neglected. A vigorous climber, it twines itself around any weed, crop or other support present in an infested area. When no support is available, it grows along the ground.

The leaves usually are arrow-shaped and fairly small. The flowers are bell-shaped, about $\frac{3}{4}$ inch in diameter and predominately white;

*Respectively, assistant agronomist; associate professor, extension agricultural chemist.

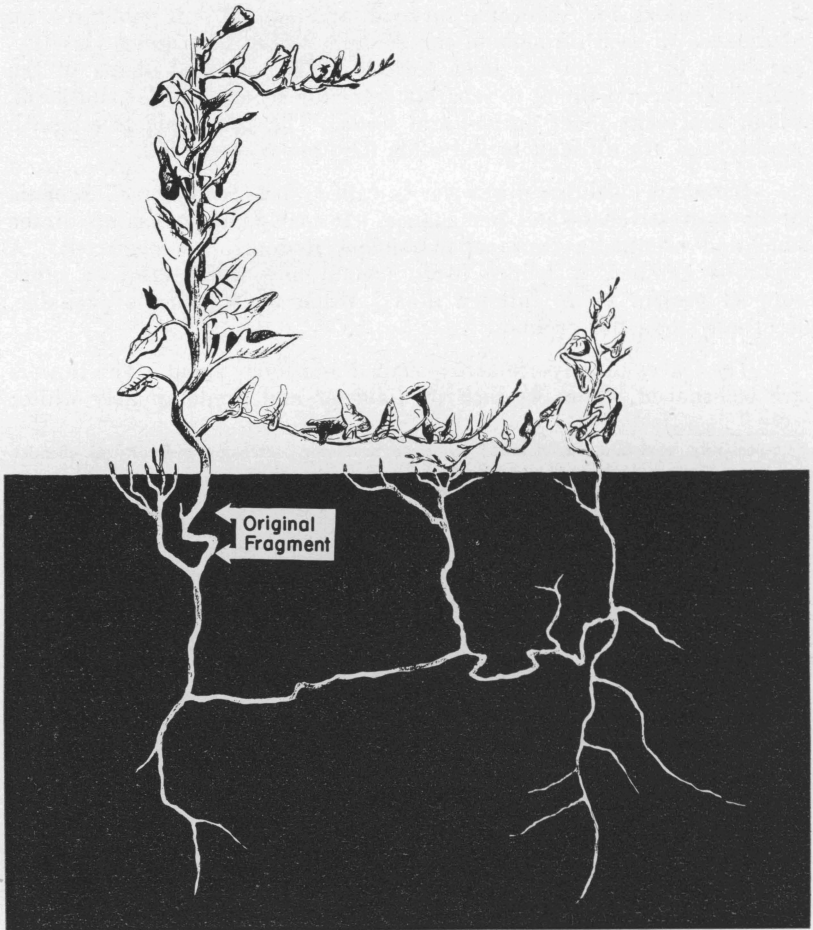


Bindweed in bloom.

but various shades of pink may also occur. The usual blooming season in Northwest Texas is in late May and early June. A crop of bindweed seed usually matures by the time wheat is ready to harvest.

The root system of an established bindweed plant is very extensive and may penetrate the soil to great depths. The main roots are long, whitish cords about 1/10 inch in diameter and give rise to many lateral branch roots. Buds on the lateral branch roots may develop into new above-ground plants anywhere along the root, gradually increasing the size of the patch.

New infestations usually start from seeds carried by harvesting machinery, livestock or as impurities in crop seed or feed. One bindweed plant started from seed may spread into a patch 10 feet in diameter in one season.



Root system and growing habits of field bindweed.

Methods of Control

CLEAN SEED AND FEED

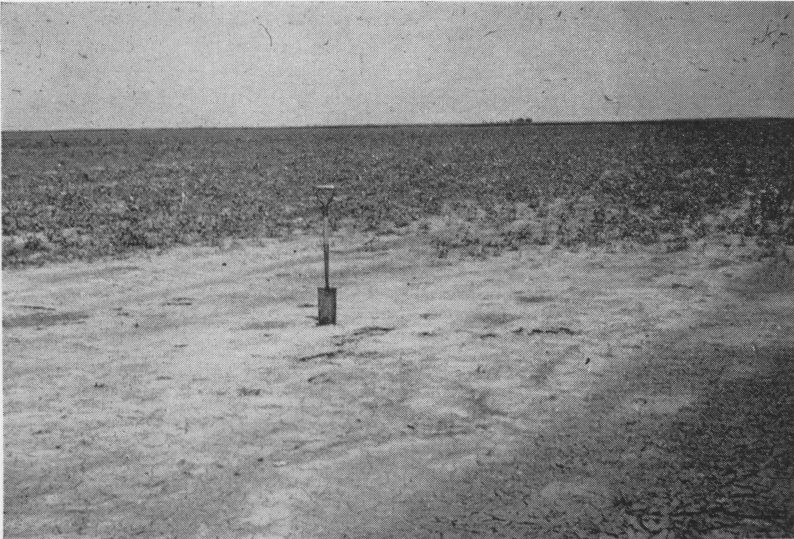
Plant crop seed that is known to be free of bindweed seed and use clean feed. Careless use of contaminated field seed and feed will spread bindweed faster than farmers can hope to control it.

SOIL STERILANTS AND FUMIGANTS

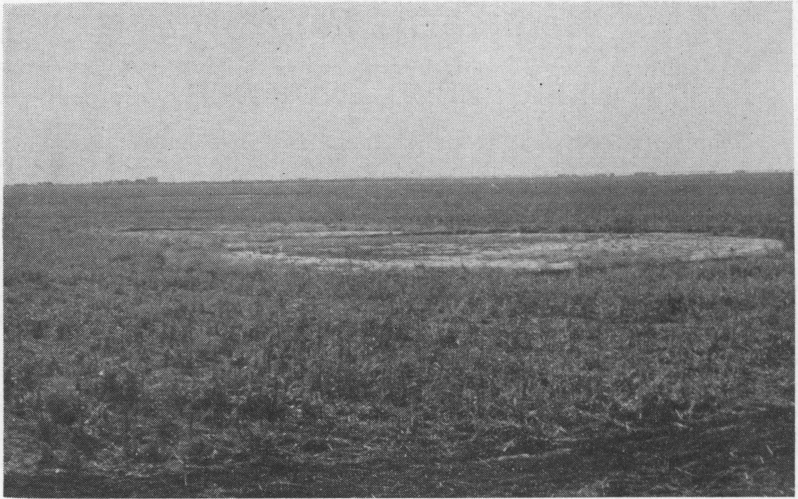
METHODS OF APPLICATION

Patches of bindweed $\frac{1}{2}$ acre or less can be eradicated economically with soil-sterilizing chemicals. These chemicals act through the soil and their effectiveness depends on rainfall following application. Two to 4 inches of water within 1 month after application is usually sufficient to leach the chemicals in the soil. If the chemicals are not leached into the soil, they may blow away. Applying the sterilants to wet soil in August or September gives the best results because wind movement is usually low and rainfall is quite high during these months. Sterilants should be spread 10 feet beyond the infested area in order to kill all of the lateral roots.

Irrigation water can be used to leach soil sterilants into the soil. If the patch is less than 10 square rods, the sterilants should be applied just prior to a regular irrigation. When the patches are larger, the



Control of bindweed with soil sterilants on dryland.



Bordered area in irrigated field where bindweed were controlled with soil sterilants.

area should be bordered and flooded with about 3 or 4 inches of water. The flooding should be repeated in 1 month if it does not rain. Do not apply more than 4 inches of water at one time because the sterilants may be leached too deeply for maximum effectiveness.

After the chemicals are applied, the land should be left idle for 2 years. Then the remaining plants should be re-treated. If water is available, reflooding will insure rapid kill of the weeds. Re-treatment should be continued until the weeds are eradicated.

CHLORATE AND BORON-TYPE CHEMICALS

Sodium chlorate, Concentrated Borascu, Atlacide, Borascu, Polybor Chlorate, Polybor and Chlorax are examples of chlorate and boron-type herbicides. Tests indicate that 5 pounds of sodium chlorate, 16 pounds of Concentrated Borascu, 7 pounds of Atlacide, 30 pounds of Borascu and 12 pounds of Polybor Chlorate per square rod, respectively, are about equally efficient in eradicating bindweed. The chlorates are flammable and poisonous, and should not be applied near buildings; nor should cattle graze treated areas until after the materials are leached into the soil. It is safest to apply chlorates dry with a mechanical spreader. Boron materials are nonpoisonous and nonflammable. The chlorate-type herbicides sterilize the soil for about 3 years, and the boron materials for about 5 years, depending on moisture conditions.

KARMEX W (CMU)

Three-eighths pound of actual Karmex W (3-p-chlorophenyl-1, 1 dimethylurea) (CMU) per square rod has eradicated bindweed. Soil

to which this amount of Karmex W was applied in 1951 was sterile in 1955 indicating that the period of sterility will be very long. **KAR-MEX W SHOULD NOT BE USED ON IRRIGATED LAND EXCEPT IN A BORDERED AREA BECAUSE IT WILL MOVE WITH IRRIGATION WATER AND KILL ANNUAL CROPS.**

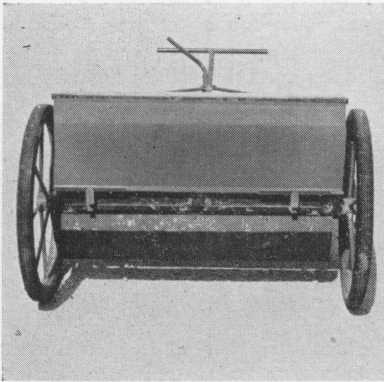
CARBON BISULFIDE (HIGH-LIFE)

Carbon bisulfide has proved satisfactory in controlling bindweed, but the cost is high.

When carbon bisulfide is applied to solid patches of bindweed, 2-ounce shots are placed 6 inches under the surface 18 inches apart with a special applicator for best results. Cheaper and equally good results are obtained by making a crowbar-like punch that makes a 6-inch hole and pouring 2 ounces of chemical in the hole with a 3-foot piece of pipe with a funnel soldered on the end. In either case, the hole must be closed with the heel or tamped to prevent the escape of the gas.

For best results on solid patches, a string or rope with knots every 18 inches should be used to determine where the shots are to

be made. When one row is completed, the string is moved over 18 inches and started in such a way that the second line of shots are opposite the blank spaces in the first line. In other words, the shots are "dodged" or "staggered." With scattered vines, 2-ounce shots are given each individual plant. If two vines are growing within a foot of each other, one shot may be placed between the two plants. **IMPORTANT: CARBON BISULFIDE VAPORIZES. THE GAS, BEING HEAVIER THAN AIR, GOES DOWN SO THAT IN SOME CASES THE TOP FEW INCHES OF THE BINDWEED PLANTS ARE NOT KILLED. THESE MUST BE**



Mechanical spreader used for applying sodium chlorate and boron compounds to small patches of field bindweed.

CUT OFF OR PLOWED UP AT THE END OF 4 WEEKS OR THEY MAY START NEW GROWTH AND BECOME ESTABLISHED AGAIN.

METHYL BROMIDE

Methyl bromide, a gas, may be used under a gas-proof cover to control bindweed. The use of methyl bromide is limited to relatively small areas of infestation, under supervision of trained workers.

INTENSIVE CULTIVATION

Intensive cultivation is the most reliable method of reducing the stand of bindweed infestation on large areas. Its use requires close and sustained attention over 2 or more years. Repeated removal of bindweed tops by cultivation prevents food storage and gradually reduces the reserve food supply in the roots. New shoots from old bindweed plants use more stored food than they return to the roots until they are 16 days old. Because it usually takes from 4 to 6 days for the weeds to emerge after being cut off 4 inches deep, cultivations at 3-week intervals are recommended. However, if growing conditions are very favorable and the weeds emerge faster, 2-week cultivations may be required.

A sweep-type plow should be used to be certain that all of the tops are severed. Sweep plows also leave crop residues on the soil surface, greatly reducing the hazard of water and wind erosion. For this reason it is desirable to start the cultivation period with a heavy stubble on the land and to use cultural methods that preserve this surface litter as long as practical. One-way plows, disk harrows, lister plows and rod weeders destroy litter and tend to cover weeds instead of cutting them off; consequently, root reserves are not depleted.

Bindweed seedlings can be controlled by cultivations at monthly intervals.



A sweep-type plow suitable for intensive cultivation.

2,4-D (2,4-DICHLOROPHENOXY ACETIC ACID)

2,4-D is cheap and easy to apply and can be used to control large infestations of bindweed if other susceptible plants are not growing nearby. Most broad-leaved field crops, such as cotton and alfalfa and many vegetables, flowers, ornamental shrubs and trees are easily damaged by the careless use of 2,4-D. Safe use of this chemical is discussed in Farmers Bulletin No. 2005 and Texas Extension Leaflet No. 210.

2,4-D is available usually as esters, amine salts and sodium salt. The esters and amines are liquids and the sodium salt is a powder. One form of 2,4-D is usually as effective as another when equivalent amounts are used on vigorously growing bindweed. However, the esters are preferred under unfavorable growing conditions. Rates of application of 2,4-D are stated in terms of pounds of acid equivalent per acre. One pound of 2,4-D per acre is the best rate of application on noncrop land.

All stages of vigorously growing bindweed are sensitive to 2,4-D, but best results are usually obtained when it is sprayed in the bud or bloom stage. Under favorable weather conditions good results are also obtained from spraying fall growth. Repeated applications of 2,4-D give good bindweed control, but seldom give complete eradication of established stands. After bindweed is sprayed with 2,4-D, the top growth should not be destroyed for 2 to 4 weeks. This lapse of time is needed for the chemical to be translocated to the roots.

2,4-D can be used to control bindweed in small grains and sorghums if properly applied. Small grains should not be sprayed with 2,4-D until after they are tillered and spraying should be discontinued before the grain is in boot. At their most resistant stages, small grains tolerate up to $\frac{1}{2}$ pound of 2,4-D as amine, ester or sodium salt.

Sorghums are more susceptible to 2,4-D injury than small grains, but they tolerate up to $\frac{1}{2}$ pound of 2,4-D amine in between the 3-inch and early boot stage. 2,4-D applied at other stages may cause serious yield reductions.

Applications of 2,4-D are very useful where cultivation is not feasible, such as in roadways, grass waterways, pastures and rangeland.

CROPPING SYSTEMS WITH COMPETITIVE CROPS

Intensive cultivation and applications of 2,4-D combined with a competitive crop is the most efficient method of controlling large areas of bindweed. Close drilled crops planted in the fall, such as wheat, oats and barley, are satisfactory competitive crops. Spring-planted



Small bindweed patch controlled with soil sterilants applied prior to regular irrigation.

crops ordinarily are not satisfactory since early growth of bindweed usually depletes soil moisture before such crops make vigorous growth.

Intensive cultivation during fallow periods and the use of 2,4-D both in and between crops in a wheat-fallow rotation ordinarily reduces the stand of bindweed 90 percent or more in the Panhandle of Texas. Thorough sweep cultivation 4 inches deep at 3-week intervals during the fallow period is recommended under usual rainfall conditions. During seasons of favorable rainfall bindweed may make very rapid growth following any particular cultivation. If this happens it is best usually to allow the weed to grow until the runners are 6 to 10 inches long and then treat with 1 pound of 2,4-D per acre. Cultivation following 2,4-D treatment should be delayed 2 weeks after weeds emerge. Spring treatment of bindweed in small grain with $\frac{1}{2}$ pound of 2,4-D per acre before the crop reaches the boot stage is effective in temporarily controlling the weed.

One year of intensive cultivation followed by sweep cultivation every 3 weeks between annual crops of small grain is recommended where a small grain-fallow rotation is unprofitable. In non-cotton growing areas an application of 2,4-D at 1 pound per acre ordinarily can be used to advantage to replace one or more summer cultivations between crops of small grain. Also spring use of 2,4-D at $\frac{1}{2}$ pound per acre prior to the boot stage is recommended for temporary control of this weed in annual small grain crops in non-cotton growing areas.

The growing of annual crops of broadcast forage sorghums on land severely infested with bindweed should be preceded by a year of intensive sweep cultivation or one or more applications of 2,4-D at 1 pound per acre. Temporary control of this weed in growing sorghum can be obtained by applying $\frac{1}{2}$ pound of 2,4-D amine after the sorghum is 3 inches tall and before it reaches the boot stage.

One or more years of intensive cultivation followed by sweep cultivation every 2 weeks between annual crops of fall-sown small grain may be used in many cotton-growing sections of the State for the control of extensive bindweed infestations. Close drilled forage sorghums may be used in a similar manner where rainfall is high and small grains are not well adapted.

The use of 2,4-D and similar herbicides to control bindweed in cotton-growing areas of the State is hazardous.

Amount of 2,4-D commercial solutions required to make spray solutions of various strengths

Lb. 2,4-D acid per gallon as shown on label of container	Lb. of 2,4-D acid per pint of commercial solution	Ounces of 2,4-D commercial solution to give rates per acre as shown			<i>For hand sprayers</i> Thoroughly wet foliage of bindweed. To 1 gal. of water add:
		$\frac{1}{4}$ lb./a	$\frac{1}{2}$ lb./a	1 lb./a	
2.00	.25	16 oz.	32 oz.	64 oz.	2 $\frac{1}{4}$ tsp.
2.64	.33	12 oz.	24 oz.	48 oz.	2 tsp.
3.00	.375	11 oz.	22 oz.	44 oz.	1 $\frac{1}{2}$ tsp.
3.34	.42	10 oz.	19 oz.	40 oz.	1 $\frac{1}{2}$ tsp.
3.50	.44	9 oz.	18 oz.	36 oz.	1 tsp.
4.00	.50	8 oz.	16 oz.	32 oz.	$\frac{3}{4}$ tsp.
6.00	.75	5 oz.	11 oz.	21 oz.	$\frac{1}{2}$ tsp.

NOTE: Remember—16 oz. equals 1 pt. and 32 oz. equals 1 qt. You will need a measure that accurately measures quarts and pints and one that measures ounces.

Recommended weight of dry chemicals to control bindweed

	Lb. per 100 sq. ft.	Lb. per sq. rod	Years sterile
Sodium chlorate	2	5	3
Concentrated Borascu	6	16	5
Atlacide	2 $\frac{1}{2}$	7	3
Polybor Chlorate	4	12	4
Karmex W (3-p-chlorophenyl 1, 1 dimethylurea) (CMU) 6 oz. actual material 2 oz.			after 4 yrs.
May move with irrigation water			

Have You Met



. **YOUR COUNTY EXTENSION AGENTS?**
If not, drop by to see them soon. They represent both the United States Department of Agriculture and The Texas A. & M. College System in your county and they can furnish the latest information on farming, ranching and homemaking.

Most county extension agents have their offices in the county courthouse or agriculture building. Get to know them and take advantage of their services.

This publication is one of many prepared by the Texas Agricultural Extension Service to present up-to-date, authoritative information, based on results of research. Extension publications are available from your local agents or from the Agricultural Information Office, College Station, Texas.