1960

Chemical Weed Control in Field Crops

Cooperative Extension
South Dakota State University

Historical, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

For current policies and practices, contact SDSU Extension

Website: extension.sdstate.edu
Phone: 605-688-4792
Email: sdsu.extension@sdstate.edu

Chemical Weed Control In Field Crops

Keith E. Wallace and Lyle A. Derscheid

Clean seed, proper seedbed preparation, good rotations, and sound soil management practices are prime requisites of controlling weeds in crops They will eliminate many annual weeds and prevent infestation by most perennial weeds. Chemicals are valuable supplements to these practices. However, if we rely on 2,4-D or other chemicals, we at least partially neglect the standard practices. Consequently, weeds resistant to chemicals are allowed to spread.

Once weeds become established, special practices are needed to eliminate them. These practices include the use of special cultivation, competitive crops, and chemicals in addition to the old reliable practices already mentioned. One application of any one method seldom eliminates all perennial weeds. Even though they are eliminated, new weeds come from seeds in the soil. Some of these seeds remain viable for as long as 20 years and many years of diligent work are required to eradicate them.

Numerous tillage and chemical methods that will control weeds in crops are available. In fact, it is possible to eliminate some of the most persistent perennial noxious weeds while growing crops if the proper combination of crops, cultivation, and chemicals is used.

For detailed information on the control or elimination of any of South Dakota's noxious weeds, refer to the circular that discusses the specific weed.

When using chemicals for weed control in crops (small grain especially) it is important to do it at the earliest possible time. This is important for two reasons: (1) the weeds are easier to kill when young (2) the weeds are competing with the crop for moisture and nutrients. If competition is not removed early they will cause yield reductions in the crop. This quite often happens by the time weeds are 6 inches tall.

In experimental work weed-free wheat yielded 45 bushels per acre. Wheat infested with mustard sprayed at the 4-leaf stage yielded 43.5 bushels per acre, sprayed at 6-leaf stage yielded 39.8 bushels per acre, sprayed at flag leaf stage yielded 17.1 bushels per acre, the same as unsprayed wheat.

Crops and weeds get past the most desirable growth stages for spraying quite rapidly. At this time the weeds are not visible from a distance. Therefore, it is necessary to dismount from the car or tractor and walk through the field at early stages of development in order to know the extent of the weed problem as well as the stage of development of crops and weeds.

Stages of Growth in Field Crops

This plant is in the 5-leaf stage of growth.

A plant with 4 leaves and 1 tiller. Also in 5-leaf stage.

A plant with 3 leaves and 2 tillers is in the 5-leaf stage.

Here's a close-up of the late boot stage. In the early boot stage of development, the stem is swollen between the second and third joint.

chemical weed control in crops

Cooperative Extension Service

SOUTH DAKOTA STATE COLLEGE

F. S. 5

Selective Chemical Weed Control in Crops

Noxious Weeds

Crop	Weeds	Time (Most susceptible stage of weed)	Chemical	Rate lbs./A.	Remarks
Small grain	Canada thistle Perennial sow thistle	2-6 inches high (June 1-10)	2,4-D amine for good growing conditions, 2,4-D ester for poor growing conditions	¼	Noxious weeds require higher rates of 2,4-D than the safe rates mentioned for crops in the chart below. As a result one may have to use a more tolerant crop or risk injuring the crop if he wishes to eliminate the weed. Good weed control pays in the long run.
	Field bindweed (Creeping jenny)	Early budding			
	Hoary cress Russian knapweed Leafy spurge	When weed is up and crop is in tolerant stage	2,4-D ester	1	
Corn and Sorghum	All of above weeds	Spring application same as for small grain. Mid-August application same rates using drop nozzles.			

Annual Weeds

Crop	Weeds	Safest time to spray (Most tolerant growth stages of crop)	Chemical	Rate* lbs./A.	Remarks
Oat Varieties Mo-0-205 Garry	Lamb's quarters Marsh elder Annual morning glory Mustards Puncture vine Ragweed* Cinquefoil Cocklebur Wild lettuce Pennycress Peppergrass False flax Annual vetch Annual sow thistle Marc's tail Pigweed Lady's thumb Sunflower Velvet leaf	3-leaf to dough	2,4-D ester 2,4-D or MCPA amine (1)	⅓ ½	
		after dough (2)	2,4-D	1	
Dupree Minhafer Burnett		5-leaf to dough	2,4-D ester 2,4-D or MCPA amine (1)	⅓ ½	
		after dough (2)	2,4-D	1	
Ransom Waubay Newton Andrew		6-leaf to dough	2,4-D ester 2,4-D or MCPA amine (1)	⅓ ½	These varieties may be injured by treatment at 6 leaf to dough stage but weed control should more than off-set yield reductions.
		after dough (2)	2,4-D	1	
Brunker Clinton Bonda Ajax		6-leaf to early boot	2,4-D ester 2,4-D or MCPA amine (1)	⅓ ½	
		after dough (2)	2,4-D	1	
Nemaha Cherokee		after boot begins to swell	2,4-D ester 2,4-D or MCPA amine (1)	⅓ ½	
		after dough (2)	2,4-D	1	
Mindo Marion		after heading after dough (2)	2,4-D 2,4-D	⅓ 1	
Spring wheat and barley	Same as for oats	5-leaf to early boot	2,4-D ester 2,4-D amine	⅓ ½	
		after dough (2)	2,4-D	1	
Winter wheat and rye	Same as for oats	Spring, fully stooled to boot	2,4-D ester 2,4-D amine	⅓ ½	Do not spray in fall.
		after dough	2,4-D (2)	1	
Flax	Marsh elder Lamb's quarters Mustards Pigweeds Ragweed Kochia	Before weeds become 4 inches tall	2,4-D amine	¼	2-4-D may delay maturity from 3-7 days.
	Mustards Lamb's quarters	Before weeds become 4 inches tall	MCPA amine	¼	
	Sunflower Cocklebur	Before weeds become 6 inches tall	2,4-D	⅓	This rate of application is apt to injure the flax but is required to kill the weeds.

Annual Weeds--Con't

Crop	Weeds	Safest time to spray (Most tolerant growth stages of crop)	Chemical	Rate* lbs./A.	Remarks
Flax	Pigweed Ragweed Kochia Marsh elder	After weeds are 4 inches tall	2,4-D	⅓	This rate of application is apt to injure the flax but is required to kill the weeds.
	Broadleaved	After bolls turn brown (2)	2,4-D	½-1	Germination of seed may be reduced if chemical is applied before bolls turn brown.
	Foxtails Barnyard grass	Before weeds are 2 inches tall	TCA Dalapon	5 1	6¼ pounds of 90% sodium salt. 1⅓ pounds of 85% sodium salt.
Corn	Same as for oats	Before silking after several days of cool weather	2,4-D ester 2,4-D amine	¼ ½	
	Foxtails Barnyard grass Lamb's quarters Russian thistle	Pre-emergence	Simazin or Atrazine	2-4	**For trial use only.** Must have ½-1 inch of rainfall within 2½ to 3 weeks after application
	Foxtails Barnyard grass	Pre-emergence	CDAA	4	**For trial use only.** Must have ½ inch of rainfall within the first week after application.
Sorghum	Same as for oats	4-12 inches tall	2,4-D ester 2,4-D amine	⅓ ½	Heights are determined by measuring from ground to where a new leaf is emerging.
	Foxtails Barnyard grass	Pre-emergence	CDAA		**For trial use only.** As for corn.
Sugar Beets	Foxtails Barnyard grass	Just before beets emerge	TCA	5	
		Post-emergence Before weeds are 4 inches tall	Dalapon	2	
	Wild oats	Post-emergence Before weeds are 4 inches tall	Dalapon	4	Beets may be temporarily retarded but soon outgrow effects.
Birdsfoot trefoil Alfalfa Red Clover Alsike Clover Ladino Clover	Lamb's quarters Mustards Ragweeds Pigweeds Marshelder	Seedlings when companion crop or weed canopy is 10-15" tall or established stands right after mowing	2,4-D amine MCPA amine (1)	¼	
Alfalfa Red or alsike clover Birdsfoot trefoil	Kochia Russian thistle Penny cress Lamb's quarters Pigweed Mustards Smartweeds	When legume is 2-4 inches tall	2,4-DB amine 2,4-DB ester	½-1 ½	Will kill tops of bindweed and Canada thistle. Forage from treated crops should not be fed to livestock.
Alfalfa Sweet clover Birdsfoot trefoil	Foxtails Barnyard grass (not wild oats)	Seedlings alone or in flax, established stand after mowing	Dalapon TCA	1 5	Forage from treated crops should not be fed to livestock.
Grasses Seedlings	Broadleaved	After 4-leaf stage	2,4-DB 2,4-D MCPA	½-1 ¾ ¾	
Established stands	Broadleaved	Any time (except heading time for seed fields) best weed control in June	2,4-D MCPA 2,4,5-T	2 2 2	

*Rate per acre, maximum pounds of 2,4-D or MCPA acid equivalent that have been applied at tolerant stages of growth without reducing crop yield.

(1) MCPA is not so apt to injure the crop; however, it is less effective as a weed killer. Use only if mustards or lambsquarters are predominant weed species.

(2) Treatment at this stage will not remove weed competition early enough to improve crop yield, however, it may prevent weed seed production and will facilitate harvesting operations.

Sprayer Adjustment And Chemical Measurement

It is essential that a sprayer operator knows how much spray is being applied per acre. It is also essential to mix the water and chemical in the right proportions. If this is not done, the operator runs the risk of injuring his crop with too much spray or getting poor weed control with too little chemical. He must, therefore, calibrate his sprayer carefully and measure his chemical accurately.

Sprayer Calibration

Step 1. Select an area for a test run that is similar to the field to be sprayed. Accurately measure a distance of one-eighth mile or 660 feet.

Step 2. Place the sprayer on level ground and fill the tank with water. It is best to fill it to the brim.

Step 3. Spray the test run, using the same gear and throttle setting on the tractor that will be used when spraying —usually 3 to 5 miles per hour. Also use the same spray pressure that will be used when spraying—somewhere between 30 and 50 pounds.

Step 4. Return the sprayer to the original filling position, on level ground, and measure the amount of water required to refill the tank to the brim.

Step 5. Multiply "66" times the amount of water required to fill the sprayer. Divide this answer by the width of the spray swath. This gives the gallons applied per acre.

Step 6. Determine the number of acres that can be sprayed with one sprayer tankful of spray. Divide the number of gallons in the tank by the number of gallons applied per acre.

Measurement of Chemical

Step 7. Determine the amount of chemical needed per acre by checking in this circular to see how much chemical is needed to kill the weed in question and also check to see if the crop will tolerate this amount.

Step 8. Use the table to determine the number of quarts or pints required to fill the sprayer.

Step 9. Calculate the number of pints needed in the sprayer. Multiply the acres that can be sprayed with one tankful of spray by the number of pints required per acre.

CALCULATING THE AMOUNT OF CHEMICAL TO APPLY PER ACRE

If You Wish to Apply This Many Pounds Per Acre	Your Chemical Contains This Much 2,4-D Acid Equivalent or MCP Acid Equivalent or 2,4,5-T Acid Equivalent per Gallon				Your Chemical Contains 85% Sodium Salt of Dalapon. Apply This Amount on Each Acre
	2.64 or 2.68	3.00	3.34 or 3.40	4.00	
	Apply This Amount on Each Acre				
⅛	⅜ pt.	⅓ pt.	3/10 pt.	¼ pt.	
¼	¾ pt.	⅔ pt.	⅜ pt.	½ pt.	
⅓	1 pt.	8/9 pt.	7/9 pt.	⅔ pt.	
½	¾ qt.	⅔ qt.	1⅓ pt.	1 pt.	
¾	1 1/7 qt.	1 qt.	9/10 qt.	1½ pt.	
1	1½ qt.	1⅓ qt.	1⅓ qt.	1 qt.	1⅓ lb.
2	3 qt.	2⅔ qt.	2⅔ qt.	2 qt.	2⅔ lb.
5					6⅔ lb.
10					13⅓ lb.

EXTENSION SERVICE, SOUTH DAKOTA STATE COLLEGE OF AGRICULTURE AND MECHANIC ARTS, BROOKINGS, SOUTH DAKOTA

Published and distributed under Acts of Congress, May 8 and June 30, 1914, by the Agricultural Extension Service of the South Dakota State College of Agriculture and Mechanic Arts, Brookings, John T. Stone, Director, U. S. Department of Agriculture cooperating.

5M Jan. 1960 (File 15.20)