

Weed Control in Small Grains

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Effective weed control in field crops can usually be accomplished with a combination of cultural, mechanical, and chemical practices. In row crops, tillage can be an integral part of weed control. However, in close-sown small grain crops, tillage is not feasible, except that early germinating weeds may be destroyed by tillage during seedbed preparation. Therefore, more dependence on cultural and chemical weed control practices is needed.

Cultural Practices

Sowing clean seed at an adequate seeding rate will help to reduce weed populations in small grains. Also, small grain must be seeded early so the cool season small grain crop can compete effectively with weeds. Early spring seeding reduces warm season annual grass weed problems, such as foxtail, that are increased by late seeding. However, early spring seeding does not help to reduce wild oats or most annual or perennial weed problems. These weeds must be controlled with herbicides because delayed seeding with repeated tillage to control these weeds results in reduced small grain yields.

Perennial Weed Control

Most herbicides available for use in small grains will control annual weeds at safe usage rates for small grain, but will not control established perennials. Perennial weeds such as Canada thistle or quackgrass should be controlled prior to (preferably the year before) seeding small grains. Glyphosate (Roundup) may be used to control most perennials prior to seeding small grain. (See herbicide label.) Also, many perennial broadleaf weeds can be controlled with 2,4-D or dicamba (Banvel) in the fall prior to seeding small grain.

Herbicides for Weed Control in Small Grains

(This folder summarizes herbicide treatments controlling weeds in small grains. For additional information, refer to herbicide labels.)

Herbicide use on small grains in Minnesota is extensive, with more than 75 percent of the acreage treated annually. However, several weeds are not being effectively controlled (Table 1).

Table 1. The ten most prevalent weeds in small grain in Minnesota with current weed control practices (1979 survey - 1,021 fields sampled).

Weed species	% fields infested	Weed density infested fields (plants/m ²)
Green foxtail	60	35
Common lambsquarters	56	9
Smartweed sp.	55	7
Wild buckwheat	53	7
Yellow foxtail	47	42
Pigweed sp.	44	6
Canada thistle	39	2
Wild oat	30	6
Wild mustard	28	3
Ragweed sp.	27	10

Spring Wheat, Durum Wheat, Oats, and Barley

If small grain is not underseeded with a legume, more herbicides and higher rates may be used. (See tables 2 and 4.)

Winter Wheat and Rye

For winter wheat and rye, apply all weed control chemicals except triallate in the spring only. Apply triallate in either fall or spring. (See table 4.)

Consider Effectiveness and Tolerance

Accurately identify the weed problem and then select the most effective herbicide. (See table 5.) Consider crop tolerance as well as effectiveness, however. (See table 6.) See table 7 for common names and trade names of herbicides and their formulations.



Wild mustard and wild buckwheat control in wheat requires a combination of herbicides.

Table 2. Suggestions for chemical weed control in spring-sown small grains not underseeded with a legume

Chemicals ¹	Pounds per acre of acid equivalent or active ingredient broadcast	Time of application	Remarks	Environmental Protection Agency limitations on use
<i>Spring or durum wheat or barley</i>				
2,4-D amine	¼ to 2/3	After tillering to early boot.	For broadleaves; amine is less injurious to crop.	Do not graze for 2 weeks after treatment.
2,4-D ester	1/6 to ½			
MCPA amine	¼ to 2/3	Two-leaf to early boot.		None
MCPA ester	1/6 to ½			
bromoxynil	¼ to ½	Two-leaf to early boot.	For broadleaves; best control is when weeds are small. Bromoxynil is effective on smartweeds and wild buckwheat, and may be tank-mixed with diclofop.	Do not graze for 30 days after treatment.
bromoxynil and MCPA esters	¼+¼	Three-leaf to early boot.		
Chlorsulfuron	1/96 to 1/32	Preemergence or postemergence	For broadleaves and grasses; follow label directions to avoid carry-over injury to sensitive crops.	None
picloram and 2,4-D amine	1/64 to 3/128+ ¼ to ⅝	Four-leaf to early boot.	Picloram may persist in the soil to harm most broadleaf crops the following year. See label.	None
triallate	1 to 1½ (wheat) 1¼ to 1½ (barley)	Fall—granules preferred. Apply just before freezeup and, if possible, single pass incorporate. Use shallow tillage in spring. Spring—Preplanting or postplanting incorporation for barley. Postplanting incorporation only for spring or durum wheat.	For wild oat control. Must be incorporated into soil except for fall-applied granules. Use higher rates for granules, lower rates for liquid. Liquid may be tank-mixed with trifluralin on spring wheat or barley.	Do not graze livestock on treated areas.
diallate	1¼ (barley)	Fall—Apply and incorporate. Spring—Use postplanting incorporation.	For wild oat control.	None
barban	¼ to ⅝	When wild oat is in two-leaf stage. Two sequential applications at ¼ lb./A each or one "late" application of up to ½ lb./A permitted. See label.	For wild oat control. Use high rate on wild oat populations over 50 plants/sq. ft. and on semidwarf wheats.	Do not graze treated fields until after harvest.
difenzoquat	5/8 to 1	When wild oat is in three- to five-leaf stage.	For wild oat control. Use higher rates for higher density stands of wild oat. May be tank-mixed with MCPA and/or bromoxynil and with 2,4-D.	Do not graze treated fields or cut for silage. Grain and straw can be fed. Use only on barley, and on durum wheat and spring wheat varieties listed on the label.
diclofop	¾ to 1¼ (wheat) ¾ to 1 (barley)	One- to four-leaf stage of grass weeds (wheat). One- to three-leaf stage of grass weeds (barley).	For annual grass weeds including wild oat. Use high rate for larger weeds. Tank mix only with bromoxynil. Do not apply other broadleaf herbicides within one week of diclofop application.	Do not graze treated areas or harvest forage from treated fields prior to grain harvest.
trifluralin	½ to ¾	Postplanting incorporation in spring, or granules may be applied and shallowly incorporated in fall.	Improper application may result in crop injury. See label. Liquid formulation may be tank-mixed with triallate.	None
<i>Spring or durum wheat or oats</i>				
dicamba and MCPA	⅝ + ¼	Two- to five-leaf stage.	Dicamba is effective on wild buckwheat or smartweeds.	Do not graze or feed forage to dairy animals prior to crop maturity.
<i>Spring wheat</i>				
propanil	1½	Three- to five-leaf stage of wheat.	For annual grasses and certain broadleaves. May cause wheat injury or a delay in maturity.	Do not graze treated crop or cut for green chop feed.
propanil + MCPA isooctyl ester	1⅝+¼	Two- to four-leaf stage of grass weeds.		
<i>Oats</i>				
2,4-D amine	¼ to ½	Six-leaf to early boot.	MCPA is less injurious to crop.	Do not graze for 2 weeks after treatment.
MCPA amine	¼ to 2/3	Two-leaf to early boot.	Bromoxynil for smartweeds or wild buckwheat.	None
MCPA ester	1/6 to ½			None
bromoxynil	¼ to ⅝			Do not graze for 30 days after treatment.

¹See table 7 for trade names of herbicides and their formulations.

Table 3. Suggestions for chemical weed control in spring-sown small grains underseeded with a legume

Chemicals	Pounds per acre of acid equivalent broadcast	Time of Application	Remarks	Environmental Protection Agency limitations on use
<i>Spring-sown wheat, oats, and barley</i>				
2,4-D or MCPA amine	½ to ¾	Six-leaf to early boot stage of small grain. Not before clover is 2 inches tall.	Legumes injured, canopy of crop or weeds reduces injury. Do not use on sweet clover.	Do not graze dairy animals on treated areas for 14 days after application of 2,4-D.
diallate	1¼	Incorporate into the soil after planting but before emergence.	For wild oat control in barley underseeded to a legume.	None

Table 4. Suggestions for weed control in winter wheat and rye

Chemicals	Pounds per acre of acid equivalent broadcast	Time of application	Remarks	Environmental Protection Agency limitations on use
<i>Winter wheat or rye</i>				
2,4-D amine	½ to ¾ } ¼ to ½ }	In spring, after grain is fully tillered, but before boot stage.	For broadleaves.	Do not graze for 2 weeks after treatment with 2,4-D. None for MCPA.
2,4-D ester				
MCPA amine or ester	¼ to ¾ }	After wheat is fully tillered to boot stage.	For broadleaves.	Do not forage or graze for 30 days after treatment with bromoxynil.
bromoxynil	¼ to ½ }			
bromoxynil+ MCPA ester	¼+¼ }			
<i>Winter wheat only</i>				
dicamba+2,4-D amine	⅙+¼ to ⅝	After winter dormancy until wheat begins to joint.	For broadleaves.	Do not graze dicamba-treated fields or harvest for dairy feed prior to crop maturity.
dicamba+MCPA amine	⅙+¼ to ⅝			
diclofop	¾ to 1¼	When grass weeds are in the one- to four-leaf stage.	For annual grass control. May be tank-mixed with bromoxynil.	Do not graze treated fields or harvest treated forage prior to grain harvest.
difenzoquat	5/8 to 1	When wild oat is in three- to five-leaf stage.	For wild oat control.	Do not graze treated fields or cut for silage. Grain and straw can be fed.
triallate	1¼ (liquid) 1¼ to 1½ (granules)	Must be incorporated into soil after application. Apply preplanting or postplanting.	For wild oat control.	Do not graze livestock on treated areas.
barban	¼ to ⅝	When wild oat is in two-leaf stage.	For wild oat control. Use high rate for wild oat populations over 50 plants/sq. ft. Sequential applications may be made if necessary. See label.	Do not graze treated fields until after harvest.
picloram+2,4-D amine	1/64 to 3/128+ ¼ to ⅝	Four-leaf to early boot.	For broadleaf weeds. May persist in the soil. Use only where a grass or grain crop will be planted the following year; one application per year.	None

Caution

Avoid repeated and prolonged contact with all herbicides, especially direct contact with skin and eyes. Check label directions and restrictions. Avoid wind drift of herbicides to susceptible crops and ornamentals.

Table 5. Effectiveness of herbicides on major weeds in small grains

	trifluralin (Treflan)	triallate (Far-go)	diallate (Avadex)	2,4-D amine or ester	MCPA amine or ester	bromoxynil (Brominal/ Buctril)	dicamba (Banvel)	picloram (Tordon 22K)	barban (Carbyne)	difenzoquat (Avenge)	diclofop (Hoelon)	propanil (Stampede)	Chlorsulfuron (Glean)
Grasses													
Green foxtail	G	N	N	N	N	N	N	N	N	N	G	G	G
Yellow foxtail	G	N	N	N	N	N	N	N	N	N	F	G	G
Barnyard grass	G	N	N	N	N	N	N	N	N	N	G	G	G
Wild oat	P	G	G	N	N	N	N	N	G	G	G	P	P
Broadleaves													
Wild mustard	N	N	N	G	G	F	P	P	N	N	N	F	G
Wild buckwheat	P	N	N	F	F	G	G	G	N	N	N	G	G
Lambsquarters	G	N	N	G	G	G	G	F	N	N	N	G	G
Pigweed	G	N	N	G	G	G	G	F	N	N	N	G	G
Smartweed (annuals)	P	N	N	F	F	G	G	P	N	N	N	P	G
Common ragweed	N	N	N	G	G	G	G	F	N	N	N	P	G
Giant ragweed	N	N	N	G	G	G	G	F	N	N	N	P	G
Kochia	P	N	N	G	G	G	G	F	N	N	N	F	G
Marshelder	P	N	N	G	G	G	G	F	N	N	N	P	—
Canada thistle	N	N	N	F	F	N	G	P	N	N	N	N	G
Perennial sowthistle	N	N	N	F	F	N	G	P	N	N	N	N	F

G=good; F=fair; P=poor; N=no control; —=inadequate information.
 Effectiveness ratings apply if herbicide is used according to label recommendations as to rate, time of application, etc., and if favorable temperature and moisture conditions prevail.

Table 6. Crop tolerance and herbicide clearance¹

Herbicides	Oats	Wheat	Barley	Rye
2,4-D amine	F	G	G	G
2,4-D ester	P	F	G	F
MCPA amine	G	G	G	G
MCPA ester	G	G	G	G
bromoxynil	G	G	G	G
dicamba	G	F	P	—
triallate	—	G	G	—
diallate	—	F	F	—
barban	—	F	F	—
difenzoquat	—	*	G	—
trifluralin	—	F	F	—
picloram	—	G	G	—
propanil	—	F	—	—
diclofop	—	G	G	—
chlorsulfuron	—	G	G	—

¹P=poor; F=fair; G=good; —=not cleared for use.
 *Good tolerance on winter wheat, and on spring wheat and durum wheat varieties listed on the label. Not cleared for use on other spring wheat varieties. See label.

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Table 7. Herbicide names and formulations used in small grains

Common name	Trade name	Concentration and commercial formulation ¹
barban	Carbyne, Carbyne 2EC	1 lb./gal. L, 2 lb./gal. L
bromoxynil	Buctril, Brominal	2 lb./gal. L, 4 lb./gal. L
bromoxynil and MCPA	Bronate, Brominal Plus	2 or 3 lb./gal. MCPA+ 2 or 3 lb./gal. bromoxynil L
diclofop	Hoelon	3 lb./gal. L
diallate	Avadex	4 lb./gal. L 10% G
dicamba and MCPA	MonDak, Banvel M	1.25 lb./gal. dicamba+ 2.50 lb./gal. MCPA L
chlorsulfuron	Glean	75% DF
difenzoquat	Avenge	2 lb./gal. L
MCPA	Several, mixtures	See product label.
triallate	Far-go, Avadex-BW	4 lb./gal. L 10% G
2,4-D	Several	See product label.
trifluralin	Treflan	4 lb./gal. L
picloram	Tordon 22K	2 lb./gal. L
propanil	Stampede	3 lb./gal. L

¹G=granular; L=liquid; DF=dry flowable.

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