

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



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

Spring Wheat, Durum Wheat, Oats, and Barley

If small grain is not underseeded with a legume, more herbicides and higher rates may be used (Table 2). Table 3 includes herbicides that can be used when legumes are underseeded.

Winter Wheat and Rye

For winter wheat and rye, apply most weed control chemicals in the spring. Apply triallate, bromoxynil or chlorsulfuron to winter wheat, not rye, in either fall or spring (Table 2).

Consider Effectiveness and Tolerance

Accurately identify the weed problem and then select the most effective herbicide (Table 4). Consider crop tolerance as well as effectiveness of the herbicide (Table 5). See Table 6 which lists common names and trade names of herbicides and their formulations.

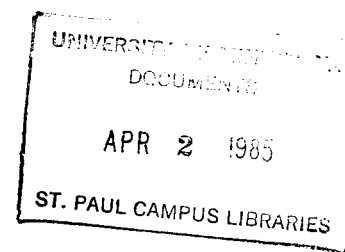


Table 2. Herbicide choices for use in durum, winter or spring wheat, oats, barley, and rye with no underseeded legumes.

Herbicide	Active ingredient (lb/A) or (formulation/A)	Remarks
No-Till or Minimum Till		
Chlorsulfuron (Glean)	.016 to .05 (.33 to .5 oz)	Controls broadleaves and grasses, except wild oats. Apply during fallow in the fall or spring prior to seeding wheat. Do not use on soils over pH 7.5. See rotational crop restrictions on the label that are required due to carryover. Do not use on rye.
Glyphosate (Roundup) <i>Labeled mixtures*</i> Dicamba (Banvel) 2,4-D	.19 to .75 (.5 to 2 pts) (.12 to .25) (.25 to .5)	Controls emerged grass and broadleaf weeds with no soil residual. Apply prior to grain emergence. Add surfactant at lower herbicide rates. Avoid spray drift. Improves control of emerged broadleaf weeds when low glyphosate rates used. Improves control of emerged broadleaf weeds when low glyphosate rates used.
Paraquat (Paraquat Plus, Gramoxone)	.25 to .5 (1 to 2 pts)	Controls emerged grasses and broadleaf weeds with no soil residual. Apply prior to grain emergence. Add surfactant. <i>Restricted Use Pesticide</i>
Preplant Incorporated or Preemergence		
Chlorsulfuron (Glean)	.008 to .02 (.16 to .5 oz)	For broadleaf weeds and grasses except wild oats in winter or spring wheat and barley only. Apply in fall or spring. Use shallow tillage only after application. Do not use on soils over pH 7.5. See label for rotational crop restrictions due to carryover.
Diallate (Avadex)	1.25 (1.25 qts)	For wild oat control in barley. Apply preplant incorporated in the fall or in the spring after seeding barley. <i>Restricted Use Pesticide</i>
Triallate (Far-Go EC) (Far-Go Gran)	1 to 1.5 (1 to 1.5 qts) (10 to 15 lbs)	For wild oat control in durum, winter or spring wheat and barley applied fall or spring before or after seeding. Use higher rate on barley only.
Trifluralin (Treflan) (Treflan 10G) <i>Labeled mixture*</i> Triallate (Far-Go)	.5 to .75 (1 to 1.5 pts) (5 to 7.5 lbs) 1	For annual grasses, except wild oats and some broadleaves in durum or spring wheat and barley. Apply fall, granules preferred, or postplant spring, liquid formulation preferred. Must be incorporated. Adds wild oat control in spring applications to durum or spring wheat and barley.
Postemergence		
Barban (Carbyne 2EC) <i>Labeled mixtures*</i> Bromoxynil (Buctril, Brominal) Chlorsulfuron (Glean) Diclofop (Hoelon)	.25 to .75 (1 to 1.5 pts) .25 .008 to .024 .25 to .5	Postemergence control of wild oats only in all wheats and barley. Apply to wild oats in the 2-leaf stage. Adds control of emerged annual broadleaf weeds. Adds broadleaf weed control. See label for rotational crop restrictions. Improves wild oat and adds annual grass control in wheat and barley. <i>Restricted Use Pesticide</i>
Difenzoquat (Avenge)	.25 to .5	Improves wild oat control.
Bromoxynil (Brominal ME4) (Buctril) <i>Labeled mixtures*</i> Barban (Carbyne) Chlorsulfuron (Glean) Dicamba (Banvel) Diclofop (Hoelon) Difenzoquat (Avenge) MCPA 2,4-D	.25 to .5 (.5 to 1 pt) (1 to 2 pts) .38 .01 to .02 .06 to .12 .75 to 1.25 .62 to 1 .25 to .5 .25 to .5	Postemergence control of most small annual broadleaf weeds in wheat, oats, and barley. May also be applied to winter wheat and rye in the fall for control of winter annuals. Adds postemergence control of wild oats in the 2-leaf stage in wheat and barley. Adds residual weed control in wheat and barley. See rotational crop restriction on label. Improves broadleaf weed control in all wheats and oats. May injure barley. Adds wild oat and foxtail control in wheat and barley. <i>Restricted Use Pesticide</i> Adds wild oat control in barley and wheat. See label for wheat variety tolerance. Improves broadleaf weed control, especially perennials. Improves broadleaf weed control, especially perennials.
Chlorsulfuron (Glean) <i>Labeled mixtures*</i> Barban (Carbyne) Bromoxynil (Brominal, Buctril) Dicamba (Banvel) Difenzoquat (Avenge)	.008 to .02 (.16 to .5 oz) .25 to .75 .25 .06 to .12 .62 to 1	Controls broadleaf weeds and suppresses grasses, except wild oats in durum, winter or spring wheat and barley. Do not use on soils over pH 7.5. See label for rotational crop restrictions due to carryover. Adds wild oat control in all wheats and barley. Apply to wild oats in the 2-leaf stage. Improves broadleaf weed control. Apply postemergence to small weeds. Improves broadleaf weed control in durum, spring or winter wheat. Adds wild oat control in durum or spring wheat and barley. See difenzoquat label for wheat variety clearances.
Dicamba (Banvel) (Banvel II) <i>Labeled mixtures*</i> Chlorsulfuron (Glean)	.06 to .12 (.12 to .25 pt) (.25 to .5 pt) .008 to .02	Controls many broadleaf weeds including wild buckwheat and smartweeds in durum, winter or spring wheat and oats. See label for crop growth stage restrictions. Used most frequently in tank mixes. Lower dicamba rates used in tank mixes. Avoid spray drift onto nearby sensitive plants. Adds residual weed control and annual grass suppression, except wild oats. See rotational crop and pH restrictions on the label.
MCPA (Mondak) 2,4-D	.25 to .38 .25 to .38	Improves broadleaf weed control, especially wild mustard. Improves broadleaf weed control, especially mustard. Do not use on oats.
Diclofop (Hoelon) <i>Labeled mixture*</i> Bromoxynil (Buctril, Brominal)	.75 to 1.25 (2 to 3.3 pts) .37 to .5	Controls wild oat and other annual grasses in durum, winter or spring wheat and barley. Use lower rate in barley. <i>Restricted Use Pesticide</i> Adds broadleaf weed control.

Difenzoquat (Avenge) <i>Labeled mixtures*</i>	.62 to 1 (2.5 to 4 pts)	For wild oat control only in durum, winter or spring wheat and barley. See difenzoquat label for use limitations on wheat varieties.
Bromoxynil	.375 to .5	Adds broadleaf weed control.
Chlorsulfuron (Glean)	.008 to .02	Adds broadleaf control and grass suppression. See label for rotational crop and soil pH restrictions.
MCPA	.25 to 1	Adds broadleaf weed control.
2,4-D	.25 to .75	Adds broadleaf weed control.
MCPA (Amines) (Esters)	.25 to .66 .16 to .5	Controls many broadleaf weeds in all small grains. Apply from 2-leaf to early boot stage of crop. Safer to grain than 2,4-D or dicamba. Use lower rates of the ester formulations. Weak on wild buckwheat and smartweeds. Avoid drift onto nearby sensitive crops.
<i>Labeled mixtures*</i>		
Bromoxynil (Buctril, Brominal)	.25 to .38	Improves control of wild buckwheat and smartweeds.
Dicamba (Banvel, Banvel II)	.12	Improves control of wild buckwheat and smartweeds.
Propanil	.94	Adds foxtail control when treated in the 1- to 3-leaf stage. Use with lowest rate, .25 lb/A, of MCPA on durum, spring wheat and barley. Temporary yellowing of grain may occur.
2,4-D (Amines) (Esters)	.25 to .66 .16 to .5	Controls many broadleaf weeds in all small grains but weak on wild buckwheat and smartweeds. Oats more sensitive to 2,4-D. Use lower rates of ester formulations. Avoid drift onto nearby sensitive crops.
<i>Labeled mixtures*</i>		
Bromoxynil (Buctril, Brominal)	.25 to .38	Improves control of wild buckwheat and smartweeds.
Dicamba (Banvel, Banvel II)	.12	Improves control of wild buckwheat and smartweeds. Barley may be injured.
Picloram (Tordon)	.015 to .023	Improves control of wild buckwheat in wheat and barley. Picloram is persistent and will carry over in the soil. Do not rotate other crops on treated grain fields. Not cleared for use on durum wheat or oats. <i>Restricted Use Pesticide</i>

*Follow label directions and precautions of all products in a mixture.

Table 3. Herbicide choices for weed control in spring sown small grains underseeded with legumes.

Herbicide	Active ingredient, lb/A or (formulation/A)	Remarks
Diallate (Avadex)	1.25 (1.25 qts)	Use on barley only for wild oat control. Apply preplant incorporated in the fall or in the spring after the barley is seeded. <i>Restricted Use Pesticide</i>
MCPA (Amine)	.12 to .25	Postemergence control of broadleaf weeds. Legumes injured but usually recover. Use on heavy stands of broadleaf weeds. Do not use on sweet clover. Canopy of grain or weeds reduces legume injury.
2,4-D (Amine)	.12 to .25	Postemergence control of broadleaf weeds. Legumes may be severely injured so use only on heavy infestations of broadleaf weeds. Do not use on sweet clover. Canopy of grain or weeds reduces legume injury.

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 4. 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	P	F	G	G	G	F	N	N	N	G
Lambsquarters	F	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	F	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	G
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
Sunflower	N	N	N	G	F	G	G	F	N	N	N	F	G
Russian thistle	F	N	N	F	N	G	F	F	N	N	N	P	G
Field bindweed	N	N	N	G	G	P	G	P	N	N	N	N	F
Eastern black nightshade	N	N	N	G	G	G	G	F	N	N	N	P	N
Cocklebur	N	N	N	G	G	G	G	F	N	N	N	F	G

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 5. 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.

Table 6. Herbicide names and formulations used in small grains

Common name	Trade name	Concentration and commercial formulation ¹
barban	Carbyne, Carbyne 2 EC	1 lb./gal. L, 2 lb./gal. L
bromoxynil	Buctril, Brominal ME4	2 lb./gal. L 4 lb./gal. L
bromoxynil and MCPA	Bronate, Brominal Plus	2 + 2 lb./gal. MCPA + bromoxynil 3 + 3 lb./gal. MCPA + bromoxynil L
diclofop	Hoelon	3 lb./gal. L
diallate	Avadex	4 lb./gal. L 10% G
dicamba + MCPA	MonDak	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	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.

Read the pesticide label and follow the instructions as a final authority on pesticide use.

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