Chemical Weed Control in Small Grain and Flax 1981

Cooperative Extension South Dakota State University

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Chemical Weed Control in Small Grain and Flax 1981
Herbicides are a valuable supplement to and not a replacement for good rotations, clean seed, proper seedbed preparation, tillage, and crop competition.

**Herbicide Suggestions**

Information in this publication is based on research by the South Dakota Agricultural Experiment Station and other research or observations. Herbicides are included only after the chemical is registered by the Environmental Protection Agency (EPA) as to residue tolerances in crops used for food or feed.

This information provides a summary of herbicide uses and does not imply a guarantee or responsibility for results. Tradenames are for reader convenience and do not imply product endorsement. Users are responsible for following label directions and precautions.

**OATs (not underseeded to legumes)**

**MCPA AMINE or MCPA ESTER**

0.5-1 pt MCPA amine-4 lb/gal or 0.5-0.75 pt MCPA ester-4 lb/gal (0.8-1.5 or 0.9-1.5 act.)

**SOME BROADLEAVES**

Apply at 3- to 4-leaf stage of crop. At other growth stages, crop is more tolerant to the treatment than to other treatments. Crop least tolerant at boot to heading. Weeds must be small. MCPA is equal to 2,4-D on wild mustard, lambsquarters, and Canada thistle. MCPA is less effective than 2,4-D on larger broadleaved weeds. Poor control of kochia and wild buckwheat. Most situations require 0.5-1 pt/A. Do not graze dairy or slaughter animals on treated areas for 2 weeks after treatment.

**2,4-D AMINE**

0.5-0.75 pt 2,4-D amine-4 lb/gal (0.8-1.3 act.)

**BROADLEAVES**

Apply at 3- to 4-leaf stage of crop. Do not apply at boot to heading. Less crop tolerance than to MCPA. Oat varieties vary in tolerance to 2,4-D. Very good control of several annual broadleaves. Weak on wild buckwheat and kochia. Use higher rate for larger weeds or for perennials, but risk of crop injury increases. Do not graze dairy or slaughter animals on treated areas for 2 weeks after application.

Harvest aid application of 1 lb/A acid equiv. may be made after the dough stage. Straw should not be used for feed.

**BANVEL (DICAMBA)**

0.5 pt Banvel-4 lb/gal (1/8 act.)

Wild Buckwheat, Some Annual Broadleaves

Apply at 2- through 4-leaf stage of crop. Do not apply after the 4-leaf stage. Marginal crop tolerance. Excellent wild buckwheat and good kochia control. Does not control wild mustard. Usually used in a tank-mix with MCPA. Minimum carrier is 5 gpa for ground and 3 gpa for aerial. Do not graze or harvest forage for dairy feed prior to milk stage of kernel development.

**BANVEL + MCPA AMINE**

1/8-1/4 pt Banvel-4 lb/gal + 0.4-0.75 pt MCPA-4 lb/gal (1/16-1/8 + 1/4-3/8 act.)

Wild Buckwheat, Several Annual Broadleaves

Tank-mix. Apply at 3- to 4-leaf stage of crop. Do not apply after the 4-leaf stage. Marginal crop tolerance. Use high rate of dicamba for best kochia control. Lower rates preferred for small weeds and better crop tolerance. Application directions and restrictions as for dicamba alone.

**BROMINAL or BUCTRIL (BROMOXYNIL)**

1-1.5 pt Brominal-2 lb/gal or 1-2 pt Buctril-2 lb/gal (1/4-3/8 or 3/8 act.)

Wild Buckwheat, Some Annual Broadleaves

Apply at 2-leaf to early boot stage of crop. Fair crop tolerance. Risk of leaf burn under hot, humid conditions. Use lower rates for maximum crop safety. Excellent wild buckwheat and good kochia control. Very good control of several other annual broadleaves. Primarily for heavy infestations of kochia or wild buckwheat. Not effective on perennials. Good coverage required. Minimum carrier is 10 gpa for ground and 2-4 gpa for Brominal or 5 gpa for Buctril with aerial application. Brominal may be tank-mixed with ½ pt/A MCPA to improve mustard control. Apply combination at 4- to 5-leaf crop stage. Do not graze for 30 days after application.

**FOLLOW THE LABEL**

Federal regulations make it unlawful for any person to use an herbicide in a manner inconsistent with its labeling. This includes the kind of crop and weed, rate, carrier and other application directions; storage, disposal, and protective clothing; or other precautions stated.

**TIME TO APPLY.** The best time to apply most treatments is based on crop and/or weed growth stage. Refer to Figure 1 to determine crop leaf stage. Some herbicides are applied preemergence (after planting but before weeds or crop emerge). Some must be incorporated. Others are applied preplant incorporated (before planting).
OATS (continued)

TORDON 22K + MCPA AMINE (PICLORAM + MCPA)

1 fl oz Tordon 22K-2lb/gal + 1/2-½ pt MCPA amine-4lb/gal (1/64 + 1/4-3/8 act.)

WILD BUCKWHEAT, SOME ANNUAL BROADLEAVES

Tank-mix. Apply at 3- to 5-leaf stage of crop when weeds are small. Excellent on wild buckwheat. Also controls some annual broadleaves such as mustard and lambquarters. Poor kochia control. Used primarily where wild buckwheat is the major problem. Good crop tolerance. Do not plant susceptible broadleaved crops such as alfalfa, sunflowers, or soybeans the following year. Minimum carrier is 5 gpa for ground and 1 gpa for air. Consult label for all application directions and restrictions. Special Local Needs state registration. Restricted Use pesticide. Crop use restrictions as for MCPA alone.

WINTER WHEAT and RYE

2,4-D AMINE or 2,4-D ESTER

½-1½ pt 2,4-D amine-4lb/gal (¼-½ act.)
½-1 pt 2,4-D ester-4lb/gal (¼-½ act.)
½-1½ pt 2,4-D ester-6lb/gal (¼-½ act.)

BROADLEAVES

Apply in spring when crop is fully tilled until early boot stage. Do not apply before tillering or in boot stage. Better crop tolerance with amine. Very good control of several broadleaved weeds; less satisfactory for kochia or wild buckwheat. Best treatment for broadleaved perennials. Lower rates are for small, susceptible annuals and higher rates for larger broadleaved annuals or for perennials. Rate of ½ lb/A acid equiv. ester or ½ lb/A acid equiv. amine has been satisfactory for most general broadleaved problems. Do not graze dairy or slaughter animals on treated areas for 2 weeks after application. Harvest aid application of 1 lb/A acid equiv. may be used after dough stage. Straw should not be used for feed.

TORDON 22K + 2,4-D or MCPA (PICLORAM + 2,4-D or MCPA)
(wheat only)

1-1½ fl oz Tordon 22K-2lb/gal + ½-1½ pt 2,4-D or MCPA-4lb/gal (1/64-1/48 + 1/4-3/8 act.)

WILD BUCKWHEAT, SOME ANNUAL BROADLEAVES

Tank-mix. Apply in spring after tillering to early boot. Excellent for wild buckwheat. Ester or amine forms of 2,4-D or MCPA improve control of other broadleaves. Poor kochia control. Used primarily where wild buckwheat is the major problem. Lower rates are for small weeds. Good crop tolerance. MCPA or 2,4-D amine in tank-mix offers best crop tolerance. Use proportionately less 2,4-D for 6 lb/gal product. Do not plant susceptible broadleaved crops such as alfalfa, sunflowers, or soybeans the following year. Minimum carrier is 5 gpa for ground and 1 gpa for air. Consult label for all application directions and precautions. Special Local Need state registration. Restricted Use pesticide. Crop use restrictions as for 2,4-D or MCPA alone.

BROMINAL or BUCTRIL (BROMOXYNIL)

1-1½ pt Brominal-2lb/gal or 1½ pt Buctril-2lb/gal (1/4-3/8 or 3/8 act.)

WILD BUCKWHEAT, SOME ANNUAL BROADLEAVES

Apply in spring at 2-leaf to early boot stage of crop. Very good crop tolerance. Excellent on wild buckwheat. Normally used with MCPA or 2,4-D for broad spectrum control. Good coverage required. Minimum carrier is 10 gpa for ground and 2-4 gpa for Brominal or 5 gpa for Buctril for aerial application. Do not graze for 30 days after treatment.

BRONATE or BROMINAL PLUS
(wheat only)

1-1½ pt Bronate-2+2lb/gal or 1½ pt Brominal Plus-2+2lb/gal (1/4-3/8 + 1/4-3/8 act.)

WILD BUCKWHEAT, SEVERAL ANNUAL BROADLEAVES

Commercial premix of bromoxynil + MCPA ester. Apply in spring at 2-leaf to early boot stage of crop. Broad spectrum weed control with good crop tolerance. Excellent wild buckwheat and good kochia control, but do not use for perennial weed control. Brominal may be tank-mixed with 1/4-3/8 lb/A acid equiv, 2,4-D or MCPA. Good coverage is required. Application directions and restrictions same as for bromoxynil.

BANVEL (DICAMBA)
(wheat only)

1/8-¼ pt Banvel-4lb/gal (1/16-1/8 act.)

KOCHIA

Apply in spring before jointing stage of crop. Do not apply at later stages. Marginal crop tolerance. Primarily for severe kochia in winter wheat. Also controls emerged wild buckwheat. May be tank-mixed with 1/4-3/8 lb/A acid equiv. 2,4-D or MCPA. The lower dicamba rates may be used in combinations for small weeds. Use higher dicamba rate for best kochia control. Minimum carrier is 5 gpa for ground and 3 gpa for air. Do not harvest for dairy feed prior to milk stage of kernel development.

AVENGE (DIFENZOQUAT)
(wheat only)

2¼-4 pt Avenge-2lb/gal (½-1½ act.)

WILD OATS

Apply in spring when wild oat is in the 3- to 5-leaf stage. High rate is for heavy infestations (more than 25 plants per square foot). Best results under good growing conditions. Do not apply when plants are wet. Rain within 6 hours may reduce control. Minimum carrier is 5 gpa for ground or 3 gpa for air. Do not graze or harvest forage from treated fields. May be tank-mixed with recommended rates of bromoxynil and/or MCPA amine or 2,4-D amine or ester. Refer to application directions and precautions for the mixture used.
DURUM, HARD RED SPRING WHEAT, and BARLEY
(not underseeded to legumes)

**MCPA AMINE or MCPA ESTER**

1/2-1 pt MCPA amine-4lb/gal or 1/3-1 pt MCPA ester-4lb/gal (1/4-1/2 act.)

**SOME BROADLEAVES**

Apply from 5-leaf to early boot stage for best crop tolerance; but may be applied from emergence to early boot with minimum risk. Avoid spraying at boot to heading. Weeds must be small. Most situations require 1/2 to 1 pt/A. MCPA or 2,4-D appear to be equally effective on wild mustard, lambsquarters, and Canada thistle. MCPA is less effective than 2,4-D on larger weeds. Kochia and wild buckwheat control is usually unsatisfactory. Do not graze dairy or slaughtered animals on treated areas for 2 weeks after treatment.

**BANVEL (DICAMBA)**

1/4 pt Banvel-4lb/gal (1/8 act.)

**WILD BUCKWHEAT, SOME ANNUAL BROADLEAVES**

Durum and hard red spring wheat only. Apply at the 2- through 4-leaf crop stage. Do not apply after the 4-leaf stage. Does not control wild mustard. Usually used with MCPA or 2,4-D to improve control of other broadleaves. Marginal crop tolerance. Minimum carrier is 5 gpa for ground and 3 gpa for aerial application. Do not graze or harvest forage for dairy feed prior to milk stage of kernel development.

**BANVEL + MCPA or 2,4-D MONDAK**

1/8-1/4 pt Banvel-4lb/gal + 1/3-1/4 pt MCPA or 2,4-D-4lb/gal (1/16-1/8 + 1/4-3/8 act.)

**WILD BUCKWHEAT, SEVERAL ANNUAL BROADLEAVES**

Durum and hard red spring wheat only. Tank-mix or use MonDak commercial premix containing 1/4 lb dicamba + 2 1/2 lb MCPA amine acid equiv. per gallon. Apply at 3- to 4-leaf stage of crop. Do not apply after the 4-leaf stage. Marginal crop tolerance. MCPA in tank-mix offers best crop tolerance. Excellent wild buckwheat and good kochia control. Very good control of several other annual broadleaved weeds. Time of application is too early for maximum perennial control. Use higher rates for best kochia control; use lower rates for best crop tolerance and for small weeds. Application directions and restrictions as for dicamba alone.

**BUCTRIL or BROMINAL (BROMOXYNIL)**

1/3 pt Buctril-2lb/gal or 1-1/3 pt Brominal-2lb/gal (3/8 or 1/4-3/8 act.)

**WILD BUCKWHEAT, SOME ANNUAL BROADLEAVES**

Apply at 2-leaf to early boot stage of crop. Very good crop tolerance. Excellent wild buckwheat control. Usually used in combination with MCPA ester for broad spectrum control. Good coverage required. Minimum carrier is 10 gpa for ground or 2-4 gpa for Brominal and 5 gpa for Buctril for aerial application. Do not graze for 30 days after treatment.

**BRONATE or BROMINAL PLUS (BROMOXYNIL + MCPA)**

**BROMINAL + MCPA or 2,4-D**

1-1/3 pt Bronate or Brominal Plus-2+2lb/gal (1-1/3 pt Bronate or Brominal Plus-2+2lb/gal) (1/4-3/8 + 1/4-3/8 act.)

1-1/3 pt Brominal + 1/3-1/4 pt MCPA or 2,4-D-4lb/gal (1/4-3/8 + 1/4-3/8 act.)

**WILD BUCKWHEAT, SEVERAL ANNUAL BROADLEAVES**

Bronate or Brominal Plus is commercial premix containing 2 lb/gal acid equiv. each of bromoxynil and MCPA ester. Tank-mix Brominal with MCPA or 2,4-D. Apply at 4-leaf to early boot stage of crop. MCPA is preferred for maximum crop safety. Mixture with MCPA can be applied as early as 2-leaf stage with minimal risk. Excellent wild buckwheat and good kochia control. Very good control of several other annual broadleaves. Not for perennials. Low rate is for small weeds. Later applications may require the higher rates. Good coverage required. Application directions and restrictions same as for Buctril or Brominal.

**TORDON 22K + 2,4-D or MCPA**

1-1/3 fl oz Tordon 22K-2lb/gal + 1/3-1/4 pt 2,4-D or MCPA-4lb/gal (1/64-1/48 + 1/4-3/8 act.)

**WILD BUCKWHEAT, SOME ANNUAL BROADLEAVES**

Hard red spring wheat, durum, and barley. Tank-mix. Apply at 3- to 5-leaf stage of crop. Ester or amine form of 2,4-D or MCPA improves control of other broadleaves. Excellent wild buckwheat control. Poor kochia control. Used primarily when wild buckwheat is the major problem. Lower rates are for small weeds. Acceptable crop tolerance. Avoid late spraying. MCPA or 2,4-D amine in tank-mix offers best crop tolerance. Use proportionately less 2,4-D for 6 lb/gal product. Do not plant susceptible broadleaves such as alfalfa, sunflowers, or soybeans the following year. Minimum carrier is 5 gpa for ground and 1 gpa for air. Consult label for all application directions and precautions. Special Local Needs state registration. Restricted Use pesticide.
### Stampedede (Propalanil)

**4 pt Stampede-3lb/gal (1½ act.)**

**Green Foxtail, Some Annual Broadleaves**

Hard red spring wheat only. Durum reported to be more sensitive and should not be treated. Apply when foxtail has 2 to 3 leaves for best results. Do not treat after the 3- to 4-leaf stage of foxtail. Wheat should be in the 3- to 5-leaf stage. Do not treat after crop is tillered or under drought stress (top ⅛ inch of soil is dry). Grass control has been variable but satisfactory under good growing conditions. Results are poor when plants are under drought stress. Good control of redroot pigweed, wild buckwheat, and lambsquarters; fair on Kochia. Considerable crop yellowing and leaf burn; however, crop usually recovers if conditions are favorable. Lower rate was less consistent and has been deleted from the label. Do not mix with other herbicides. Do not use in fields treated with organophosphate insecticide. Minimum carrier is 10 gpa for ground and 5 gpa for aerial application.

### Treflan (Trifluralin)

**1-1½ pt Treflan-4lb/gal (½-¼ act.)**

**Green Foxtail**

Durum and hard red spring wheat only. Apply after planting and incorporate 1 to 1½ inch deep with two flextine or spike-tooth harrowings. Immediate incorporation preferred but may be delayed up to 24 hours if soil surface is dry and there is little wind. Excessive residue should be incorporated prior to planting. Seed must be planted 2-3 inches deep so it is below the treated soil. Use the low rate on light, low organic matter soil and the high rate on heavy, clay soil. The rate of 1½ pt/A has been satisfactory in most SDSU tests. Foxtail control has been very consistent, except with extremely dry topsoil. Does not control wild oats. May be applied by ground or aerial equipment using minimum carrier of 5 gpa. Do not plant oats or sorghum the following year. Special Local Needs state registration.

### Far-Go (Triallate)

**1-1½ pt Far-GO-4b/gal (¾-1¼ act.)**

**Wild Oats**

Durum, hard red spring wheat, and barley. Apply after planting and incorporate immediately into the top 2 inches of soil with two harrowings. Application and incorporation may be done before planting for barley. Excessive plant residue should be worked into the soil before application. Barley is more tolerant than wheat. Use low rate on wheat. Crop seed must be planted 2-3 inches deep so seed is below layer of treated soil. Wheat seed in treated soil layer will be damaged. Not suggested for disk-planted (endgate seeder) wheat. May be applied in liquid fertilizer. Minimum carrier is 10 gpa. Do not graze livestock on treated areas. Spray formulations preferred for spring treatment.

Granules preferred for fall application. Rates of granules listed are for fall treatment. Granules should be applied in the fall within 3 weeks of soil freeze-up. Stubble fields should be worked with a field cultivator or disk before application. Incorporate granules into top 2 inches of soil within 48 hours using a field cultivator or other suitable equipment. Spring seedbed tillage must be shallow.

### Treflan + Far-GO

**1-1½ pt Treflan-4b/gal + 1-1½ pt Far-GO-4b/gal (¼-⅓ + ⅓-¼ act.)**

**Green Foxtail, Wild Oats**

Durum, hard red spring wheat only. Tank-mix. Apply and incorporate immediately as for Far-GO alone. Adjust rates for soil type. Consistent control. Rates of 1 pt/A Treflan + 1 pt/A Far-GO have been satisfactory in most SDSU tests. Refer to application directions and precautions for each product used alone.

### Hoelon (Diclofop)

**2-3½ pt Hoelon-3lb/gal (¼-½ act.)**

**Green Foxtail, Wild Oats**

Apply when wheat has 1-4 leaves and barley has 1-3 leaves. Wheat is more tolerant than barley. Use 2-2½ pt/A in wheat or barley when foxtail and wild oat have 2-3 leaves. Rates of 2½-3 pt/A may be used in wheat when weeds have 3-4 leaves. Do not treat larger weeds. Good wild oat and foxtail control. Some crop leaf discoloration occurs under stress conditions; therefore, avoid treating while under drought stress. Do not tank-mix with other herbicides, as control can be reduced. Minimum carrier is 10 gpa for ground and 5 gpa for air. Do not graze or harvest forage from treated fields. Conditional Registration. Restricted Use pesticide.

### Carbyne (Barban)

**2-3 pt Carbyne-1lb/gal (¾-3¼ act.)**

**Wild Oats**

Apply when wild oat is in 2-leaf stage. Wild oat control is good if weed emergence is uniform. Activity is greatest at low temperatures. Use high rate for heavy populations and when temperatures are high and soil moisture is inadequate. Light frost prior to application should not increase crop injury if temperatures reach above 50°F for several hours each day for 3 days after application. Some durum varieties reported to be less tolerant; however, Leeds and Wells appear to be as tolerant as hard red spring wheat. Use 5-10 gpa carrier and 45 psi pressure and have boom on ground equipment rotated forward so spray hits weeds at a 45° angle. Use 3-5 gpa for aerial application. Treated fields should not be grazed.

Rescue alternatives include a single application of 4 pt/A if wild oat is in 2½- 3½-leaf stage or a split application of a second 2 pt/A applied 7-14 days after initial treatment. These are strictly rescue programs and should be considered only when crop tolerance is of little concern.

### Avenge (Difenzoquat)

**2½-4 pt Avenge-2lb/gal (¾-1¼ act.)**

**Wild Oats**

Barley, durum (except Lakota and Wascona), hard red spring wheat (Butte, Olaf, Era only). Apply when wild oat is in 3- to 5-leaf stage. Wild oat is most susceptible at the 5-leaf stage. Use higher rate for early application and for weed densities over 25 plants/square foot. Best results under good growing conditions. Barley is more tolerant than wheat. Treat only approved varieties, as sensitive varieties can be severely injured. Do not treat under drought stress. Minimum carrier is 5 gpa for ground and 3 gpa for aerial application. Do not graze or harvest forage from treated fields.

May be tank-mixed with recommended rates of bromoxynil, and/or MCPA amine or 2,4-D amine or ester. Refer to application directions and precautions for the herbicide used.
### FLAX

<table>
<thead>
<tr>
<th><strong>MCPA AMINE</strong> or <strong>MCPA ESTER</strong></th>
<th>½ pt MCPA amine-4lb/gal or ½ pt MCPA ester-4lb/gal (¼ or ¼ act.)</th>
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</thead>
<tbody>
<tr>
<td><strong>FEW BROADLEAVES</strong></td>
<td>Apply when flax is 2 to 6 inches tall but before buds form. Treat before weeds are 4 inches tall. Fair to good control of mustard and lambquarters. Poor on kochia or wild buckwheat. Fair to good crop tolerance. Better crop tolerance and improved weed control when sprayed early. Usually applied in combination with Dowpon. Avoid treating during drought stress. Flax may be underseeded to alfalfa. Not labeled for pre-harvest application.</td>
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<tr>
<td><strong>DOWPON (DALAPON)</strong></td>
<td>1 lb Dowpon-74% wsp (¼ act.)</td>
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<tr>
<td><strong>FOXTAILS</strong></td>
<td>Apply when flax is 1 to 6 inches tall and foxtail is less than 2 inches tall. Less control of barnyardgrass. Usually not effective on wild oats. Treating early when weeds are small gives best results and reduces risk of crop injury. Marginal crop tolerance. Stunting may occur, especially under dry conditions. Varietal differences have been observed, but not consistently. Minimum carrier is 5 gpa for ground or air. Do not use on flax underseeded to grasses or legumes. Usually applied in combination with MCPA.</td>
</tr>
<tr>
<td><strong>DOWPON + MCPA AMINE</strong></td>
<td>1 lb Dowpon-74% wsp + ½ pt MCPA amine-4bl/gal (¼ + ¼ act.)</td>
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<tr>
<td><strong>FOXTAILS, ANNUAL BROADLEAVES</strong></td>
<td>Tank-mix. Apply when flax is 2 to 6 inches tall. Avoid late treatment to reduce injury. Crop height of 2-4 inches preferred. Marginal crop tolerance, especially under drought stress. Reduction of Dowpon rate improves crop safety, but usually reduces grass control. Do not use on flax underseeded to alfalfa or grasses. Refer to Dowpon and MCPA sections above.</td>
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<tr>
<td><strong>BROMINAL or BUCTRIL (BROMOXYNIL)</strong></td>
<td>1-1½ pt Brominal-2bl/gal or 1½ pt Buctril-2bl/gal (1½-3½ or 3½ act.)</td>
</tr>
<tr>
<td><strong>WILD BUCKWHEAT, SOME ANNUAL BROADLEAVES</strong></td>
<td>Apply when flax is 2 to 8 inches tall and weeds are in 2- to 4-leaf stage. Excellent wild buckwheat and good kochia control. Used in flax primarily for dense infestations of these weeds. Also controls several other annual broadleaves but is weak on wild mustard. Fair to good crop tolerance. Do not apply at bud stage or in humid weather when temperature is over 85°F. Higher rates increase risk of leaf burn. Neither product is recommended in combination with other herbicides because of crop injury. Minimum carrier is 10 gpa for ground and 2-4 gpa for Brominal or 5 gpa for Buctril aerial application. Do not use on flax underseeded to alfalfa.</td>
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<tr>
<td><strong>EPTAM (EPTC)</strong></td>
<td>2½-3½ pt Eptam-7 lb/gal (2-3 act.)</td>
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<tr>
<td><strong>ANNUAL GRASS, FEW ANNUAL BROADLEAVES</strong></td>
<td>Eptam is registered for preplant incorporated application for flax; however, the Eptam label for the 1981 season will not include flax. Unused Eptam which includes flax on the label may be used. Users must assume all risks when using unlabeled product. The change was due to severe stunting and stand reduction in a few fields. This was usually associated with maximum rates and deep planting. Crop searing at emergence and even slight stand reductions (under 20%) usually has not reduced yield. Data indicate excellent yields in most tests. Eptam gives excellent control of several annual grasses and a few annual broadleaves. Control of sunflower, wild mustard, kochia, or Russian thistle is unsatisfactory. Use lower rate for foxtail only. Eptam is applied preplant and must be incorporated immediately with a tandem disk set to cut 5 to 6 inches deep. A second incorporation improves uniformity. Minimum carrier is 10 gpa. Flax may be underseeded to alfalfa.</td>
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<tr>
<td><strong>AVADEX (DIALATE)</strong></td>
<td>1½ qt Avadex-4lb/gal (1½ act.)</td>
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<tr>
<td><strong>WILD OATS</strong></td>
<td>Apply either before or after planting. Must be incorporated. Incorporate preplant application immediately into top 2 inches of soil with shallow disk or other suitable equipment. Follow with a harrow or leveling device. A second incorporation improves uniformity, especially under trashy conditions. Application after planting should be incorporated immediately with two harrowings. Delayed or improper incorporation reduces control. Excellent crop tolerance. Good wild oat control. Control is reduced by very cool or dry soil conditions. Minimum carrier is 5-10 gpa. Flax may be underseeded to alfalfa.</td>
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<tr>
<td><strong>CARBYNE (BARBAN)</strong></td>
<td>2-3 pt Carbyne-1lb/gal (¼-3/8 act.)</td>
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<tr>
<td><strong>WILD OATS</strong></td>
<td>Apply when wild oat is in 2-leaf stage but before 12-leaf stage of crop. Good wild oat control if emergence is uniform. Excellent crop tolerance. Use lower rate under cool, wet conditions. Use 5-10 gpa carrier and 45 psi pressure with the boom on ground equipment rotated forward so spray hits weeds at 45° angle. Use 3-5 gpa carrier for aerial application. Do not tank-mix with other herbicides. Do not use on flax underseeded to alfalfa. Do not graze treated fields until after crop harvest.</td>
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### SPECIAL WEED PROBLEMS

#### VOLUNTEER SUNFLOWERS

<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>Bronate</strong> or <strong>Brominal Plus</strong></td>
<td>All wheat and barley. Excellent, consistent control. Also very good on kochia and wild buckwheat. Very good crop tolerance. May be applied over wide range of crop growth stages. Good choice when kochia and wild buckwheat are also problems when crop is in the 4-leaf to early boot stage. Good coverage important. Refer to Bronate or Brominal Plus section for specific crop.</td>
</tr>
<tr>
<td><strong>Banvel + MCPA Amine</strong></td>
<td>Durum, hard red spring wheat, and oats. Very good to excellent, consistent control. Short residual control if topsoil is moist. Also very good on kochia and wild buckwheat. Fair crop tolerance. Better crop tolerance with MCPA than with 2,4-D in the combination. Application limited to a narrow range of crop growth stages. Do not apply late. Good choice for early spraying of dense stands when kochia and wild buckwheat are also problems in crops at the 3- to 4-leaf stage. Refer to Banvel + MCPA section for specific crop.</td>
</tr>
<tr>
<td><strong>MCPA Amine or Ester</strong></td>
<td>All wheat, barley, and oats. Good to very good control of small sunflowers. Also controls mustard and lambsquarters but less effective on many other weeds or large sunflowers. Excellent crop tolerance at a wide range of growth stages. The safest treatment for oats. Use 1 pt/A for most situations. Ester form preferred. Good choice when kochia or wild buckwheat is not a problem and treatment must be made before wheat or barley is tilled or at very late crop growth stages. Also good choice for retreating second flush. Refer to MCPA section for specific crop.</td>
</tr>
<tr>
<td><strong>2,4-D Amine or Ester</strong></td>
<td>All wheat, barley, and oats. Amine only on oats. Good to very good control. Good crop tolerance when applied at the 5-leaf to early boot stage of wheat or barley or 3- to 4-leaf stage of oats. Use ½ lb/A acid equiv. for ester and ¾ lb/A acid equiv. for amine. Ester better on larger sunflowers. Controls several other broadleaves. Good choice for light to moderate infestations in fields where other broadleaves are present and spraying is delayed until crop reaches the proper stage. Refer to 2,4-D section for specific crop.</td>
</tr>
</tbody>
</table>

#### WILD BUCKWHEAT

<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tordon 22K + 2,4-D</strong></td>
<td>All wheat and barley. Refer to Tordon 22K + 2,4-D section for specific crop.</td>
</tr>
<tr>
<td><strong>Tordon 22K + MCPA</strong></td>
<td>All wheat, barley, and oats. Refer to Tordon + MCPA section for specific crop.</td>
</tr>
<tr>
<td><strong>Banvel</strong></td>
<td>All spring wheat and oats. Usually used as a tank-mix with MCPA or 2,4-D to improve control of other weeds. Use MCPA combination on oats. Refer to specific crop section.</td>
</tr>
<tr>
<td><strong>Buctril or Brominal</strong></td>
<td>All wheat, barley, and oats. Usually used in combination with MCPA (Bronate, Brominal Plus) on all wheat and barley. Refer to specific crop section.</td>
</tr>
</tbody>
</table>

#### FIELD BINDWEED

<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2,4-D Amine or Ester</strong></td>
<td>All wheat, barley, and oats. Amine only on oats. Use maximum rate unless willing to accept risk of crop injury with higher rates of ½ lb/A acid equiv. for ester or ¾ lb/A acid equiv. for amine. Refer to 2,4-D section for specific crop.</td>
</tr>
</tbody>
</table>

#### CANADA THISTLE

<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2,4-D Amine or Ester</strong></td>
<td>Same as for field bindweed.</td>
</tr>
<tr>
<td><strong>MCPA Amine or Ester</strong></td>
<td>Same as for 2,4-D on field bindweed. Better crop tolerance, especially in oats. Use maximum rates for product.</td>
</tr>
</tbody>
</table>

#### PENNYCRESS, BLUE MUSTARD

<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2,4-D Ester or Amine</strong></td>
<td>Winter wheat. Apply in spring when weeds are in rosette stage. Most other weeds will not have emerged. Use ½ lb/A acid equiv. 2,4-D ester or ¾ lb/A acid equiv. for amine. Best results in warm weather. Some risk of crop injury. Refer to 2,4-D section for winter wheat.</td>
</tr>
<tr>
<td><strong>Bronate or Brominal Plus</strong></td>
<td>Winter wheat. Apply in spring when weeds are in rosette stage. Most other weeds will not have emerged. Best crop tolerance. Best results in warm weather. Refer to Bronate or Brominal Plus section for winter wheat.</td>
</tr>
</tbody>
</table>
## ROUNDUP

**1-2 pt Roundup-3lb/gal**

**NONSELECTIVE**

Roundup is a nonselective, translocated herbicide, with no soil residual. May be applied before spring planting to control emerged annual weeds in no-till or reduced tillage systems. Use 1 pt/A for annual grasses and up to 1 qt/A for annual broadleaves less than 6 inches tall. Excellent on annual grasses; adequate on volunteer winter wheat. Wild buckwheat and Russian thistle are somewhat tolerant. Higher rates are required for perennials; however, applications at any rate are not recommended in early spring. Use minimum carrier of 5 gpa for ground or 3 gpa for air. Add 1 pt of non-ionic surfactant per 25 gallons of solution.

After harvest applications in stubble will replace one tillage operation. Add 11 lb/A acid equiv. 2,4-D amine to control annual broadleaves. Apply combination by ground only. Weeds must be growing actively. Dust on leaves reduces control.

Lower rates (¼ - ½ pt/A) of Roundup are being evaluated. Control of small grass seedlings in the spring has been promising when applied in low carrier volumes. Fall application at those rates has been more variable, depending on size and condition of the weed and growing conditions. Further testing is planned.

## PARAQUAT

**1 qt Paraquat-2lb/gal**

**NONSELECTIVE**

Paraquat is a nonselective contact herbicide that may be applied before planting until just before crop emerges. No soil residual. Useful for controlling emerged weeds before planting in no-till or reduced tillage systems. May be used before planting barley or wheat. Minimum carrier is 20 gpa for ground or 5 gpa for air. Use ½ pt X-77 spreader per 100 gallons of solution. Follow handling precautions, as paraquat is highly toxic. Restricted Use pesticide.

## SMALL GRAIN (underseeded to legume)

### MCPA AMINE

**½ pt MCPA amine-4lb/gal (¼ act.)**

**LAMBSQUARTERS, MUSTARD, RAGWEED, PIGWEED**

Apply when companion crop is in tillered to boot stage and legume seedlings are 2 to 3 inches tall. Emergency treatment for heavy weed growth. Crop and/or weed canopy reduces risk of crop injury. Check product label.
**HERBICIDE COST**

Consult your local dealer for actual cost. Prices will vary and are subject to change. Prices based on average, suggested retail prices for the previous season.

<table>
<thead>
<tr>
<th>Herbicide</th>
<th>Amt/A</th>
<th>Cost/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCPA amine</td>
<td>½-1 pt</td>
<td>$1.00-2.00</td>
</tr>
<tr>
<td>MCPA ester</td>
<td>½-1 pt</td>
<td>1.20-2.35</td>
</tr>
<tr>
<td>2,4-D ester (4 lb)</td>
<td>½-1 pt</td>
<td>0.75-1.50</td>
</tr>
<tr>
<td>2,4-D amine (4 lb)</td>
<td>½-1 pt</td>
<td>0.88-1.75</td>
</tr>
<tr>
<td>Banvel</td>
<td>1/6-1/4 pt</td>
<td>0.65-1.30</td>
</tr>
<tr>
<td>Buctril, Brominal</td>
<td>1-1½ pt</td>
<td>5.00-7.50</td>
</tr>
<tr>
<td>Bromate, Brominal Plus</td>
<td>1-1½ pt</td>
<td>5.80-8.70</td>
</tr>
<tr>
<td>Tordon + MCPA</td>
<td>1-1½ oz+</td>
<td>1.70-2.50</td>
</tr>
<tr>
<td>Treflan</td>
<td>1-1½ pt</td>
<td>4.50-6.75</td>
</tr>
<tr>
<td>Stampedes</td>
<td>2 qt</td>
<td>6.70</td>
</tr>
<tr>
<td>Far-go (liq)</td>
<td>1-1¾ pt</td>
<td>5.90-8.90</td>
</tr>
<tr>
<td>Hoelon</td>
<td>2-3½ pt</td>
<td>11.80-19.70</td>
</tr>
<tr>
<td>Avenge</td>
<td>2-4 pt</td>
<td>10.90-17.50</td>
</tr>
<tr>
<td>Carbyne</td>
<td>2-3 pt</td>
<td>4.00-6.00</td>
</tr>
<tr>
<td>Eptam</td>
<td>2½-3½ pt</td>
<td>6.95-10.40</td>
</tr>
<tr>
<td>Dalapon</td>
<td>1 lb</td>
<td>2.00</td>
</tr>
</tbody>
</table>

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Fig 1. Small grain growth stages. Count all the leaves on small plants. If tillers are present, count each tiller and all leaves above the tillers (leaves below tiller may disappear).