See specific product label to determine correct rate for soil type and weed species found in each field. Tables 2.5-5, 2.5-6, and 2.5-7 list characteristics and efficacy of herbicides. A good small grain stand is very competitive and normally does not require an herbicide treatment. It is important to control all existing vegetation at planting time, prior to no-till production.

<table>
<thead>
<tr>
<th>Trade Name</th>
<th>Common Name</th>
<th>Site of Action Number</th>
<th>Application</th>
<th>Product/A</th>
<th>lb ai/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,4-D amine 4S</td>
<td>2,4-D</td>
<td>4</td>
<td>full tiller to prejointing (growth stages 3–6)</td>
<td>0.5–2 pt</td>
<td>0.25–1</td>
</tr>
</tbody>
</table>

- For use on wheat, barley, rye, and oats.
- Use lower rates for small annual weeds.
- Use lower rate (0.25 to 0.5 pt/A) if underseeded with legume (alfalfa, red or white clover are labeled; vetch and sweet clover will be severely injured).
- Spraying small grains too young or after jointing can result in reduced yields or uneven ripening.
- In general, apply when small grain is 4 to 8 inches tall.
- May be tank-mixed with Harmony Extra SG, Banvel, or Maestro (Buctril).
- No rotation restriction to soybean; 3-month rotation restriction to vegetables; see Table 2.1-11.

<table>
<thead>
<tr>
<th>Trade Name</th>
<th>Common Name</th>
<th>Site of Action Number</th>
<th>Application</th>
<th>Product/A</th>
<th>lb ai/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,4-D LVE 4E</td>
<td>2,4-D</td>
<td>4</td>
<td>full tiller to prejointing (growth stages 3–6)</td>
<td>0.5–2 pt</td>
<td>0.25–1</td>
</tr>
</tbody>
</table>

- For use on wheat, barley, rye, and oats.
- Use lower rates for annual weeds.
- For wild garlic or onion control, apply 1.5 to 2 pt.
- Avoid use if temperatures are expected to exceed 75°F.
- No rotation restriction to soybean; 3-month rotation restriction to vegetables; see Table 2.1-11.

<table>
<thead>
<tr>
<th>Trade Name</th>
<th>Common Name</th>
<th>Site of Action Number</th>
<th>Application</th>
<th>Product/A</th>
<th>lb ai/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aim 2EC</td>
<td>carfentrazone</td>
<td>14</td>
<td>up to the jointing stage (growth stages 1–5)</td>
<td>0.5–2 fl oz</td>
<td>0.008–0.016</td>
</tr>
</tbody>
</table>

- For use on wheat, barley, and oats to control certain broadleaves.
- Apply before weeds are 4 inches tall.
- May be tank-mixed with 2,4-D, MCPA, or other common small grain herbicides to improve control and increase weed spectrum. Some research has shown that Aim provides suppression of Star-of-Bethlehem and speedwell.
- No rotation restrictions to soybean or vegetables; see Table 2.1-11.

<table>
<thead>
<tr>
<th>Trade Name</th>
<th>Common Name</th>
<th>Site of Action Number</th>
<th>Application</th>
<th>Product/A</th>
<th>lb ai/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Axial XL 0.42L</td>
<td>pinoxaden</td>
<td>1</td>
<td>2-leaf to preboot (growth stages 2–8)</td>
<td>16.4 fl oz</td>
<td>0.053</td>
</tr>
</tbody>
</table>

- For use on wheat or barley.
- Controls certain grassy weeds such as annual ryegrass, foxtails, barnyardgrass, and wild oat. (Apply Axial XL before weeds have more than 5 leaves on the main stem.)
- Axial XL does not control downy brome or ACCase-resistant grasses.
- Tank-mix with other labeled herbicides to enhance weed control spectrum.
- No rotation restriction to soybean; 30 days for leafy and root crops, all other vegetables after 90 days; see Table 2.1-11.

<table>
<thead>
<tr>
<th>Trade Name</th>
<th>Common Name</th>
<th>Site of Action Number</th>
<th>Application</th>
<th>Product/A</th>
<th>lb ai/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Axiom 68 DF</td>
<td>flufenacet + metribuzin</td>
<td>5 15</td>
<td>spiking to 2 leaf (growth stage 1)</td>
<td>4–10 oz</td>
<td>0.133–0.333 / 0.033–0.083</td>
</tr>
</tbody>
</table>

- For use on wheat and triticale.
- Plant seeds 1 to 2 inches deep to improve crop safety; do not use on broadcast-seeded wheat.
- Apply when crop is between full germination and 2-leaf stage and when weeds have not germinated (preemergence) and 1-leaf stage. Apply prior to weed emergence to 1-leaf-stage weeds.
• Use rate depends on soil texture; see product label.
• Some crop varieties are more sensitive; see product label.
• No rotation restriction to soybean; 12-month rotation restriction to vegetables; see Table 2.1-11.
• Water quality advisory.

<table>
<thead>
<tr>
<th>Dicamba Products</th>
<th>Rate (oz/A)</th>
<th>Usage Stage</th>
<th>Rate (fl oz)</th>
<th>Application Window</th>
</tr>
</thead>
<tbody>
<tr>
<td>Banvel 4S (dicamba DMA salt)</td>
<td>4</td>
<td>Full tiller to jointing (growth stages 3–6)</td>
<td>2–4 fl oz</td>
<td>0.06–0.12</td>
</tr>
<tr>
<td>Clarity 4S (dicamba DGA salt)</td>
<td>4</td>
<td>Full tiller to jointing (growth stages 3–6)</td>
<td>2–4 fl oz</td>
<td>0.06–0.12</td>
</tr>
<tr>
<td>Engenia 5S (dicamba BAPMA salt)</td>
<td>4</td>
<td>Full tiller to jointing (growth stages 3–6)</td>
<td>1.6–3.2 fl oz</td>
<td>0.06–0.12</td>
</tr>
<tr>
<td>XtendiMax 2.9S/FeXapan (dicamba DGA salt with VaporGrip)</td>
<td>4</td>
<td>Full tiller to jointing (growth stages 3–6)</td>
<td>2.75–5.5 fl oz</td>
<td>0.06–0.12</td>
</tr>
</tbody>
</table>

• For use on fall-seeded barley and wheat only.
• Crop safety and weed control will be similar for all dicamba formulations.
• May be tank-mixed with Maestro (Buctril) or 2,4-D to broaden spectrum of control.
• Do not use if legumes are underseeded.
• No rotation restrictions.

<table>
<thead>
<tr>
<th>Metribuzin Products</th>
<th>Rate (oz/A)</th>
<th>Usage Stage</th>
<th>Rate (fl oz)</th>
<th>Application Window</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimetric EXT 75WG/TriCor 75DF (metribuzin)</td>
<td>5</td>
<td>2-leaf to 4-tiller (growth stages 1–5)</td>
<td>2–4 oz</td>
<td>0.047–0.19</td>
</tr>
</tbody>
</table>

• For use on wheat and barley.
• For control of Group 2 (ALS) resistant common chickweed: Dimetric EXT is approved for use under 24(c) labels in Maryland, Pennsylvania, and West Virginia (expires Dec. 2020), and TriCor has a section 24(c) label in Virginia (expires December 2020).
• The typical use rate is 2–4 oz/A (3 oz/A is recommended) either in the fall or spring when the crop is in the 2-leaf to 4-tiller growth stage.
• Rate depends on soil texture; see product label.
• Local research has shown wheat safety is best with an early spring application (at greenup). Potential for injury increases with late spring applications or fall applications.
• Plant wheat at least 1 inch deep.
• Glory can be tank-mixed with other small grain herbicides to broaden control spectrum.
• Certain wheat and barley varieties are sensitive to metribuzin. Refer to the respective label for additional details on varieties and other use restrictions.
• In general, fall-applied herbicide generally provided more consistent common chickweed control, but spring metribuzin treatments were adequate as well.
• For best results, apply metribuzin when chickweed is small (4 to 6 inches in diameter).
• No rotation restriction to soybean; 4 to 18 months for vegetables; see Table 2.1-11.

<table>
<thead>
<tr>
<th>Harmony Extra SG 50DF</th>
<th>Rate (oz/A)</th>
<th>Usage Stage</th>
<th>Rate (fl oz)</th>
<th>Application Window</th>
</tr>
</thead>
<tbody>
<tr>
<td>thifensulfuron + tribenuron</td>
<td>2</td>
<td>2-leaf to before visible flag leaf (growth stages 1–7)</td>
<td>0.45–0.9 oz</td>
<td>0.009–0.018</td>
</tr>
</tbody>
</table>

• For use on wheat, barley, and oats.
• Controls wild garlic and broadleaf weeds. Tank-mix with Express 50SG for improved wild carrot control. Not recommended for cornflower.
• Rates depend on type of weeds and severity.
• For garlic control use higher rates of Harmony Extra SG plus 2,4-D when garlic is less than 12 inches tall.
• Always premix Harmony Extra SG in water before adding to the spray tank.
• Tank-mixing with Banvel or Maestro (Buctril) may result in reduced control of certain broadleaf weeds.
• Do not tank-mix with Malatthion.
• Any crop may be planted 45 days after application; see Table 2.1-11.
Harmony SG can be used on fall-seeded wheat, barley, triticale, and oats.
Harmony SG controls wild garlic and broadleaf weeds. Not recommended for cornflower.
The common rate is 0.75 oz/A, but higher or lower rates may be used.
Tank-mix with other herbicides to increase weed control spectrum.
Harmony SG also may be used as a preplant burndown application before small grain emergence.
Any crop may be planted 45 days after application; see Table 2.1-11.

### Huskie 2.06L
- pyrasulfotole +
- 6
- first-leaf to flag-leaf emergence (growth stages 1–7)
- 11–15 oz
- 0.026–0.036
- 0.151–0.205

Huskie controls many annual broadleaf weeds.
In some university trials, Huskie provided control of marestail at the rosette stage when applied in the spring.
4-month rotation restriction to soybean; more than 9 months for vegetables; see Table 2.1-11.

### Maestro (Buctril 2E)
- bromoxynil
- 6
- emergence to boot stage (growth stages 1–9)
- 1–2 pt
- 0.25–0.5

For use on wheat, barley, and triticale.
May be applied to a small-grain/alfalfa underseeding.
Apply before weeds have more than four leaves or are 2 inches tall, or rosettes exceed 1 inch in diameter.
Use flat fan nozzles and a minimum of 10 gal/A for best results.
Weak on chickweed and henbit.
May be tank-mixed with Harmony Extra SG, MCPA, 2,4-D, or Banvel/Clarity.
30-day rotation restriction for all crops; see Table 2.1-11.

### MCPA amine or ester 4L
- MCPA
- 4
- full tiller to prejoint stage (growth stages 3–6)
- 0.5–1 pt
- 0.25–0.5

For use on wheat, barley, rye and oats.
Safer on small grains underseeded with legumes than 2,4-D (amine formulation only), but use the lower rate (0.25–0.5 pt) and apply in 5–10 gal water/A; legumes should be 2 to 3 inches tall and cereal should be 8 inches tall to provide canopy to protect legume.
For best results, apply while weeds are small, typically when cereal is 4 to 8 inches tall.
No rotation restrictions are indicated.

### Osprey 4.5 WDG
- mesosulfuron
- 2
- emergence to jointing stage (growth stages 1–5)
- 4.75 oz
- 0.013

For use on winter wheat and triticale.
In our region, Osprey will be primarily targeted for control of annual ryegrass, including ACCase-resistant biotypes and downy brome.
Applications should be made when weeds are young and actively growing at the 1-leaf to 2-tiller stage.
To broaden weed control spectrum, Osprey may be tank-mixed with other herbicides, including Harmony Extra SG, Harmony SG, MCPA, Maestro (Buctril), and Stinger.
Do not topdress with nitrogen fertilizer within 14 days following an Osprey application.
Certain insecticides and fungicides may be tank-mixed.
Soybean can be planted after 90 days of application, corn after 12 months, vegetables after 10 months, and alfalfa after 10 months; see Table 2.1-11.

### Peak 57WDG
- prosulfuron
- 2
- 3-leaf to before visible second node (growth stages 2–6)
- 0.25–0.5 oz (1 pack/6–12 A)
- 0.009–0.018 oz

For use on wheat, barley, oats, rye, and triticale.
Peak controls wild garlic and broadleaf weeds.
For best results apply when weeds are small and use the 0.5 oz/A rate if used alone.
• May be tank-mixed with Banvel/Clarity, 2,4-D, MCPA, or Maestro (Buctril) to broaden weed spectrum; however, certain application timing restrictions may apply.
• Do not apply organophosphate (op) insecticide 15 days before or 10 days after Peak application.
• Be cautious of crop rotation restrictions (10 months for soybean and 22 months for alfalfa; see label for other cropping restrictions); see Table 2.1-11.

<table>
<thead>
<tr>
<th>PowerFlex HL 13WDG</th>
<th>pyroxsulam</th>
<th>2</th>
<th>3-leaf to jointing (growth stage 6)</th>
<th>2 oz</th>
<th>0.016</th>
</tr>
</thead>
</table>

• For use on wheat and triticale.
• Crop stunting and chlorosis is commonly observed with spring applications; stunted wheat can be observed for weeks after application. Stunting and chlorosis has not been observed with fall applications.
• The PowerFlex activity on certain grass and broadleaf weeds, including annual ryegrass, downy brome, and annual bluegrass, is improved with fall applications.
• Soybean can be planted 3 months after application. Vegetables can be planted after 9 to 12 months; see Table 2.1-11.

<table>
<thead>
<tr>
<th>Prowl H2O 3.8SC</th>
<th>pendimethalin</th>
<th>3</th>
<th>first-leaf to before the flag leaf is visible (growth stages 1–7)</th>
<th>1.5–3 pt</th>
<th>0.7–1.4</th>
</tr>
</thead>
</table>

• For use on wheat or triticale.
• Wheat or triticale must be planted 0.5–1 inch deep to avoid crop injury.
• Must be applied before weed emergence. Any emerged weeds will not be controlled, so use a tank mixture to control emerged weeds.
• For best results, apply Prowl H2O once the wheat rows are visible and before weeds have emerged.
• Prowl controls many annual grass and broadleaf weeds.
• Wheat or triticale must be planted 0.5 to 1 inch deep to avoid crop injury.
• No rotation restriction to soybean or vegetables; see Table 2.1-11.

<table>
<thead>
<tr>
<th>Quelex 20.4WDG</th>
<th>halaxifen</th>
<th>4</th>
<th>2-leaf to flag leaf emergence (growth stages 2–8)</th>
<th>0.75 oz</th>
<th>0.005</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>florasulam</td>
<td>2</td>
<td></td>
<td></td>
<td>0.005</td>
</tr>
</tbody>
</table>

• For use on wheat, barley, or triticale.
• Best to apply to small, actively growing weeds (2- to 4-leaf stage).
• Quelex is a slow-acting herbicide.
• Do not apply within 60 days of crop harvest.
• Rotation is 3 months to soybeans and 15 months to most vegetables; see Table 1-5.

<table>
<thead>
<tr>
<th>Sharpen 2.85SC</th>
<th>saflufenacil</th>
<th>14</th>
<th>preplant or preemergence</th>
<th>1–4 fl oz</th>
<th>0.022–0.088</th>
</tr>
</thead>
</table>

• For use on wheat, barley, oats, rye, and triticale.
• Be sure seed row is sufficiently covered with soil to avoid washing and concentrating the herbicide in the seed zone.
• Apply Sharpen for burndown and/or limited residual control of certain annual broadleaf weeds; see Table 2.5-4.
• Sharpen does not control grass weeds.
• Do not apply Sharpen if crop has emerged.
• No rotation restriction to soybean; 1 to 5 months for vegetables, depending on species; see Table 2.1-11.

<table>
<thead>
<tr>
<th>Starane Ultra 2.8L</th>
<th>fluroxypyr</th>
<th>4</th>
<th>2-leaf to early boot (growth stages 2–9)</th>
<th>4.8–6.4 fl oz</th>
<th>0.09–0.13</th>
</tr>
</thead>
</table>

• For use on wheat, barley, triticale, and oats.
• The Starane label claims to control bedstraw, chickweed, hemp dogbane, prickly lettuce, ragweed, and velvetleaf and to suppress bindweed, wild buckwheat, mustard species, and others.
• Starane provides good control of Group 2 (ALS) resistant common chickweed.
• 120-day rotation restriction to crops not listed, including soybean. 24(c) labels in Delaware and Virginia permit 90-day rotation to soybeans.
**Stinger 3S**
clothpyralid
4
3-leaf to early boot (growth stages 2–9)
0.25–0.33 pt
0.1–0.125

- For use on wheat, barley, and oats.
- For best results, apply while weeds are actively growing.
- For Canada thistle, apply when thistle is 1 to 2 feet tall.
- May be tank-mixed with any other small grain herbicide to increase weed spectrum. (Curtail is a premix of clopyralid and 2,4-D. See product label for details.)
- Do not use plant residues or manure from animals that consumed forage from treated areas for compost or mulch where susceptible plants may be grown the following season.
- 10.5-month rotation restriction to soybean for soils with greater than 2% organic matter; 18-month restriction for soils with less than 2% organic matter. See label, as vegetable rotation varies greatly by species; see Table 2.1-11.

**Talinor 1.77EC**
bicyclopyrone +
27
2 leaf-stage to pre-boot (growth stages 2–9)
13.7–18.2 fl oz
0.03–0.04
bromoxynil
6

- For use on wheat or barley.
- Always add the directed rate of CoAct+ plus crop oil concentrate (preferred) or non-ionic surfactant.
- Best to apply to small, actively growing weeds.
- Rotation is 10 months to soybeans and 9 to 18 months to most vegetables; see Table 2.1-11.

**Valor SX 51WDG or Valor EZ 4L**
flumioxazin
14
early preplant
1–2 oz
0.032–0.064

- For use on wheat only in Delaware, Maryland, New Jersey, Pennsylvania, and Virginia.
- Must be applied 7 days prior to planting in no-till or minimum-till wheat; 30-day preplant restriction from conventionally tilled wheat.
- When using as a burndown, apply 2 oz/A.
- Wheat must be planted a minimum of 1 inch deep.
- Valor improves control of horseweed and other broadleaf weeds when tank-mixed with other herbicides that broaden control spectrum.
- With sandy soils, stunting and stand loss can occur if seed is not planted at least 1 inch deep and heavy rain occurs shortly after application.
- No rotation restriction to soybean; more than 4 months for vegetables; see Table 2.1-11.

**Zidua 85WDG or Zidua 4.17SC**
pyroxasulfone
15
delayed pre- to early postemergence (4th tiller) (growth stages 1–3)
0.7–2.5 oz or 1.25–4 fl oz
0.04–0.13

**Anthem Flex 4SE**
pyroxasulfone +
carfentrazone
15
14
2-4.5 fl oz
0.004–0.01

- For use on wheat only.
- All products can be applied as a delayed preemergence (80% germination with 0.5-inch-long shoot to spiking) to control annual grasses and small-seeded broadleaf weeds.
- Do not use on broadcast seeded wheat; do not plant wheat deeper than 1.5 inches (but at least 1 inch deep).
- Do not apply if more than 0.25 inches of rain is expected within 48 hours.
- Crop injury may result under prolonged wet soil conditions.
- Consult label; soil texture influences rate.
- Zidua alone will not control emerged weeds; Anthem Flex contains carfentrazone (Aim), which will provide control of certain weed species if they are very small at time of application.
- No rotation restriction to soybean; 18 months for vegetables; see Table 2.1-11.

**Water quality advisory.**