Preplant and Preemergence Herbicides for Soybean Production

The following herbicides are used to control weeds as they emerge. Certain products require mechanical incorporation prior to planting, while others may be applied before, at, or after planting. Incorporation may reduce the need for timely rainfall after application and may improve control of certain weeds. Adjust rate to soil type as specified on label. In no-till, an additional burndown herbicide may be required to control emerged weeds. Many herbicides used primarily for pre-emergence weed control may also be applied following crop emergence. Recommendations for post applications of these products are included in this section rather than in the postemergence section.

<table>
<thead>
<tr>
<th>Trade Name</th>
<th>Common Name</th>
<th>Formulation</th>
<th>Rate/Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authority</td>
<td>sulfentrazone</td>
<td>75 DG</td>
<td>4.0 to 5.3 oz/A</td>
</tr>
<tr>
<td>Spartan</td>
<td>sulfentrazone</td>
<td>75D DF</td>
<td>5.3 to 8.0 oz/A</td>
</tr>
</tbody>
</table>

Mode of Action
PPO

Application Timing
Early Preplant—Apply up to 30 days prior to planting.
Preplant incorporated—Apply and uniformly incorporate no deeper than the top 1 to 2 inches of soil. May be applied up to 30 days prior to planting.
Preemergence—Apply before soybeans emerge.

Comments
- For use in a planned program to be followed by a postemergence application such as Classic, Classic + Roundup Ultra (RR soybean varieties), or Synchrony STS.
- Soybean stunting may occur if excessive rainfall occurs after application and before soybean emergence.
- Do not apply if there are visible signs of cracking due to soybean emergence.
- Thoroughly clean application equipment after use to avoid crop injury. Refer to label for cleaning instructions.
- Do not apply aerially.
- Do not apply through any type of irrigation system.
- Some soybean varieties demonstrate less tolerance to sulfentrazone. Refer to the label for a list of these varieties.

<table>
<thead>
<tr>
<th>Trade Name</th>
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<th>Rate/Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Axiom 68 DF</td>
<td>flufenacet 54.4% + metribuzin 13.6%</td>
<td>7 to 13 oz/A</td>
</tr>
</tbody>
</table>

Mode of Action
Unknown +PSII

Application Timing
Preplant surface—Applications may be made up to 14 days before planting.
Preplant incorporated—Apply and incorporate into the top 1 to 2 inches of soil up to 14 days before planting.
Preemergence—Apply after planting but prior to soybean or weed emergence.
Comments—Axiom 68DF
• Axiom cannot be mixed or loaded within 50 feet of any well, lake, river, stream, reservoir, or sinkhole. This does not apply to properly capped or plugged wells, impervious pads, or properly diked mixing and loading areas.
• Do not apply aerially or with irrigation systems.
• Soybeans should be planted a minimum of 1 to 1½ inches deep.
• Axiom is labeled at lower rates in soybeans than corn due to residue limits rather than to lower tolerance. The labeled rates will only provide early season weed control.

<table>
<thead>
<tr>
<th>Trade Name</th>
<th>Common Name</th>
<th>Rate/Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boundary</td>
<td>6.3 lb S-metolachlor + 1.5 lb metribuzin</td>
<td>1 to 2.5 pt/A</td>
</tr>
</tbody>
</table>

Mode of Action
Unknown + PSII

Application Timing
Preplant surface or incorporated—Apply up to 14 days before planting. If incorporating, mix into the upper 1 to 2 inches of soil.
Preemergence—Apply after planting but prior to soybean or weed emergence.

Comments
• Intended for use with a planned postemergence program. Boundary will provide 4 to 6 weeks residual control.
• On soils with pH above 7.0, use the 1.25 pt/A rate only.
• 1.25 pt/A Boundary provides the equivalent of 1 pt/A Dual II MAGNUM plus 4.9 oz/A Sencor 75DF.
• Refer to label for other comments relative to postemergence products following Boundary and burndown of existing vegetation at the time of planting.
• Do not use on sand soils. On coarse textured soils, do not use on loamy sands with less than 2% organic matter.

<table>
<thead>
<tr>
<th>Trade Name</th>
<th>Common Name</th>
<th>Rate/Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canopy</td>
<td>64.3% metribuzin + 10.7% chlorimuron ethyl</td>
<td>2 to 7 oz/A</td>
</tr>
</tbody>
</table>

Mode of Action
PSII + ALS

Application Timing
Early preplant—Apply up to 45 days prior to planting. Will provide some burndown of existing weeds.
Preplant incorporated—Apply and uniformly incorporate no deeper than 1 to 2 inches deep in the soil. May be applied up to 45 days prior to planting.
Preemergence—Apply before soybeans emerge.

Comments
• Do not apply on fields with a pH greater than 6.8 when using rates of 3 to 7 oz/A.
• Canopy at 2 oz/A can be used as a burndown treatment on soils with variable pH outside of the Nicollet-Clarion-Webster and Hamburg-Ida-Monona soil associations.
• Chlorimuron has a long soil residual and may carry over and injure corn. Carryover of chlorimuron is greater on soils with a high pH. Refer to label for rotational restrictions. Chlorimuron may interact with ALS herbicides applied to corn the following year, thus increasing the potential for injury to corn.
• Consider potential for localized areas in field that may have a high pH resulting in carryover. Composite soil samples taken for fertility testing may not reveal these areas.
• Do not plant field corn for 10 months after application or Clearfield field corn for 8 months.
## Comments–Canopy 75 DF, continued

- Canopy may interact with other ALS herbicides applied to soybeans, thus increasing the potential for crop injury.
- Soybean injury may occur if excessive rainfall occurs after application.
- Thoroughly clean sprayer following use to avoid crop injury. Refer to label for cleaning instructions.
- Do not graze treated fields or harvest for forage or hay. May be applied aerially.
- When used for burndown, add 1% v/v crop oil concentrate. Assure II or Roundup Ultra may be included to improve grass control. Substitute 0.25% NIS for the COC when mixing with Roundup Ultra.

### Trade Name | Common Name | Rate/Range
---|---|---
Canopy XL 56.3 DF | 46.9% sulfentrazone + 9.4% chlorimuron ethyl | 2.5 to 7.9 oz/A

### Mode of Action
PPO + ALS

### Application Timing

**Fall applications**—Apply 2.5 oz after fall harvest but before ground freeze to control winter annual weeds.

**Early preplant**—Apply up to 30 days prior to planting. Will provide some burndown of existing weeds.

**Preplant incorporated**—Apply and uniformly incorporate no deeper than 1 to 2 inches deep in the soil. May be applied up to 30 days prior to planting.

**Preemergence**—Apply before soybeans emerge.

### Comments
- Do not apply on fields with a pH greater than 6.8.
- Chlorimuron has a long soil residual and may carry over and injure corn. Carryover of chlorimuron is greater on soils with a high pH. Refer to label for rotational restrictions. Chlorimuron may interact with ALS herbicides applied to corn the following year, thus increasing the potential for injury to corn.
- Consider potential for localized areas in field that may have a high pH resulting in carryover. Composite soil samples taken for fertility testing may not reveal these areas.
- Do not plant field corn for 10 months after application or Clearfield field corn for 8 months.
- Soybean injury may occur if excessive rainfall occurs after application.
- Canopy XL may interact with other ALS herbicides applied to soybeans, thus increasing the potential for crop injury.
- Fall applications intended for controlling winter annuals. Will provide limited activity on spring germinating weeds.
- Apply in a minimum of 10 gallons of water per acre.
- Do not apply aerially.
- Thoroughly clean sprayer following use to avoid crop injury. Refer to label for cleaning instructions.
- Do not graze treated fields or harvest for forage or hay.
- When used for burndown, add 1% v/v crop oil concentrate. Assure II or Roundup Ultra may be included to improve grass control. Substitute 0.5% NIS for the COC when mixing with Roundup Ultra.

### Trade Name | Common Name | Formulation | Rate/Range
---|---|---|---
Command 4EC | clomazone | 4 EC | 1 to 2 pt/A
Command 3ME | | 3ME | 1½ to 2½ pt/A

### Mode of Action
Bleacher
**Application Timing—Command 4EC**

Early preplant—Apply Command 4EC prior to field green-up (trees or shrubs bordering the treatment site have broken dormancy and are showing green leaf tissue) but no later than April 1 south of I-80 and April 10 north of I-80.

Preplant incorporated—Apply Command 4EC and incorporate immediately unless the soil is dry. On dry soils, incorporation must be completed within 8 hours of application. Shallow incorporation generally results in better weed control than deep incorporation.

Preemergence—Apply Command 3ME before soybeans emerge. May be applied up to 30 days before planting.

**Comments**

- Off-site movement of spray drift or vapors of Command can cause foliar whitening or yellowing of nontarget plants. Prior to making applications, read and strictly follow all precautions and instructions on the label.
- Command 3ME is an encapsulated formulation. Encapsulation reduces volatilization from the soil surface, therefore reducing the likelihood of off-target movement and injury to susceptible plants in adjacent areas.
- Do not apply within 1,200 ft of towns, subdivisions, commercial fruit and vegetable production, nurseries, or greenhouses. Refer to label for other restrictions.
- Command may carry over and cause early season injury to rotational crops.
- Do not plant wheat, oats, barley, rye, or alfalfa in the fall of the year of application or in the spring of the following year.
- Thoroughly clean sprayer following use to avoid crop injury. Refer to label for cleaning instructions.
- May be applied with fluid fertilizer; do not apply aerially.
- Do not allow livestock to graze on treated soybean vines or harvest vines for forage.

<table>
<thead>
<tr>
<th>Trade Name</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Command Xtra</td>
<td>39.6% sulfentrazone + 31.4% clomazone</td>
<td>8 to 12 oz/A + 21.3 to 32 oz/A</td>
</tr>
</tbody>
</table>

**Mode of Action**

PPO + bleacher

**Application Timing**

Early preplant—Apply up to 30 days prior to planting. May provide some burndown of existing weeds.

Preemergence—Apply before soybeans emerge.

**Comments**

- Do not apply on fields with soils classified as sand with less than 1% organic matter.
- Do not apply more than once per season.
- Do not allow livestock to graze on treated soybean vines, or feed treated soybean vines or vine trash to livestock.
- Command Xtra is a co-pack containing 3 quarts Command Xtra B and 2 gallons Command Xtra G.
- Each Command Xtra co-pack will treat 8 to 12 acres depending on the soil type.

<table>
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<tr>
<th>Trade Name</th>
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<th>Rate/Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 60DF</td>
<td>24% flufenacet + 36% metribuzin</td>
<td>9 to 16 oz/A</td>
</tr>
</tbody>
</table>

**Mode of Action**

unknown + PSII

**Application Timing**

Preplant surface or incorporated—Apply up to 14 days prior to planting. If incorporating, mix into upper 1 to 2 inches of soil.

Preemergence—Apply following planting but before crop or weed emergence.
**Comments–Domain 60DF**

- Intended for use with planned postemergence program. Domain will provide only early season (from 3 to 6 weeks) residual control.
- Crop injury may occur when 1) soils have a calcareous surface area or a pH of 7.5 or greater, 2) a soil applied OP insecticide is used, or 3) applied or incorporated unevenly.
- Sixteen oz/A Domain provides the equivalent of 0.5 lb Sencor 75DF/A.
- Flufenacet is similar in activity to metolachlor, acetochlor, and other amide herbicides.

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>Dual II MAGNUM</td>
<td>S-metolachlor</td>
<td>7.64 EC</td>
<td>1.0 to 2.0 pt/A</td>
</tr>
<tr>
<td>Dual II MAGNUM G</td>
<td>S-metolachlor</td>
<td>16G</td>
<td>6 to 15 lb/A</td>
</tr>
</tbody>
</table>

**Mode of Action**
Unknown

**Application Timing**
Fall application—Apply 1.67 to 2.0 pt/A of Dual II MAGNUM after September 30 north of U.S. 30 or after October 15 south of U.S. 30 when soil temperature at a 4-inch depth is less than 50°F. Do not apply to frozen soil.

Early preplant—Apply up to 30 days ahead of planting as a single application or up to 45 days ahead of planting as a split application.

Preplant incorporated—Apply and incorporate into the top 2 inches within 14 days before planting.

Preemergence—Apply during or after planting but before weeds or crops emerge.

**Comments**
- The higher rates are required on soils with high organic matter or for control of black nightshade.
- May be applied with liquid or dry fertilizers, through center pivot irrigation, or aerially.
- Treated areas may be grazed or used for forage.
- ISU research has found that fall applications increase the likelihood of late-season weed breakthroughs due to early degradation of metolachlor.

<table>
<thead>
<tr>
<th>Trade Name</th>
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<th>Formulation</th>
<th>Rate range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Express</td>
<td>tribenuron</td>
<td>75% DF</td>
<td>1/6 to 1/3 oz</td>
</tr>
</tbody>
</table>

**Mode of Action**
ALS

**Application Timing**
Fall application - Apply in the fall after harvest but before ground freeze.

**Comments**
- Do not apply in spring.
- Do not plant corn or soybean within 45 days of application.
- Express will provide control of chickweed and certain other winter annuals.
<table>
<thead>
<tr>
<th>Trade Name</th>
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<th>Formulation</th>
<th>Rate/Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>FirstRate/Amplify</td>
<td>cloransulam-methyl</td>
<td>84% WDS</td>
<td>0.6 to 0.75 oz/A</td>
</tr>
</tbody>
</table>

**Mode of Action**
ALS

**Application Timing**
- **Preplant incorporated**—Apply and incorporate into the top 1 to 3 inches of soil up to 4 weeks prior to planting.
- **Preplant surface**—Apply up to 4 weeks prior to planting.
- **Preemergence**—Apply after planting but before crop emergence.

**Comments**
- FirstRate can be applied postemergence. Refer to the label to determine the proper application rate.
- A post application of 0.3 oz/A FirstRate may follow a soil application of 0.75 oz/A or less.
- Do not apply more than 1.05 oz/A FirstRate per growing season.
- FirstRate may interact with other ALS herbicides applied to soybeans, thus increasing the potential for crop injury.
- Giant ragweed populations resistant to FirstRate have been identified in Iowa and some adjacent states.
- Refer to the FirstRate label for specific rotational information.
- Cloransulam occasionally has injured corn the year following application. Late applications, below average precipitation after application, and interactions with other ALS herbicides increase the potential for adverse crop response.

<table>
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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Frontier</td>
<td>dimethenamid</td>
<td>6.0 EC</td>
<td>16 to 32 oz/A</td>
</tr>
<tr>
<td>Outlook</td>
<td>dimethenamid-P</td>
<td>6.0 EC</td>
<td>10 to 21 oz/A</td>
</tr>
</tbody>
</table>

**Mode of Action**
Unknown

**Application Timing**
- **Early preplant**—Use split applications made 30 to 45 days before planting. Treatments made 30 days or less before planting may be made as a single application. Use the highest rate recommended for the soil type.
- **Preplant incorporated**—Incorporate 1 to 2 inches deep up to two weeks before planting.
- **Preemergence**—Apply after planting and before crop emergence.
- **Early postemergence**—May be applied up to the third trifoliolate stage.

**Comments**
- Do not graze or feed forage, hay, or straw to livestock.
- If conditions of high rainfall and water-saturated soil occur during soybean germination or seedling development, Frontier may suppress soybean development.
- Frontier may be applied at reduced rates of 15 to 20 oz/A when used in postemergence tank mixes with Pursuit.
- Temporary soybean burn and stunting may occur if applied to emerged soybeans.
- Outlook contains the resolved isomer of dimethenamid.

<table>
<thead>
<tr>
<th>Trade Name</th>
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<th>Rate/Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gauntlet</td>
<td>75% sulfentrazone + 84% cloransulam-methyl</td>
<td>5.33 to 6.67 oz/A + 0.6 to 0.75 oz/A</td>
</tr>
</tbody>
</table>

**Mode of Action**
PPO + ALS
**Application Timing—Gauntlet**

Early preplant—Apply up to 30 days prior to planting. May provide some burndown of existing weeds.

Preplant incorporated—Apply up to 30 days prior to planting and incorporate in the top 1 to 3 inches of soil.

Preemergence—Apply before soybeans emerge.

**Comments**

- Do not apply if soybeans have begun to emerge, as injury may result.
- Do not apply by air or through any type of irrigation system.
- Do not make more than one application per season.
- Do not feed treated soybean forage or soybean hay to livestock.
- Do not harvest soybeans for 65 days after Gauntlet application.
- Do not apply to soils classified as sands containing less than 1% organic matter.
- Gauntlet is a co-pack containing 26.5 oz sulfentrazone and five water soluble packets each containing 0.6 oz FirstRate (8:1).
- Cloransulam occasionally has injured corn the year following application. Late applications, below average precipitation after application, and interactions with other ALS herbicides increase the potential for adverse crop response.

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>Lasso EC, MicroTech</td>
<td>alachlor</td>
<td>4 EC, ME</td>
<td>2 to 3.0 qt/A</td>
</tr>
<tr>
<td>Intro</td>
<td></td>
<td>4 EC</td>
<td>16 to 20 lb/A</td>
</tr>
</tbody>
</table>

**Mode of Action**

Unknown

**Application Timing**

Early preplant—MicroTech may be applied up to 30 days ahead of planting as a single application, or up to 45 days ahead of planting as a split application.

Preplant incorporated—Apply within 7 days of planting and incorporate into the top 2 inches of soil.

Preemergence—Apply after planting, before weed and crop emergence, and within 5 days of last preplant tillage operation.

**Comments**

- All products containing alachlor are restricted use pesticides and contain a groundwater protection statement.
- MicroTech and Partner are encapsulated formulations of alachlor.
- The higher rates are required on soils with high organic matter or for control of black nightshade.
- Lasso and MicroTech may be applied in fluid fertilizer.
- Do not apply by air; do not graze treated area or feed treated forage to livestock.
- Refer to specific alachlor label for tank mixing and application instructions.

<table>
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<th>Rate/Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lorox DF</td>
<td>linuron</td>
<td>50 DF</td>
<td>1 to 5 lb/A</td>
</tr>
<tr>
<td>Lorox</td>
<td></td>
<td>4 L</td>
<td>1 to 5 pt/A</td>
</tr>
</tbody>
</table>

**Mode of Action**

PSII

**Application Timing**

Preemergence—Apply after planting but before crop emerges.
Comments—Lorox

- Soybeans should be planted at least 1 1/4 inches deep to reduce risk of injury. Injury from Lorox appears as yellowing (chlorosis) followed by necrosis of lower leaves.
- Heavy rainfall following application on a poorly prepared seedbed may result in severe injury.
- Lorox is not effective on many of the high organic matter soils found in the Clarion-Nicollet-Webster soil association.
- Do not apply in liquid fertilizer; may be applied aerially.

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>Prowl</td>
<td>pendimethalin</td>
<td>3.3 EC</td>
<td>1.2 to 3.6 pt/A</td>
</tr>
<tr>
<td>Pendimax</td>
<td>3.3 EC</td>
<td>1.2 to 3.6 pt/A</td>
<td></td>
</tr>
<tr>
<td>Pentagon</td>
<td>60 DG</td>
<td>0.85 to 2.5 lb/A</td>
<td></td>
</tr>
<tr>
<td>Prowl H₂O</td>
<td>3.8 ACS</td>
<td>1.5 to 3.0 pt/A</td>
<td></td>
</tr>
</tbody>
</table>

Mode of Action

Microtubule

Application Timing

Preplant incorporated—Incorporate 1.2 to 3.6 pt EC or equivalent/A into the soil within 7 days after application, and plant soybeans within 60 days after application. Prowl H₂O may be applied up to 60 days prior to planting and incorporated.

Preplant surface—May be surface applied up to 45 days before planting. Prowl at 1.2 to 3.6 pt/A applied alone should be followed by a postemergence application of Pursuit.

Preemergence—Apply 1.2 to 3.0 pt/A at planting or up to 2 days after planting.

Fall application—May be applied following harvest but before soil freeze-up.

Comments

- Do not apply preemergence north of I-80 due to increased potential for crop injury.
- Prowl H₂O is a water-based encapsulated formulation. Encapsulation may reduce volatilization losses associated with surface applications and allow easier cleaning of equipment after spraying compared to the EC formulation.
- At label rates, Prowl may occasionally carry over and injure rotational crops. Carryover is most likely in areas of overlaps or other areas of misapplication.
- May be applied in the fall when followed with an early postemergence application of Pursuit. ISU does not recommend fall applications.

<table>
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<tr>
<th>Trade Name</th>
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<th>Rate/Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pursuit Plus</td>
<td>2.7 lb pendimethalin + 0.2 lb imazethapyr/gal</td>
<td>2.5 pt/A</td>
</tr>
</tbody>
</table>

Mode of Action

Microtubule + ALS

Application Timing

Preplant surface applications—May be surface applied up to 45 days prior to soybean planting. Mechanical incorporation is recommended if sufficient rainfall to activate herbicide does not occur prior to planting.

Preplant incorporated—Apply following land preparation and thoroughly incorporate to a depth of 1 to 2 inches within 7 days of application.

Preemergence—May be surface applied up to 2 days after soybean planting south of I-80 only. Do not apply after soybean planting north of I-80.
Comments–Pursuit Plus
- The components of Pursuit Plus have long soil residual characteristics and may carry over. Refer to label for specific rotational restrictions.
- Mechanically incorporated treatments have provided more consistent control than surface applied treatments.
- Do not apply aerially. Do not graze or feed treated forage. Do not apply products containing chlorimuron ethyl, imazaquin, or imazethapyr the same year as Pursuit Plus.
- Pursuit Plus may interact with other ALS herbicides applied to soybeans, thus increasing the potential for crop injury.
- See remarks under Pursuit and Prowl.
- Imazethapyr may interact with ALS herbicides applied to corn the following year, thus increasing the potential for injury to corn.

<table>
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</tr>
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<tbody>
<tr>
<td>Python</td>
<td>flumetsulam</td>
<td>80 WDG</td>
<td>0.8 to 1.33 oz/A</td>
</tr>
</tbody>
</table>

Mode of Action
ALS

Application Timing
Preplant incorporated and preemergence—Apply from 30 days prior to planting until before the cracking stage.

Comments
- Do not harvest within 85 days of application.
- Do not use on soils with pH greater than 7.8.
- Do not use on soils with more than 5% organic matter if the soil pH is less than 5.9.
- Do not use on peat or muck soils.
- Do not graze or feed treated soybean forage, hay, or straw to livestock.
- Python may interact with other ALS herbicides applied to soybeans, thus increasing the potential for crop injury.
- Do not apply aerially.

<table>
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</thead>
<tbody>
<tr>
<td>Sencor</td>
<td>metribuzin</td>
<td>75 DF</td>
<td>½ to ½ lb/A</td>
</tr>
<tr>
<td>Sencor</td>
<td></td>
<td>4 F</td>
<td>¼ to 1¼ pt/A</td>
</tr>
</tbody>
</table>

Mode of Action
PSII

Application Timing
Preplant incorporated—Metribuzin may be applied between 7 and 21 days ahead of planting, depending upon tank mix partner. Refer to label for specific restrictions.
Preemergence—Apply at or after planting but prior to soybean emergence.

Comments
- Injury potential is greater on soils with a pH greater than 7. Do not use on soils with a pH greater than 7.5.
- Injury appears as yellowing or bronzing of lower leaves, followed by necrosis and sometimes stand reductions.
- Plant seed at least 1½ inches deep to reduce risk of crop injury.
- Treated vines may be grazed or fed to livestock 40 days after application.
Trade Name  | Common Name  | Formulation | Rate/Range
--- | --- | --- | ---
Sonalan  | ethalfluralin  | 3 HFP | 1.5 to 3.5 pt/A

**Mode of Action**
Microtubule

**Application Timing**
Preplant incorporated—Incorporate into the top 2 to 3 inches of soil within 2 days after application. May be applied up to 3 weeks prior to planting.

**Comments**
- Sonalan is similar to Treflan in performance but has reduced risk of carryover. Soybeans have slightly less tolerance to Sonalan than to Treflan.
- Will provide partial control of black nightshade when using higher rates (up to 3½ pt/A) and two-pass incorporation. Higher rates increase risk of crop injury.
- Do not graze or forage soybean vines treated with Sonalan.
- Do not apply Canopy to soil with less than 0.5% organic matter.
- Do apply aerially.
- Do not use Sencor combinations on coarse-textured soils with less than 1% organic matter.
- Refer to all labels when applying tank mix combinations.

Trade Name  | Common Name  | Rate/Range
--- | --- | ---
Squadron  | 2.0 lb pendimethalin + 0.33 lb imazaquin/gal | 3.0 pt/A

**Mode of Action**
Microtubule + ALS

**Application Timing**
Preplant incorporated—Incorporate into the top 1 to 2 inches of soil immediately before or up to 45 days before planting. Incorporate within 7 days of application.
Preemergence—Apply up to 45 days before, during, or after planting but prior to soybean emergence.

**Comments**
- Do not apply postemergence to soybeans.
- Do not plant corn the year following Squadron application.
- Incorporate Squadron + Prowl combinations north of I-80.
- Do not apply through chemigation systems.
- Do not graze or feed treated soybean forage, hay, or straw to livestock.
- Apply Squadron only once during the growing season.
- ISU does not recommend the use of 2,4-D amine formulations.
- ISU does not recommend the use of 2,4-DB.
- Squadron may interact with other ALS herbicides applied to soybeans, thus increasing the potential for crop injury.
- Imazaquin has long soil residual characteristics and has demonstrated carryover to rotational corn.
- Refer to Squadron label for specific rotational recommendations.
- Do not use products containing chlorimuron ethyl, fluometosulam, imazethapyr, or imazaquin the same year as Scepter application, unless labeled otherwise, due to carryover to rotational corn.
- There is a 90-day interval between Squadron application and soybean harvest.
Trade Name | Common Name | Formulation | Rate/Range
---|---|---|---
Steel | 0.17 lb imazaquin + 0.17 lb imazethapyr + 2.25 lb pendimethalin/gal | | 3.0 pt/A

Mode of Action
ALS + ALS + microtubule

Application Timing—Steel
Preplant incorporated—Incorporate into the top 1 to 2 inches of soil within 7 days after application. May be applied up to 45 days prior to planting.
Preemergence—Apply up to 45 days prior to planting but before crop emergence. Steel may be applied to the surface prior to planting and up to 2 days after planting south of I-80.

Comments
• Do not apply Steel after planting north of I-80.
• In no-tillage systems, Steel may be mixed with 2,4-D, 2,4-DB, Gramoxone Extra, or Roundup to control existing weeds.
• Refer to label for rotational restrictions. ISU recommends following Steel applications with a Clearfield corn hybrid the year following application in Iowa.
• Do not apply Steel after soybean emergence due to concerns for crop injury.
• Steel may interact with other ALS herbicides applied to soybeans, thus increasing the potential for crop injury.
• Do not apply to crops other than soybeans.
• In northern Iowa (Region 3 on the label), apply Steel prior to July 1.
• Refer to Steel label for herbicides restricted for application the same year as Steel application.

Trade Name | Common Name | Formulation | Rate/Range
---|---|---|---
Treflan HFP | trifluralin | 4 EC | 1 to 2 pt/A
Treflan TR-10 | | 10% granule | 5 to 10 lb/A
Trifluralin, Tri-4, generic brands | | 4 EC | 1 to 2 pt/A

Mode of Action
Microtubule

Application Timing—Treflan
Preplant incorporated—Treflan must be incorporated one time within 24 hours after application; a second pass should be made any time prior to planting. Incorporate into the top 2 to 3 inches of soil.

Comments
• May be applied aerially or with liquid or dry fertilizer.
• At labeled rates, trifluralin may occasionally carry over and injure rotational crops. Carryover is most likely in areas of overlaps or other areas of misapplication.
• There are no limitations on crop use following trifluralin application.
• Treflan may be applied in the fall from October 15 to December 31; however, ISU does not recommend this application.
• Refer to all labels when applying a tank mix.