

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

Mode of Action

Microtubule

Application Timing

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.

Postemergence Herbicides for Soybean Production

The following herbicides are used to control established weeds following soybean emergence. Some products are labeled for both preemergence and postemergence applications.

Trade Name	Common Name	Formulation	Rate/Range
Aim/Avalanche	carfentazone-ethyl	2EW	0.25 – 1.6 oz/A

Mode of Action

PPO

Application Timing

Apply up to 30 days before planting until soybeans reach the third trifoliolate. Weeds should be emerged and actively growing but no more than 4 inches tall or rosettes are less than 3 inches in diameter. Apply Aim at 0.25 oz/A broadcast for velvetleaf control. Aim/Avalanche may be applied at 0.5 to 1.6 oz/A as a post-directed treatment.

Comments

- Aim/Avalanche can be applied broadcast only at a rate of 0.25 oz/A. Apply higher rates as a post-directed application.
- Do not apply when wind speed is greater than 10 MPH.
- Do not tank mix with EC formulations or use crop oil concentrate.
- If spray contacts soybean foliage, severe injury can occur.

Trade Name	Common Name	Formulation	Rate/Range
Assure II	quizalofop-p-ethyl	0.8 EC	5 to 10 oz/A

Mode of Action

ACCase

Application Timing

Apply to young, actively growing grasses with size range listed on label. Apply prior to 80 days before harvest. Do not apply after soybean pod set.

Recommended Spray Additives

Crop oil concentrate-1% v/v; or nonionic surfactant-0.125-0.25% v/v.

Comments

- Refer to the label for specific additive recommendations.
- Use lower rate of surfactant with Pinnacle tank mixes.
- Tank mixing with broadleaf herbicides may reduce grass control. Rates may be increased by 2 oz when used in tank mixes to overcome antagonism for some grass species.
- May be applied aerially.
- Do not graze treated fields or harvest for foliage or hay.
- Do not tank mix Assure II with other herbicides when treating yellow foxtail, woolly cupgrass, barnyardgrass, crabgrass, quackgrass, or wirestem muhly.
- When making a sequential application, apply Assure II and delay application of broadleaf herbicide 24 hours, or apply the broadleaf herbicide and delay Assure II application 7 days.
- Do not use vegetable-based oils as adjuvants with Assure II.
- Do not cultivate within 7 days prior to or after Assure II application.
- Assure II is rainfast within 1 hour of application.
- Do not apply more than 18 oz/A Assure II per season.
- Do not apply Assure II within 80 days of harvest or after pod set has begun.
- May be applied early preplant as a burndown tank-mix with Authority, Canopy XL and/or 2,4-D. Refer to the specific labels for restrictions.

Trade Name	Common Name	Formulation	Rate/Range
Basagran	bentazon	4 L	1 to 2 pt/A

Mode of Action

PSII

Application Timing

Apply when weeds are small and actively growing and before weeds reach maximum size listed on label.

Recommended Spray Additives

Crop oil concentrate-1 to 2 pt/A; UAN-0.5 to 1 gal/A; or ammonium sulfate-2.5 lb/A or 3 qt/A.

Comments–Basagran

- Additive selection should be based on weed species present. Do not use both COC and UAN.
- Thorough coverage of foliage required for adequate control. Apply in a minimum of 20 gal of water/A and a minimum of 40 PSI.
- Do not cultivate within 5 days before or after application.

Trade Name	Common Name	Formulation	Rate/Range
Blazer, Ultra Blazer	acifluorfen	2 L	0.5 to 1.5 pt/A

Mode of Action

PPO

Application Timing

Apply early when weeds are small and actively growing and before weeds reach maximum size listed on label. Do not apply within 50 days of harvest.

Recommended Spray Additives

Nonionic surfactant-1 pt per 100 gal water; higher rates may be used for specific weeds. UAN-0.5 to 1 gal/A. Crop oil concentrate-1 to 2 pts/A.

Comments

- Soybean leaves may exhibit burning, crinkling, and bronzing, particularly on young foliage. Injury is normally short lived.
- Do not cultivate within 5 days before or 3 to 7 days after application.
- Thorough coverage of foliage required for adequate control. Use a minimum of 20 gal water and 40 PSI.
- Additive selection based upon target species and tank mix partner.
- Do not use flood, whirl chamber, or CDA nozzles.
- Do not use treated plants for feed or forage.

Trade Name	Common Name	Formulation	Rate/Range
Classic	chlorimuron ethyl	25 DF	0.25 to 0.75 oz/A

Mode of Action

ALS

Application Timing

Should be applied to young, actively growing weeds. Can be applied after first trifoliolate until 60 days before harvest.

Recommended Spray Additives

Nonionic surfactant-0.25% v/v; or crop oil concentrate-1% v/v. UAN (2-4 qt/A), 10-34-0 (1-2 qt/A) or ammonium sulfate (2-4 lb/A) should be used in combination with a surfactant or COC for velvetleaf control. Use only 0.5% (v/v) COC with Cobra tank mixes and NIS with Roundup Ultra tank mixes.

Comments

- Apply in a minimum of 10 gal water. Use flat fan or hollow cone nozzles.
- Cultivation before, during, or within 7 days after application is not recommended.
- Follow label directions for cleaning sprayer after use.
- Do not graze treated fields or harvest for forage or hay.
- Classic may be aerially applied.

Comments—Classic, continued

- Classic may interact with other ALS herbicides applied to soybeans, thus increasing the potential for crop injury.
- Classic may interact with ALS herbicides applied to corn the following year, thus increasing the potential for injury to corn.
- Do not apply to plants under stress.
- There is a 60-day interval between application and harvest.
- High soil pH (greater than 7.0) increases the persistence of Classic. Refer to the Classic label for specific restrictions.
- Do not use Dash adjuvant with Classic + Pinnacle combinations.
- ISU does not recommend 2,4-DB.
- Apply Classic + Roundup Ultra on RR soybean varieties only.

Trade Name	Common Name	Formulation	Rate/Range
Cobra	lactofen	2 EC	6 to 12.5 oz/A
Phoenix	lactofen	2 EC	8 to 12.5 oz/A

Mode of Action

PPO

Application Timing

Apply to small, actively growing weeds that are not larger than listed on label.

Recommended Spray Additives

Cobra -COC-Use 0.25 to 1% (v/v); or NIS-Use 0.25% (v/v) when soil moisture is good and weeds are actively growing; or AMS-4 lb when weeds are actively growing. Additive recommendations are based upon weed size and environmental conditions. See label for specific recommendations.

Phoenix – Add NIS at 0.125 to 0.25% v/v COC is recommended when weeds are stressed due to hot and dry conditions.

Under these conditions, use COC at 1 pt/A or use COC at 0.125 to 0.5% v/v plus NIS at 0.125 to 0.25% v/v. When Phoenix is applied in combination with glyphosate, use AMS at 2 to 4 lb/A only.

Comments

- Soybean injury is likely, although plants usually recover with no impact on yield potential.
- Apply in 20 to 30 gal water at 40-60 PSI. Do not use flood nozzles.
- Do not graze or harvest for feed or bedding.
- Do not apply after growth stage R6 (full seed) or within 45 days of harvest.
- Multiple applications may be made. Do not exceed 25 oz/A/season.
- Do not make band applications while cultivating or create excessive dust while spraying.

Trade Name	Common Name	Formulation	Rate/Range
Extreme	1.8% imazethapyr 22% glyphosate	2.17 E	3 pt/A

Mode of Action

ALS + EPSPS

Application Timing

Apply to actively growing weeds within the recommended stage of growth on label.

Recommended Spray Additives

Use a non-ionic surfactant (0.125% v/v) and fertilizer such as a spray grade ammonium sulfate (2.5 lb/A) or a nitrogen-based liquid fertilizer such as 28% UAN (1. to 2 qt/A).

Comments–Extreme

- 2,4-D may be added to improve perennial weed control when Extreme is applied as a burndown in no-tillage systems.
- Do not apply postemergence to non-glyphosate-resistant soybeans.
- Do not graze or feed treated soybean forage, hay, or straw to livestock.

Trade Name	Common Name	Formulation	Rate/Range
FirstRate/Amplify	cloransulam-methyl	84% WDS	0.3 oz/A

Mode of Action

ALS

Application Timing

Apply from soybean emergence until soybeans reach 50% flowering.

Recommended Spray Additives

Nonionic surfactant (0.125 to 0.25%) plus UAN (2.5%), or crop oil concentrate or methylated seed oil (1.2%), or crop oil concentrate or methylated seed oil (1.2%) plus UAN (2.5%).

Comments

- FirstRate can be applied preplant incorporated and preemergence. 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.
- Application prior to full emergence of the first soybean trifoliolate may cause temporary chlorosis.
- 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.

Trade Name	Common Name	Formulation	Rate/Range
Flexstar	fomesafen	1.88 ME	1 to 1.25 pt/A
Reflex	fomesafen	2 LC	0.75 to 1.25 pt/A

Mode of Action

PPO

Application Timing

Apply to actively growing weeds within recommended growth stages. Apply before soybeans bloom.

Recommended Spray Additives

Flexstar

MSO or COC-0.5 to 1.0% v/v. Include a minimum of 2.5% v/v UAN or a minimum of 10 lb AMS/100 gal water.

Reflex

Nonionic surfactant-0.25% v/v; or crop oil concentrate-0.5% to 1% v/v. UAN (1 gal/A), DAP (2 pt/A), or AMS may be used in addition to the NIS or COC.

Comments–Flextar, Reflex

- Do not apply fomesafen to any field more than once every two years. Refer to label for rotational restrictions.
- Apply in a minimum of 15 gal water with 30-60 PSI. Do not use flood nozzles.
- Do not graze treated areas or harvest for hay or forage.
- May be aerially applied.

Trade Name	Common Name	Formulation	Rate/Range
Fusilade DX	fluazifop-p-butyl	2 EC	6 to 12 oz/A

Mode of Action

ACCase

Application Timing

Apply to actively growing grasses at recommended growth stages on label. Apply to soybeans prior to bloom.

Recommended Spray Additives

Crop oil concentrate-0.5 to 1% v/v; or nonionic surfactant-0.25 to 0.5% v/v. UAN (1 gal/A) or ammonium sulfate may be used in combination with either the COC or surfactant.

Comments

- Tank mixing may reduce grass control. Refer to label for directions regarding tank mixes.
- Apply in 5 to 40 gal water with pressure of 40-60 PSI. Do not use flood tips. May be applied aerially.
- Cultivation is not recommended within 7 days prior to or 7 days after application.
- Do not graze or harvest for forage or hay.

Trade Name	Common Name	Rate/Range
Fusion 2.66 EC	2.0 lb fluazifop-p-butyl + 0.66 lb fenoxaprop-ethyl/gal	6 to 14 oz/A

Mode of Action

ACCase + ACCase

Application Timing–Fusion 2.66 EC

Apply to actively growing grasses within the stage of growth recommended on the label. Apply prior to soybean bloom.

Recommended Spray Additives

Crop oil concentrate-0.5 to 1% v/v; or nonionic surfactant-0.25 to 0.5% v/v. In addition to COC or NIS, UAN or ammonium sulfate may be added to the spray mixture. The fertilizer additives should not be a substitute for the COC or NIS.

Comments

- Tank mixtures with broadleaf herbicides may reduce grass control. Refer to the Fusion label for tank mix and sequential recommendations.
- Apply in 5 to 40 gal water/A with 40-60 PSI. Do not use flood tips.
- May be aerially applied.
- Cultivation is not recommended 7 days prior to or 7 days after application.
- Do not graze or harvest soybeans for forage or hay.
- May be tank mixed with 2,4-D (LVE) and applied preplant. Refer to label for directions.

Trade Name	Common Name	Formulation	Rate/Range
Harmony GT	thifensulfuron methyl	75 DF	1/12 oz/A

Mode of Action

ALS

Application Timing

Apply to weeds that are young but before they exceed size indicated on label. May be applied after first trifoliolate has fully expanded but no later than 60 days before harvest.

Recommended Spray Additives

Nonionic surfactant-0.125 to 0.25% v/v; or crop oil concentrate-0.5% v/v. UAN (2 to 4 qt/A), 10-34-0 (1-2 qt/A) or ammonium sulfate (2-4 lb/A) in addition to a surfactant is required for control of velvetleaf.

Comments

- Harmony GT is a concentrated formulation of thifensulfuron, previously marketed as Pinnacle.
- May cause soybean injury under hot and humid weather conditions. Use of crop oil concentrate increases injury potential. Injury appears as yellowing of leaves, shortened internodes, red veins, and occasionally death of apical growing point.
- Do not tank mix with Poast Plus.
- Do not make more than one application of Harmony per growing season.
- Apply no later than 60 days before harvest.
- Apply after the first trifoliolate has fully expanded.
- Do not use Dash unless specified on other DuPont supplemental labeling.
- Harmony may interact with other ALS herbicides applied to soybeans, thus increasing the potential for crop injury.
- Do not cultivate before, during, or within 7 days after Harmony application.
- Do not graze or feed forage, hay, or straw from treated areas to livestock.
- Do not apply through chemigation systems.
- Do not tank mix Harmony with any other herbicide unless specifically labeled due to potential for excessive crop injury.

Trade Name	Common Name	Formulation	Rate/Range
Poast Plus	sethoxydim	1 EC	18 to 36 oz/A

Mode of Action

ACCase

Application Timing

Apply to actively growing grasses within the recommended stage of growth on label.

Recommended Spray Additives

Crop oil concentrate-2 pt/A; or Dash HC-1pt/A. May include AMS (2.5 lb/A) or UAN (4 to 8 pt/A). Use a silicon-based surfactant with the Galaxy tank mix (0.25% v/v).

Comments

- Application in tank mixes may reduce grass control.
- Treated fields may be used for hay but not for grazing or forage.
- Do not apply to soybeans within 75 days of harvest.
- Do not apply if rainfall is expected within one hour following application.

Trade Name	Common Name	Formulation	Rate/Range
Pursuit	imazethapyr	2 AS	4 oz/A
Pursuit EcoPak		70 DG	1.44 oz/A (1 bag/5A)

Mode of Action

ALS

Application Timing

Apply when weeds are actively growing and before weeds exceed maximum size specified on label. For most species, maximum size is 3 inches.

Recommended Spray Additives

Nonionic surfactant-1 qt/100 gal, or crop oil concentrate-1% (v/v), or methylated seed oil-1% (v/v), and include 1 to 2 qt/A nitrogen-based liquid fertilizer or 2.5 lb/A ammonium sulfate.

Comments

- Pursuit may be applied preplant incorporated or preemergence up to 45 days ahead of planting. Incorporation improves consistency of soil-applied treatments.
- Pursuit has long soil residual characteristics and may occasionally carry over. Refer to label for specific restrictions.
- Do not apply products containing chlorimuron ethyl, flumetsulam, imazaquin, or imazethapyr the same year as Pursuit.
- Do not graze or feed treated soybean forage, hay, or straw to livestock.
- Pursuit may interact with other ALS herbicides applied to soybeans, thus increasing the potential for crop injury.
- Pursuit may interact with ALS herbicides applied to corn the following year, increasing potential for injury to corn.
- Do not tank mix Pursuit with clomazone products.
- Do not apply Pursuit within 85 days of harvest.
- Apply prior to soybean bloom.
- Apply combination of Pursuit plus Roundup Ultra to RR soybean varieties.

Trade Name	Common Name	Formulation	Rate/Range
Raptor	imazamox	1 AS	4 to 5 oz/A

Mode of Action

ALS

Application Timing

Apply postemergence when weeds and soybeans are actively growing and before the weeds exceed a height of 5 inches in height but prior to soybeans reaching the bloom stage of development.

Recommended Spray Additives

Crop oil concentrate-1% (v/v); or nonionic surfactant-0.25% (v/v); or methylated seed oil-1%(v/v). Nitrogen fertilizer solution-Always include a nitrogen-based fertilizer at 1 to 2 qt/A with either a COC or NIS. AMS at 2.5 lb/A may be substituted for 28% N or 10-34-0.

Rates for Combinations with Raptor

Raptor	Combination Product	Rate/Range
4 to 5 oz/A	Blazer	8 to 20 oz/A
4 to 5 oz/A	FirstRate	0.15 to 0.3 oz/A
4 to 5 oz/A	Flexstar HL	10 to 20 oz/A
4 to 5 oz/A	Roundup Ultra	16 to 32 oz/A

Comments–Raptor

- Use a soil-applied herbicide for grass control if a heavy infestation of annual grasses is present.
- Allow at least 85 days between application and soybean harvest.
- Raptor provides shorter residual control than Scepter or Pursuit.
- Do not apply after soybeans have initiated flowering.
- Raptor may interact with other ALS herbicides applied to soybeans, thus increasing the potential for crop injury.
- Do not make more than one application per year.
- Do not graze or feed treated soybean forage, hay, or straw to livestock.
- Tank mixing Raptor with selective postemergence grass and broadleaf herbicides may reduce grass control. A sequential program is recommended.
- Do not use liquid fertilizer as a carrier.
- Do not apply through any type of irrigation system.
- For maximum weed control, cultivate 7 to 10 days following application.

Trade Name	Common Name	Formulation	Rate/Range
Resource	flumiclorac	0.86 EC	4 to 12 oz/A

Mode of Action

PPO

Application Timing

Apply postemergence to actively growing weeds within size recommendations.

Recommended Spray Additives

COC-1 qt/A; 28% N or AMS may be used in addition to COC for control of tall velvetleaf.

Comments

- Use 12 oz rate for late control of large velvetleaf.
- Do not apply within 60 days of harvest or after pod set.
- Do not graze treated fields or harvest for forage or hay.

Trade Name	Common Name	Rate/Range
Rezult	Rezult B (bentazon 4 lb/gal) Rezult G (sethoxydim 1 lb/gal)	3.2 pt/A

Mode of Action

PSII + ACCase

Application Timing

Apply when weeds are small and actively growing. Refer to the label for specific size restrictions.

Recommended Spray Additives

UAN (1 to 2 qt/A); COC (1 pt/A); DASH (1 pt/A); or ammonium sulfate (1 to 2 lb/A).

Comments–Result

- Registered for aerial application.
- Do not apply if rainfall is expected within one hour following application.
- Do not apply to weeds or crops that are under stress.
- Do not apply within 75 days of harvest.
- Do not graze or cut treated soybean fields for hay for at least 30 days after application.

Trade Name	Common Name	Formulation	Rate/Range
Roundup Ultra	glyphosate	3SL	24 to 48 oz/A
Roundup UltraMax		4SL	20 to 40 oz/A
Roundup UltraDry		65DG	9.5 to 28.8 oz/A
Roundup WeatherMAX		5.5L	16 to 32 oz/A
Roundup WeatherMax		4.5 SL	22 to 44 oz/A
Many others		3SL	24 to 48 oz/A
Touchdown IQ		3SL	1 to 4 pt
Touchdown HiTech			
Touchdown Total			

Mode of Action

EPSPS

Application Timing–Roundup

Postemergence - Glyphosate may be applied from cracking through full flowering stage.

Recommended Spray Additives

AMS may be included if weeds are under stress or hard water is used as carrier. Certain glyphosate products recommend the use of a nonionic surfactant.

Comments

- Use only on Roundup Ready® soybean varieties.
- Refer to label of product being used to determine specific recommendations for rates, spray additives, and restrictions.
- Multiple applications can be made during the growing season. Do not exceed 2 qt/A Roundup Ultra with postemergence applications. A total of 8 qt/A may be applied during the growing season, including preplant, preemergence, postemergence, and preharvest applications.
- Do not apply aerially.
- Take appropriate precautions to minimize off-target movement of spray droplets.
- The timing and rates of glyphosate used for annual weeds will not be optimal for most perennial weeds.
- Equivalent rates of different concentration formulations of glyphosate

Roundup Original (3 lb ae/gal)	Roundup Ultramax (4 lb ae/gal)	Roundup WeatherMax (4.5 lb ae/gal)
24 oz	20 oz	16 oz
32 oz	26 oz	22 oz
40 oz	32 oz	27 oz

Trade Name	Common Name	Formulation	Rate/Range
Scepter	imazaquin	70DG	1.4 to 2.8 oz/A

Mode of Action

ALS

Application Timing

Postemergence—Apply postemergence to actively growing weeds within size recommendations.

Preplant incorporated—Apply preplant incorporated before planting and incorporate into the top 1 to 2 inches of soil. May be applied up to 45 days prior to planting. Incorporate within 7 days of application.

Preemergence—Apply preemergence up to 45 days before, during, or after planting but before the crop emerges.

Postemergence—Apply postemergence to actively growing weeds within size recommendations.

Recommended Spray Additives

When used alone, apply with COC, nonionic surfactant, or organo-silicone surfactant. See label for specific recommendations.

Comments

- Scepter has long soil residual characteristics and has demonstrated carryover to rotational corn.
- Do not graze or feed treated soybean forage, hay, or straw to livestock.
- Do not apply the Scepter + Prowl combination if soybeans have emerged.
- Iowa State University does not recommend combinations with 2,4-DB or 2,4-D amine.
- Iowa State University recommends the use of Clearfield hybrids following a postemergence application of Scepter.
- Refer to Scepter label for specific rotational recommendations.
- IMI corn may be planted after 9.5 months following application of Scepter + Pursuit applications.
- Scepter may interact with other ALS herbicides applied to soybeans, thus increasing the potential for crop injury.
- Do not use products containing chlorimuron ethyl, flumetsulam, imazethapyr, or imazaquin the same year as Scepter application, unless labeled otherwise, due to carryover to rotational corn.
- There is an 18-month rotational period for non-Clearfield hybrids following a 2.8 oz/A Scepter application.

Trade Name	Common Name	Formulation	Rate/Range
Select/Arrow	clethodim	2 EC	4 to 16 oz/A

Mode of Action

ACCase

Application Timing

Apply postemergence to actively growing grasses according to the Select label. Do not cultivate 7 days prior to or within 7 days after application. Apply prior to 60 days before harvest.

Recommended Spray Additives

Crop oil concentrate-1% (v/v) (but not less than 1 pt/A); 28% N (1 to 2 qt) or AMS (2.5 lb/A) may be used in combination with the COC.

Comments

- Do not apply more than 32 oz/A per season.
- Do not apply with flood nozzles.
- Do not graze treated fields or feed forage or hay to livestock.
- Do not apply if rain is expected within 1 hour of application.
- Apply 4 to 6 oz/A Select with glyphosate to control RR volunteer corn.

Trade Name	Common Name	Formulation	Rate/Range
Stellar	0.7 lb/gal flumiclorac + 2.4 lb/gal lactofen	3.1 EC	5 to 7 oz/A

Mode of Action

PPO + PPO

Application Timing

Apply postemergence to actively growing weeds within size restrictions on label.

Recommended Spray Additives

COC or methylated seed oil (1 to 2 pts/A); 28%N (1 to 2 qts/A); or AMS (2.5 lbs/A) may be used in combination with the COC or MSO to enhance weed control.

Comments

- Do not apply aerially.
- Do not apply after pod set or within 60 days of harvest.
- Do not use hay or straw for feed or bedding.
- Use RR soybean varieties for Stellar plus glyphosate applications.
- The addition of 28% N or AMS with Stellar will increase the potential for crop injury.

Trade Name	Common Name	Formulation	Rate/Range
Synchrony STS	31.8% chlorimuron ethyl 10.2% thifensulfuron methyl	42 DF	0.5 oz/A

Mode of Action

ALS + ALS

Application Timing– Synchrony STS

Apply to actively growing weeds within the recommended growth stage. Apply after the first trifoliolate has fully expanded but no later than 60 days before harvest.

Recommended Spray Additives

Crop oil concentrate-1% (v/v) plus UAN (2 to 4 qt/A); 10-34-0 (1 to 2 qt/A) or ammonium sulfate (2 to 4 lb/A); NIS - 0.25% (v/v) with Blazer and 0.5% (v/v) with Cobra tank mixes; include UAN (2 to 4 qt/A) or ammonium sulfate (2 to 4 lb/A).

Comments

- Can be used on soybean varieties designated as STS in the variety name and non-STS varieties.
- Synchrony STS can be applied to non-STS soybean varieties. Use 0.25 oz/A and NIS at 0.25% (v/v) with UAN or AMS.
- Refer to label for soil pH and rotation restrictions.
- Apply in a minimum of 10 gal. water and use flat fan nozzles.
- Do not graze treated fields or harvest for forage or hay.
- Synchrony may interact with other ALS herbicides applied to soybeans, thus increasing the potential for crop injury.
- Chlorimuron may interact with ALS herbicides applied to corn the following year, increasing potential for injury to corn.
- Iowa State University does not recommend 2,4-DB.
- Apply prior to 60 days before soybean maturity.
- Make only one application per growing season.
- Apply after the first trifoliolate has fully expanded.
- Do not apply with chemigation systems.

Comments—Synchrony STS, continued

- Cobra may be applied in combination with Synchrony STS at a rate of 8 to 12.5 oz/A.
- Use the 4 to 6 oz/A Cobra rate for control of ALS-resistant common waterhemp and black nightshade; use 0.5% COC.
- Apply when common waterhemp is actively growing and less than 4 inches tall.
- Chlorimuron has a long soil residual life in soils with a high pH (7.0 or greater); refer to the label for specific restrictions concerning crop rotational intervals.
- Soils of concern for carryover are those in the Clarion-Nicollet-Webster and Hamburg-Ida-Monona associations, and soils in the Missouri River flood plain. Also, fields near limestone gravel roads may have a higher pH than typically anticipated.

Preplant and Preemergence Herbicides for Corn 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 reduces 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 preemergence 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.

Trade Name	Common Name	Formulation	Rate/Range
AAtrex, atrazine	atrazine	4 L	2 to 4 pt/A
AAtrex, atrazine		90 DF	1.8 to 2.2 lb/A

Mode of Action

PSII

Application Timing—AAtrex, atrazine

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

Preplant incorporated—For best results, apply within 2 weeks prior to planting.

Preemergence—Apply during or shortly after planting before weed emergence.

Postemergence—Apply before broadleaf weeds exceed 4 inches, grasses exceed 1.5 inches, and corn 12 inches in height. Include crop oil concentrate or crop oil.

Comments

- All products containing atrazine are restricted-use pesticides.
- Products containing atrazine include a groundwater advisory statement on the label.
- Atrazine residues may persist and cause damage to susceptible crops the following growing season. See label for rotation restrictions. Carryover is greatest on soils with alkaline pH.
- May be used on ear corn, silage corn, sweet corn, and popcorn.
- Maximum annual rate for preemergence application on highly erodible soils is 2.0 lb a.i./A on fields with 30% or more crop residue and 1.6 lb a.i./A on fields with less than 30% crop residue.
- Maximum annual preemergence rate on soils not highly erodible is 2.0 lb a.i./A.
- Maximum annual postemergence rate where no soil-applied atrazine was used is 2.0 lb a.i./A, and where soil-applied atrazine was used, the total amount of atrazine may not exceed 2.5 lb a.i./A.
- Do not mix or load within 50 feet of any well, sinkhole, intermittent streams and rivers, or natural or impounded lakes and reservoirs.
- No application within 66 feet of the points where field surface water runoff enters perennial or intermittent streams and rivers.

Comments—Aatrex, continued

- Atrazine may be applied within 66 feet of standpipes of tile inlets on terraced fields if the product is mechanically incorporated to a depth of 2 to 3 inches or if the field is maintained in high residue no-till production.
- If applied to highly erodible land, a 66-foot buffer planted to crop, grass, or other suitable crop must be established at runoff entry points.
- No application will be permitted within 200 feet of natural or impounded lakes and reservoirs.

Trade Name	Common Name	Rate/Range
Axiom AT 75	19.6% flufenacet + 4.9% metribuzin + 50.5% atrazine	1.5 to 3.75 lb/A

Mode of Action

Unknown + PSII + PSII

Application Timing

Preplant Surface—May be applied up to 45 days prior to corn planting.

Preplant Incorporated—Incorporate into upper 1 to 2 inches of soil within 14 days of planting.

Preemergence—Apply after planting but before crop emerges.

Comments

- Flufenacet is similar in activity to amide herbicides (metolachlor, acetochlor, etc.)
- Sequential applications are recommended for preplant applications made 30 to 45 days prior to planting.
- May be used on field corn or corn grown for silage. Do not use on popcorn, sweet corn, white corn or corn grown for seed.
- Do not apply aerially.

Trade Name	Common Name	Formulation	Rate/Range
Axiom 68 DF	flufenacet 54.4% + metribuzin 13.6%	68 DF	8 to 23 oz/A

Mode of Action

Unknown + PSII

Application Timing

Preplant surface—Apply two-thirds recommended rate as a split application 30 to 45 days before planting and the remainder at planting. Applications made less than 30 days may be as either a split or single application.

Preplant incorporated—Apply and incorporate into the top 1 to 2 inches of soil up to 14 days before planting.

Preemergence—Apply during or after planting but prior to corn or weed emergence.

Fall—Apply after October 15 when soil temperature at the 4-inch depth is less than 50°F. Iowa State University does not recommend fall application of any herbicide.

Comments

- Axiom may be impregnated on dry fertilizer.
- Axiom may be applied with liquid fertilizer, but a compatibility test is highly recommended.
- Axiom may be applied to field corn, corn grown for silage or corn grown for seed.
- 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 or to impervious pads or properly diked mixing and loading areas.
- Do not apply aerially or with irrigation systems.
- Corn should be planted a minimum of 1 to 1½ inches deep.

Trade Name	Common Name	Formulation	Rate/Range
Balance	isoxaflutole	75WDG	1 to 3 oz/A
Balance Pro		4SC	1.5 to 4.5 oz/A

Mode of Action

Bleacher

Application Timing

Preplant surface—Apply 1.5 to 3.0 oz/A 8 to 21 days before planting or 1.0 to 2.5 oz/A up to 7 days before planting.

Preplant incorporated—Apply 1.5 to 3.0 oz/A 8 to 21 days before planting or 1.0 to 2.5 oz/A up to 7 days before planting. Incorporate into the top 2 inches of soil. Avoid incorporating to depth of intended seed placement.

Preemergence—Apply 1.0 to 2.0 oz/A during or after planting but prior to corn or weed emergence.

Comments

- Do not apply more than 3 oz/A Balance in one season.
- Do not rotate to other crops within 6 months after application.
- Environmental extremes may increase the potential for crop response.
- Corn inbreds vary in their tolerance to Balance. Consult your seed company before using Balance on seed corn inbreds.
- Balance may be applied up to 30 days prior to planting where a sequential application of glyphosate, Liberty, or Lightning is planned.
- Plant corn at least 1½ inches deep; seed must be completely covered with soil and soil firmed.
- A crop oil concentrate is recommended when weeds are present at time of application (preemergence to corn) for improved control of emerged weeds.
- Do not apply through any type of irrigation system.
- Do not apply aerially.
- Balance and Balance Pro are restricted-use pesticides.

Trade Name	Common Name	Rate/Range
Bicep II MAGNUM	2.4 lb S-metolachlor + 3.1 lb atrazine/gal	1.3 to 2.6 qt/A
Bicep II Lite MAGNUM	3.33 lb S-metolachlor + 2.67 lb atrazine/gal	1.5 to 2.2 qt/A
Stalwart Xtra	2.4 lb metolachlor + 3.1 lb atrazine/gal	1.3 to 2.6 qt/A

Mode of Action

Unknown + PSII

Application Timing

Early preplant—Apply two-thirds of the recommended rate as a split treatment 30 to 45 days before planting and the remainder at planting. Applications made less than 30 days prior to planting may be as either a split or single treatment.

Preplant incorporated—Apply and incorporate into the top 2 inches of the soil within 14 days prior to planting.

Preemergence—Apply to soil surface at or after planting.

Postemergence—Apply before weeds pass the 2-leaf stage and before corn exceeds 5 inches in height. Directed applications can be made when corn is 5 to 8 inches tall.

Comments

- See remarks under Dual, Parallel and Stalwart C, and atrazine.
- All s-metolachlor and metolachlor prepackage mixtures that include atrazine are restricted-use pesticides.
- Bicep products include benoxacor, a safener that reduces the likelihood of corn injury.
- Stalwart Xtra includes the safener dichlormid that reduces the likelihood of corn injury.

Comments—Bicep II, continued

- May be applied with fluid or dry fertilizer and aerially.
- May be used on all types of corn.
- May be applied postemergence before weeds exceed 2 leaves and corn is 5 inches tall.
- May be used in a post-directed application on corn 5 to 12 inches tall.
- Stalwart Xtra is formulated with the unresolved isomers of metolachlor and will have less of the isomer primarily responsible for weed control as found in s-metolachlor products.
- Follow all atrazine surface water and groundwater warning statements and restrictions.

Trade Name	Common Name	Rate/Range
Bullet 4 F	2.5 lb alachlor + 1.5 lb atrazine/gal	2.5 to 5 qt/A
Lariat 4 F	2.5 lb alachlor + 1.5 lb atrazine/gal	2.5 to 5 qt/A

Mode of Action

Unknown + PSII

Application Timing

Early preplant—Bullet may be applied as a single application up to 30 days ahead of planting or as split application up to 45 days ahead of planting. Lariat is not registered for early preplant treatments.

Preplant incorporated—Incorporate into the top 2 inches of soil within 7 days prior to planting.

Preemergence—Apply after planting until weeds reach the 2-leaf stage and the crop is no more than 5 inches tall.

Comments

- See remarks under Lasso and atrazine.
- Lariat and Bullet are restricted-use pesticides.
- Bullet contains the encapsulated formulation of alachlor.
- May be applied with fluid or dry fertilizer.
- May be used on all types of corn.
- Follow all atrazine surface water and groundwater warning statements and restrictions.

Trade Name	Common Name	Formulation	Rate/Range
Callisto	mesotrione	4 lb/gal	6 to 7.7 fl. oz/A

Mode of Action

Bleacher (HPPD inhibitor)

Application Timing

Preemergence—Apply 6 to 7.7 oz/A prior to corn emergence.

Comments

- Do not apply to popcorn, sweet corn, or Indian corn.
- Do not apply when weather conditions may cause drift to non-target areas. The label prohibits applications when wind speed is greater than 10 mph.
- May be applied aerially.
- Callisto is cleared for postemergence applications. See remarks in Post section.

Trade Name	Common Name	Rate/Range
Camix	36.8% s-metolachlor 3.68% mesotrione	2-2.4 qts/A

Mode of Action

Unknown + Bleacher (HPPD inhibitor)

Application Timing

Early preplant—Apply up to 14 days prior to planting.

Preemergence—Apply 6 to 7.7 oz/A prior to corn emergence.

Early Postemergence—Apply before corn plants reach 5 inches in height and weeds are small and actively growing.

Comments

- Do not apply to white popcorn, sweet corn, or Indian corn.
- Do not use with liquid fertilizers when applied postemergence as severe corn injury may occur.
- Non-ionic surfactants (0.25% v/v) or crop oil concentrate (COC) (1% v/v but not to exceed 1 qt/A) can be included with early postemergence applications of Camix.
- Do not use other products that contain mesotrione during the same season after Camix has been applied.
- Do not apply postemergence to corn that has been treated with Counter insecticide as severe crop injury may occur.
- Do not apply postemergence to yellow popcorn.

Trade Name	Common Name	Formulation	Rate/Range
Define	flufenacet	60DF	12 to 21 oz/A

Mode of Action

Unknown

Application Timing

Fall—Apply after October 15 when soil temperature at 4-inch depth is less than 50 F, but before ground freezes. Use only on medium and fine-textured soils with more than 2.5% organic matter.

Preplant Surface—May be applied up to 45 days prior to corn planting.

Preplant Incorporated—Incorporate into upper 1 to 2 inches of soil within 14 days of planting.

Preemergence—Apply after planting but before crop emerges.

Comments

- Flufenacet is similar in activity to amide herbicides (metolachlor, acetochlor, etc.)
- May be used on field corn, white corn, corn grown for silage and field corn grown for seed. Do not use on popcorn or sweet corn.
- Do not apply aerially.

Trade Name	Common Name	Rate/Range
DoublePlay	5.6 lbs EPTC + 1.4 lbs acetochlor/gal	4.5 to 8 pt/A

Mode of Action

Lipid + unknown

Application Timing–Double Play

Incorporate preplant in the same operation when possible; do not delay incorporation more than 4 hours if applied in water or fluid fertilizer. Incorporate the same day as application if incorporated on dry fertilizer. Apply within two weeks of planting.

Comments

- May be used on field corn, popcorn, and production seed corn. Do not use on corn seed stock (breeders, foundation, or increase corn).
- May be applied with liquid or dry fertilizer.
- Rapid microbial degradation of EPTC following repeated use may decrease control. Do not apply during two consecutive years to the same field.
- DoublePlay is a restricted-use pesticide.

Trade Name	Common Name	Formulation	Rate/Range
Dual II MAGNUM	S-metolachlor	7.64 EC	1 to 2 pt/A
Dual II MAGNUM G	S-metolachlor	16G	6 to 15 lb/A
Parallel	metolachlor	7.8 EC	1 to 2 pts/A
Stalwart C	metolachlor	7.8 EC	1 to 2 pts/A

Mode of Action

Unknown

Application Timing

Fall application—Apply 1.67 to 2.0 pt/A of s-metolachlor or metolachlor 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 60 days ahead of planting as a split application.

Preplant incorporated—Incorporate into top 2 inches of soil within 14 days before planting.

Preemergence—Apply during or after planting prior to crop and weed emergence.

Postemergence—May be applied following corn emergence alone or in combination with specific products. See label for specific restrictions.

Comments

- May be used on corn grown for grain or silage, sweet corn, popcorn, and seed corn.
- May be applied with liquid or dry fertilizers, through center pivot irrigation, or by air.
- Dual MAGNUM II products include benoxacor, a safener that reduces the likelihood of corn injury.
- Stalwart C includes the safener dichlormid that reduces the likelihood of corn injury.
- Iowa State University research has shown that fall applications increase the likelihood of late-season weed breakthroughs due to early degradation of s-metolachlor and metolachlor.
- Parallel and Stalwart C are formulated with the unresolved isomers of metolachlor and will have less of the isomer primarily responsible for weed control as found in s-metolachlor.

Trade Name	Common Name	Rate/Range
Epic 58DF	48% flufenacet + 10% isoxaflutole	6 to 17 oz/A

Mode of Action

Unknown and bleacher

Application Timing

Preplant surface—Apply up to 21 days prior to planting.

Preplant incorporated—Incorporate in the upper 1 to 2 inches of soil up to 21 days before planting.

Preemergence—Apply before, at, or after planting but before crop emergence.

Comments

- Flufenacet is similar in activity to other amide herbicides.
- Epic is a restricted-use pesticide.
- May be used on field corn or corn grown for silage.
- Plant corn at least 1.5 inches deep.
- Crop injury may occur if corn is stressed by weather or other factors.

Trade Name	Common Name	Formulation	Rate/Range
Eradicane	EPTC	6.7 EC	4¾ to 7½ pt/A
Eradicane 25G		25 G	16 to 24 lb/A

Mode of Action

Lipid

Application Timing

EPTC must be incorporated into the soil preplant to prevent loss of the herbicide. Whenever possible, application and incorporation should be done in the same operation. If there must be a delay (less than 4 hours), application must be to a dry soil surface free from dew and incidental moisture. If applied on dry fertilizer, incorporation must be the same day as applied if soil surface is dry. Apply within 2 weeks prior to planting. Eradicane 25G may be applied in a band after planting or co-applied with dry fertilizer through pneumatic applicators.

Comments

- Rapid microbial degradation of Eradicane following repeated use has led to decreased control in Iowa. Do not apply during two consecutive years to the same field.
- May be applied with liquid fertilizer or impregnated on dry fertilizer.
- May be used on field corn, silage corn, popcorn, sweet corn, and production seed corn. Do not use on corn seed stock (breeder, foundation, or increase corn).

Trade Name	Common Name	Rate/Range
Expert	22.9% atrazine + 18.6% s-metolachlor + 10.8% glyphosate	2.5 to 3.75 qts

Mode of Action

PSII + Unknown + EPSPS

Application Timing–Expert

Early preplant—May be applied up to 30 days prior to corn planting.

Preemergence—Apply during or after planting but before corn emerges unless a Roundup Ready® hybrid is planted.

Postemergence—May be applied to Roundup Ready® hybrids after emergence until plants are 12 inches tall. Weeds should be small and actively growing.

Comments

- Do not apply with aerial equipment.
- Do not apply metolachlor containing products in tank mixture or sequentially with Expert.
- Do not graze or feed forage from treated areas for 60 days following application for all types of corn except sweet corn where a 45 day restriction exists.
- The addition of ammonium sulfate may increase performance; use AMS at 2% or 171 lbs./100 gals spray solution. Additional surfactants are not required with Expert.
- Registered for field corn, sweet corn, and popcorn.
- Expert is a restricted-use product.

Trade Name	Common Name	Formulation	Rate/Range
Express	tribenuron	75% DF	1/6 to 1/3 oz

Mode of Action

ALS

Application Timing

Fall application—Apply in the fall after harvest but before ground freeze.

Spring application—Apply a minimum of 45 days prior to planting.

Comments

- Accurate application is important.
- Do not plant corn or soybean within 45 days of application.
- Express will provide control of chickweed and certain other winter annuals.

Trade Name	Common Name	Rate/Range
FieldMaster	21.6% acetochlor + 16.2% atrazine + 8.2% glyphosate	3.5 to 5 qt/A

Mode of Action

Unknown + PSII + EPSPS

Application Timing

Preemergence—Apply preemergence. Weeds can be emerged at the time of application.

Comments

- Do not apply to emerged corn.
- Do not feed forage from corn or graze treated areas within 8 weeks after application.
- Do not apply aerially.
- FieldMaster is a restricted-use pesticide.

Trade Name	Common Name	Formulation	Rate/Range
Frontier	dimethenamid	6.0 EC	16 to 32 oz/A
Outlook	dimethenamid-P	6.0 EC	12 to 21 oz/A

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 12-inch tall field corn.

Fall—Application must be made after October 1 when soil temperatures are below 55°F and before the ground freezes.

Comments

- May be used on field, silage, popcorn, sweet, or seed corn. Before using on popcorn, sweet corn, or seed corn, verify selectivity of inbred lines with seed supplier.
- May be applied with water, fluid fertilizer, or impregnated on dry fertilizer.
- Frontier is in a similar chemical family as Dual and acetochlor (Harness, Surpass) and performs similarly to these products.
- Outlook contains the resolved isomer of dimethenamid.
- Iowa State University does not recommend fall applications of herbicides.

Trade Name	Common Name	Rate/Range
Guardsman	2.33 lb dimethenamid + 2.67 lb atrazine/gal	2.0 to 5 pt/A
Guardsman MAX	1.7 lb dimethenamid-P + 3.3 lb atrazine/gal	2.4 to 4.6 pt/A
G-Max Lite	2.25 lb dimethenamid-P + 2.75 lb atrazine/gal	2.0 to 3.5 pt/A

Mode of Action

Unknown + PSII

Application Timing

Early preplant—Apply up to 45 days before planting. A split application is recommended when the initial application is made more than 30 days prior to planting. When making EPP applications 15 to 45 days prior to planting, apply 3.5 pt/A on all soil types.

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 to corn up to 12-inches tall but before weeds exceed 1.5 inches in height.

Comments

- Guardsman MAX and G-MAX Lite are restricted use pesticides.
- Guardsman MAX and G-MAX Lite are labeled for use on field corn, silage corn, popcorn, sweet corn, and seed corn.
- Corn may be grazed or fed to livestock at 40 or more days after application.
- Do not apply through any type of irrigation system.
- Refer to atrazine comments for application restrictions.
- Sweet corn ears may be harvested 50 days or more after application of G-MAX Lite.
- 3 pt/A of G-MAX Lite is the equivalent of 18 oz/A Outlook and 1 lb/A a.i. atrazine.

Trade Name	Common Name	Formulation	Rate/Range
Harness/Confidence	acetochlor	7 EC	1.25 to 3.4 pt/A
Surpass		6.4 EC	1.5 to 3.75 pt/A
Surpass 20G		20G	6 to 15 lb/A
TopNotch		3.2CS	2 to 3.75 qt/A
Degree		3.8 L	2.25 to 5 qt/A
Harness		20G	6 to 12 lb/A

Mode of Action

Unknown

Application Timing

Early preplant—Harness can be applied up to 30 days before planting for a single application or 30 to 45 days before planting for a split application. Surpass can be applied 30 days before planting. TopNotch may be applied up to 40 days prior to planting. Surpass and TopNotch can be applied as a split application with 60% applied about 30 days before planting and the remainder at planting.

Preplant incorporated—Apply Harness and incorporate into the top 2 inches of soil within 7 days before planting. Apply Surpass and incorporate into the top 2 inches of soil within 14 days before planting.

Preemergence—Apply Harness/Surpass/TopNotch at or after planting but before crop and weed emergence.

Early postemergence—Apply Harness/Surpass/TopNotch prior to weed emergence and before corn reaches 11 inches in height.

Comments

- Acetochlor is a restricted-use pesticide.
- May be used on field corn, silage corn, popcorn, and production seed corn. Do not use on corn seed stock (breeders, foundation, or increase corn).
- May be applied with liquid fertilizer or impregnated on dry bulk fertilizer.
- Acetochlor is formulated with a safener to reduce the potential for crop injury.
- TopNotch is an encapsulated formulation marketed for use in reduced and no-till corn.
- Refer to the label for tank mixing and application information.

Trade Name	Common Name	Rate/Range
Harness Xtra/Confidence Xtra	4.3 lb acetochlor + 1.7 lb atrazine	1.8 to 2.3 qt/A
Harness Xtra 5.6L/ Confidence Xtra 5.6L	3.1 lb acetochlor + 2.5 lb atrazine	1.4 to 3 qt/A
FulTime 4CS	2.4 lb acetochlor + 1.6 lb atrazine	2.7 to 5 qt/A
Keystone	3.0 lb acetochlor + 2.25 lb atrazine	2.2 to 3.4 qt/A
Keystone LA	4.0 lb acetochlor + 1.5 lb atrazine	1.6 to 3.0 qt/A

Mode of Action

Unknown + PSII

Application Timing

Early preplant—Harness Xtra may be applied up to 30 days prior to planting. Harness Xtra may be applied as a split application 30 to 45 days before planting. FulTime may be applied up to 40 days before planting. Keystone may be applied 30 days prior to planting. Keystone may be applied as a split application 30 days before planting.

Preplant incorporated—Apply within 14 days of planting and incorporate in top 2 inches of soil.

Preemergence—Apply at or after planting but before corn emergence.

Early postemergence—Apply after corn emerges but before it reaches 11 inches in height.

Comments–Harness

- See remarks under Harness/Surpass and Atrazine.
- Harness Xtra , FulTime, and Keystone are restricted-use products.
- FulTime is an encapsulated formulation designed for systems with high amounts of crop residue.

Trade Name	Common Name	Rate/Range
Hornet WDG	18.5% flumetsulam + 60% clopyralid salt	4 to 6 oz/A

Mode of Action

ALS + auxin

Application Timing

Early preplant and preplant incorporated—Apply up to 30 days before planting. Use high end of rate on soils with more than 3% organic matter and/or when applications are made 14 to 30 days before planting.

Preemergence—Apply at or after planting until corn is two inches in height.

Comments

- A post application of Hornet WDG may follow a soil application of Hornet WDG. Do not exceed a total of 4.8 oz Hornet /A or 0.07 lb/A of flumetsulam (other products containing flumetsulam: Broadstrike + Dual, Scorpion III, and Accent Gold).
- Do not apply to sweet corn or popcorn.
- Corn inbred lines grown for hybrid seed production may be injured.
- Do not use Hornet if Counter or Thimet have been applied.
- The following restrictions apply only to soil applications: Do not use on peat or muck soils; do not use on soils with pH greater than 7.8; and do not use on soils with pH less than 5.9 and organic matter greater than 5% (both must apply). Application to soils with less than 1.5% organic matter may result in crop injury.
- Soil-applied OP insecticides should be applied in a T-band or band.
- Flumetsulam may interact with ALS herbicides applied previously and ALS herbicides applied postemergence to corn the current year, thus increasing the potential for injury.
- Do not apply through chemigation equipment. A supplemental label allows aerial application of Hornet in Iowa.

Trade Name	Common Name	Formulation	Rate/Range
Lasso EC, MicroTech	alachlor	4 EC, ME, EC	2.5 to 3.5 qt/A

Mode of Action

Unknown

Application Timing

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

Preplant incorporated—Incorporate into top 2 inches of soil within 7 days of planting.

Preemergence—Apply prior to weed emergence.

Delayed preemergence—Lasso applied alone or in combination with atrazine or Banvel may be applied following corn emergence. See label for specific restrictions.

Comments

- All products containing alachlor are restricted-use pesticides and include a groundwater advisory statement.
- May be used on corn grown for grain or silage, sweet corn, and popcorn.
- Lasso and MicroTech may be applied with liquid fertilizer or impregnated on dry fertilizer.
- Alachlor-treated corn is occasionally more subject to leafing out underground.

Comments–Lasso, continued

- CropStar is specifically formulated for application with pneumatic fertilizer systems.
- Use of a mechanical transfer system is required by all mixer/loaders and/or applicators who treat 300 acres or more annually with pesticides containing alachlor as an active ingredient.
- Due to expiration of patent rights, alachlor is now available under several brand names.
- Refer to specific alachlor label for tank mixing and application information.

Trade Name	Common Name	Rate/Range
Lexar	19% s-metolachlor 18.61% atrazine 2.44% mesotrione	3 to 3.5 qta/A

Mode of Action

Unknown + PSII inhibitor + bleacher (HPPD inhibitor)

Application Timing

Early Preplant and preemergence—Apply up to 14 days prior to planting and after planting.

Postemergence—Apply Lumax postemergence to weeds that are less than 3 inches tall and before the corn exceeds 12 inches in growth.

Comments

- Do not apply more than 3.5 qt Lexar per season.
- Do not apply Lexar postemergence to yellow popcorn.
- Do not apply postemergence with liquid fertilizers or severe corn injury will occur.
- Do not graze or feed forage from treated areas for 45 days after application.
- Do not harvest forage, grain, or stover within 60 days after last application.
- Do not apply other products that contain mesotrione during the same growing season.
- Do not apply Lexar to corn treated at planting with Counter insecticide or severe corn injury can occur.
- Do not apply aurally.
- Lexar is a restricted-use herbicide.

Trade Name	Common Name	Rate/Range
Lumax	29.4% s-metolachlor + 11% atrazine + 2.94% mesotrione	2.5 to 3 qt/A

Mode of Action

Unknown + PSII inhibitor + bleacher (HPPD inhibitor)

Application Timing

Early Preplant and preemergence—Apply up to 14 days prior to planting and until corn is no more than 5 inches tall.

Postemergence—Apply Lumax postemergence to weeds that are less than 3 inches tall and before the corn exceeds 5 inches in growth.

Comments–Lumax

- Do not apply more than 3 qt Lumax per season.
- Do not apply Callisto to fields treated with Lumax the same season.
- Do not graze or feed forage from treated areas for 45 days following application.
- Do not harvest forage, grain, or stover within 45 days of application.
- If Lumax is applied after June 1, rotate only to corn the next growing season.
- Do not apply Lumax through any type of irrigation system.
- Do not apply Lumax postemergence if the corn was treated with Counter because severe corn injury may occur. Temporary injury may occur if applied to corn treated with other OP insecticides.
- Do not apply Lumax in tank mix combinations with any organophosphate or carbamate insecticide.
- Do not make a foliar postemergence application of any organophosphate or carbamate insecticide within 7 days before or 7 days after a Lumax application due to the potential for severe corn injury.
- Do not use Lumax for sweet corn, popcorn, or ornamental (Indian) corn.
- Follow herbicide resistance management guidelines suggested on the Lumax label.
- Do not apply aerially.

Trade Name	Common Name	Formulation	Rate/Range
Princep/Simazine	simazine	90 DF	1.1 to 3.3 lb/A
Princep/Simazine		4 L	1.0 to 3.0 qt/A
Sim-Trol		4L	1.0 to 3.0 qt

Mode of Action

PSII inhibitor

Application timing

Preplant/Preemergence — Apply before weeds and corn emerges.

Fall application — Apply following crop harvest but before winter annuals emerge or ground freezes

Comments

- Simazine is a persistent compound and may injure soybean and other rotational crops. Seed rotation restrictions exist.
- Simazine does not have any foliar activity and will not control emerged weeds.
- Simazine requires more rainfall than atrazine for activation.

Trade Name	Common Name	Formulation	Rate/Range
Prowl/Pendimax	pendimethalin	3.3 EC	1.8 to 4.8 pt/A
Prowl H ₂ O		3.8 ACS	2.0 to 4.0 pt/A

Mode of Action

Microtubule

Application Timing

Preemergence—Apply after planting and before weeds and crop emerge.

Postemergence—Apply to corn up to 30” tall. Prowl will not control emerged weeds.

Culti-Spray—Apply Prowl alone when corn is at least 4 inches in height until layby, or with atrazine until corn is 12 inches in height, and incorporate with cultivation.

Comments–Prowl

- Do not incorporate Prowl.
- Plant corn at least 1.5 inches deep. Corn tolerance is due to placement of seed below herbicide.
- 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.
- Prowl may be applied aerially or in liquid fertilizer.
- If corn crop must be replanted, seeding depth must be below retilled area.
- May be used on ear corn and silage corn.
- Do not exceed 1.2 lb a.i./A atrazine for Culti-Spray applications.
- Do not apply Banvel or Marksman combinations on sands, loamy sands, sandy loams, or medium- and fine-textured soils with less than 2% organic matter.
- Refer to the label for additive recommendations for postemergence applications.

Trade Name	Common Name	Formulation	Rate/Range
Python	flumetsulam	80 WDG	0.8 to 1.33 oz/A

Mode of Action

ALS

Application Timing

Apply preplant incorporated, preplant surface, or preemergence from up to 30 days prior to planting until spike stage, depending on application rate.

Comments

- Do not harvest within 85 days of application.
- Application to soils with less than 1.5% organic matter may result in corn injury.
- 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 use on sweet corn or popcorn.
- Do not exceed 0.07 lb/A of flumetsulam per year.
- Python may interact with ALS herbicides applied previously to soybeans and to corn, thus increasing the potential for injury. If an ALS inhibitor herbicide was applied to soybeans the previous year, apply Python only if the rotational interval listed on the soybean herbicide has been met.
- Do not use Python if corn has been treated with Counter or Thimet. Other corn insecticides should be applied in a band or T-band.
- There are no insecticide restrictions if Clearfield hybrids are planted.
- Do not apply aerially.
- For PPI application, uniformly incorporate Python in the top 2 to 3 inches of soil.

Trade Name	Common Name	Formulation	Rate/Range
Sutan+	butylate	6.7 EC	4 ³ / ₄ to 7 ¹ / ₃ pt/A

Mode of Action

Lipid

Application Timing

Sutan+ must be preplant incorporated within 4 hours to prevent loss of herbicide. Whenever possible, application and incorporation should be done in the same operation. If there must be a delay (less than 4 hours) between application and incorporation, Sutan+ must be applied to a dry soil surface free from dew and incidental moisture. Sutan+ impregnated on dry fertilizer must be incorporated on the same day applied.

Comments

- Use lower rates for most annual grasses, higher rates for yellow nutsedge and suppression of shattercane.
- May be applied with liquid fertilizer or impregnated on dry fertilizer.
- Continuous use of Sutan+ may lead to enhanced microbial degradation and shorter herbicide persistence in some fields.
- May be used on field corn, silage corn, sweet corn, popcorn, and production seed corn. Do not use on corn seed stock (breeder, foundation, or increase corn).

Trade Name	Common Name	Rate/Range
Sutazine+ 6 ME	4.8 lb butylate + 1.2 lb atrazine/gal	5.25 to 10 pt/A
Sutazine+ 18.6 G	18% butylate + 5.7% atrazine	16 ² / ₃ to 22 ² / ₃ lb/A

Mode of Action

Lipid + PSII

Application Timing

Preplant incorporate into the soil within 4 hours. Whenever possible, application and incorporation should be done in the same operation. If there must be a delay in incorporation, application must be to a dry soil surface free from dew and incidental moisture. Sutazine impregnated on dry fertilizer must be incorporated on the same day applied.

Comments

- See remarks under Sutan+ and atrazine.
- Sutazine is a restricted-use pesticide.
- Sutazine may be applied with liquid or dry fertilizer.
- May be used on field corn, silage corn, sweet corn, popcorn, and production seed corn. Do not use on corn seed stock (breeder, foundation, or increase corn).
- Sutazine+ 18.6 G may be applied in a band following planting or co-applied with dry fertilizer through pneumatic applicators.
- Follow all atrazine surface water and groundwater warning statements and restrictions.