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# **Weed Control Guide For Ohio and Indiana**

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**“Herbicide Labeled for Corn”**

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## Corn: Soil-Applied Herbicides — Preplant or Preemergence

Herbicide	Formulation	Product Rate Range
AAtrrex/atrazine	4L 90DF	2 - 4 pt 1.1 - 2.2 lbs

- Mode of action: group 5 (see pages 12-13).
- Atrazine is generally applied at a rate of 1.4 to 2 pounds active ingredient per acre to control broadleaf weeds.
- Rates approaching 2 pounds active ingredient can improve control of velvetleaf, giant ragweed, cocklebur, and morningglory. Velvetleaf can be effectively controlled when atrazine is mixed with Balance, Callisto, or Hornet, but the latter three weeds are most effectively controlled with a combination of preemergence and postemergence herbicides. Atrazine will not control fall panicum, regardless of rate.
- Maximum soil-applied rate on soils not highly erodible is 2 pounds of active ingredient per acre. Maximum rate on highly erodible soils is 2 pounds active ingredient on fields with at least 30% crop residue, and 1.6 pounds active ingredient on fields with less than 30% crop residue. Soil applications may be followed with a postemergence application of atrazine, but total of all treatments cannot exceed 2.5 pounds active ingredient per acre per year.
- Preplant application of atrazine with COC and/or UAN can control small, emerged annual weeds.
- Plant only corn or sorghum the year (including fall) of atrazine application.
- Where oats, forage legumes, or forage grasses will be planted the following spring, do not apply more than 0.8 pounds active ingredient per acre.

Herbicide	Formulation
Acetochlor	various

- Acetochlor (plus safener) is sold under various trade names, including Harness, TopNotch, Surpass, Degree, Confidence, and Volley.
- Acetochlor controls annual grasses, pigweed, and black nightshade, and control or suppresses yellow nutsedge, lambsquarters, and common ragweed. Control of lambsquarters and common ragweed will generally be less effective compared to most broadleaf herbicides, but more effective than other acetamide herbicides.
- Mode of action: group 15 (see pages 12-13).
- Can be applied to field corn, popcorn, and production seed corn, but should generally not be used on corn seed stock. See labels for precautions. Acetochlor can be applied preplant or preemergence to sweet corn, but not postemergence.
- Degree and TopNotch are encapsulated products that can provide a longer period of annual grass control compared to other acetochlor products.
- Acetochlor products can be applied after planting but prior to weed emergence, and before corn height exceeds 11 inches. All acetochlor products except Degree must be applied using water as the spray carrier after the corn has emerged.
- Degree or Degree plus atrazine can be applied to emerged corn in water or UAN, but corn should not exceed 6 inches in height if fertilizer solution is used as the carrier. Do not apply in fertilizer solution when air temperatures exceed 85 degrees. Mixtures with products other than atrazine should be applied only in water if the corn has emerged. Leaf burn may occur when acetochlor is applied to emerged corn.

Degree 3.8L Use Rates (pts/A) <sup>a</sup>		
Soil Texture Group	Less than 3% OM	3% or Greater OM
Coarse	2.25 to 1.75	1.75
Medium	1.75 to 2.25	1.75 to 2.25
Fine	1.75 to 4.25	2.25 to 2.75

a. On soils with 6 to 10% organic matter, use 4.25 to 6.25 pts/A.

## Corn: Soil-Applied Herbicides — Preplant or Preemergence

### Surpass/Volley 6.4EC Use Rates (pts/A) in Conventional Tillage Systems When Applied within 14 Days before Planting<sup>a</sup>

Soil Texture Group	Less than 3% OM	3% or Greater OM
Coarse	1.5 to 2.25	1.5 to 2.5
Medium	1.5 to 2.5	1.5 to 2.5
Fine	1.5 to 2.75	2 to 3

a. Use higher end of rate range if OM content is at higher end of rate range or under anticipated heavy weed infestations.

### Surpass/Volley 6.4EC Use Rates (pts/A) in Reduced or No-till System or Conventional System When Applied More than 14 Days Before Planting

Soil Texture Group	Less Than 3% OM	3% or More OM
Coarse	2	2
Medium	2 to 2.5	2.25
Fine	3	3

### TopNotch 3.2L Use Rate (qts/A)<sup>a</sup>

Soil Texture Group	Time from Application to Planting			After planting &/or Emergence
	Less than 10	10 to 30	30 to 40	
Coarse	2	2 to 2.5	2.5	2
Medium	2 to 2.5	2.5	2.5 to 3	2 to 2.5
Fine	2.5 to 3	2.5 to 3	3 to 3.75	2.5 to 3

a. On coarse textured soils with less than 3% OM the maximum use rate is 2.25 qts/A.

Herbicide	Formulation	Product Rate Range
Acetochlor + atrazine	Various	

- Acetochlor plus atrazine (plus safener) is sold under various trade names, including Harness Xtra, Degree Xtra, Fultime, Keystone, Confidence Xtra, and Volley ATZ. These premix products control annual broadleaf and grass weeds in corn. The ratio of atrazine to acetochlor varies among products, and some products require the addition of atrazine or another broadleaf herbicide for effective control of broadleaf weeds.
- Degree Xtra and Fultime are encapsulated formulations that can provide a longer period of annual grass control compared to other acetochlor products.
- Mode of action: group 5 (atrazine), group 15 (acetochlor). See pages 12-13.
- Can be applied to field corn, popcorn, and production seed corn, but should generally not be used on corn seed stock. See labels for precautions. Can be applied preplant or preemergence to sweet corn, but not postemergence.
- Can be applied after planting and before corn height exceeds 11 inches and before weeds reach the 2-leaf stage. When mixing with postemergence herbicides to control larger weeds, follow the most restrictive label with regard to maximum corn size.
- All acetochlor products except Degree Xtra should be applied using water as the spray carrier after the corn has emerged.
- Degree Xtra can be applied in water or UAN, but corn should not exceed 6 inches in height if fertilizer solution is used as the carrier. Do not apply in fertilizer solution when air temperatures exceed 85 degrees. Mixtures with products other than atrazine should be applied only in water if the corn has emerged. Leaf burn may occur when applied to emerged corn.
- Can be mixed with Balance to improve control of velvetleaf, annual grasses, triazine-resistant lambsquarters, and burcucumber. See Balance description for precautions to avoid crop injury.

## Corn: Soil-Applied Herbicides — Preplant or Preemergence

### Degree Xtra 4L Use Rates (qts/A)

Soil Texture Group	
Coarse	2.9
Medium <sup>a</sup>	2.9 to 3.7
Fine	3.2 to 3.7

a. In areas of heavy weed pressure rates can be increased to 4.3 qts/A.

### FulTime 4L Use Rates (qts/A) in Conventional Tillage Systems When Applied within 14 Days Before Planting

Soil Texture Group	Less than 3% OM	3% or Greater OM
Coarse	2.25 to 2.7	2.7 to 3
Medium	2.7 to 3.3	3 to 3.3
Fine	3 to 3.5	3 to 5

### Harness Xtra/Confidence Xtra 5.6L Broadcast Rates (qts/A)<sup>a</sup>

Soil Texture Group	Less than 3% OM	3% or Greater OM
Coarse	1.4	1.75
Medium	1.75 to 2.25	1.75 to 2.25
Fine	1.75 to 2.25	2.25 to 2.75

a. In areas of heavy infestations use up to 2.3 qts/A on coarse-textured soils and 2.3 to 3.0 qts/A on medium- and fine-textured soils, but do not exceed 2.4 qts/A on highly erodible soils with less than 30% plant residue.

### Keystone/Volley ATZ 5.25L Use Rates in Conventional Tillage (qts/A)

Soil Texture Group	Less than 3% OM	3% or Greater OM
Coarse	2.2 to 2.4	2.4 to 2.6
Medium	2.4 to 2.8	2.6 to 2.8
Fine	2.6 to 3	2.6 to 3.4

#### Herbicide

#### Formulation

Alachlor

Various

- Alachlor controls annual grasses and pigweed, and controls or suppresses yellow nutsedge and black nightshade. Product trade names include Lasso and Micro-Tech among others.
- Mode of action: group 15 (see pages 12-13).
- Micro-Tech can be applied after corn emergence until the corn is 5 inches tall, but should be applied before weeds have passed the 2-leaf stage in a mixture with atrazine. Can be applied to emerged corn in water or UAN. Do not apply in apply in fertilizer solution when air temperature exceeds 85 degrees. Other alachlor products and combinations should be applied in water after the corn has emerged. Leaf burn may occur when applied to emerged corn.
- Lasso 4EC use rates: coarse-textured soils - 2 to 2.25 qt/A; all medium-textured soils and fine-textured soils with less than 3% OM - 2 to 2.75 qt/A; fine-textured soils with greater than 3% OM - 2.5 to 3.25 qt/A.
- Incorporation to 2 inches will improve yellow nutsedge control and reduce dependence upon rainfall.

## Corn: Soil-Applied Herbicides — Preplant or Preemergence

Herbicide	Formulation	Product Rate Range
Alachlor + atrazine	various	

- Alachlor + atrazine is available from various manufacturers, and includes products such as Lariat and Bullet . Bullet is a micro-encapsulated formulation, which may provide more effective control than Lariat and other non-encapsulated products in no-till situations.
- Mode of action: group 5 (atrazine), group 15 (alachlor). See pages 12-13.
- Lariat can be applied in water, and Bullet can be applied in water or 28% liquid nitrogen fertilizer, after planting until weeds reach the 2-leaf stage and when corn is no more than 5 inches tall. Application of Bullet in 28% should not be made if temperature exceeds 85 F. Leaf burn may occur when applied to emerged corn.

Bullet/Lariat Broadcast Rates (qts/A) <sup>a</sup>		
Soil Texture Group	Less than 3% OM	3% or Greater OM
Coarse	2.5	3
Medium	3	3.75
Fine	3.75	3.75 to 4.5

a. In areas of heavy infestations use 4 to 5 qts/A, but do not exceed 4.25 qts/A on highly erodible soils with less than 30% plant residue.

Herbicide	Formulation
Balance Pro	4L

- Balance Pro (isoxaflutole) can be applied preplant or preemergence for control of annual broadleaf weeds, including velvetleaf, pigweed, waterhemp, burcucumber, black nightshade, smartweed, lambsquarters (including triazine-resistant), and common ragweed. Balance is not effective for control of cocklebur, giant ragweed, and morningglory, but may help control these weeds in mixtures with atrazine.
- Mode of action: group 28 (see pages 12-13).
- Provides early-season control of annual grasses, allowing a reduction in the rate of companion grass herbicides (Dual, Harness, Surpass, etc).
- Can be applied up to 30 days prior to planting of LibertyLink, glyphosate-resistant, or Clearfield hybrids, where a postemergence treatment is planned.
- A mix of Balance Pro plus atrazine (1 lb ai/A) will control small, emerged annual weeds (2 inches or less), including field pennycress, shepherd's-purse, chickweed, henbit, and marestail. Apply with COC or UAN as the carrier to maximize burn-down activity. Can be mixed with 2,4-D, Gramoxone, or glyphosate for improved burndown activity on larger weeds.
- Isoxaflutole has occasionally injured corn, but severe injury has been fairly rare. Conditions that increase the risk of injury include high rainfall, cold temperatures, coarse-textured soils, and shallow planting. To reduce the risk of injury, do not exceed recommended rate for soil type, plant corn at least 1 1/2 inches deep, and make sure seed is completely covered with soil and the seed furrow is firmed.
- Seed corn inbreds vary in their tolerance; consult seed company before using Balance Pro on seed corn inbreds.

## Corn: Soil-Applied Herbicides — Preplant or Preemergence

<b>Balance Pro Use Rates (floz/A)</b>						
	<b>Soil Texture Group</b>					
	<b>Coarse</b>	<b>Medium<sup>a</sup></b>			<b>Fine</b>	
	<b>Organic matter</b>					
<b>Timing</b>	<b>Less than 1.5%<sup>b</sup></b>	<b>Greater than 1.5%</b>	<b>Less than 1.5%</b>	<b>Greater than 1.5%</b>	<b>Less than 1.5%</b>	<b>Greater than 1.5%</b>
EPP, PPI; 8 to 21 days before planting	Not Recommended	1.5 to 3	2.25 to 3.75	3 to 3.75	3.75 to 4.5	3.75 to 4.5
EPP, PPI, or PRE; 0 to 7 days before planting	Not Recommended	1.5 to 1.88	1.88 to 2.76	2.25 to 3	2.25 to 3	2.25 to 3

a. When applied preemergence to medium soils with pH greater than 7.5, reduce the rate by 0.25 floz/A.

b. Not recommended for coarse soils with less than 1.5% OM or pH greater than 7.5.

<b>Herbicide</b>	<b>Formulation</b>	<b>Product Rate Range</b>
Callisto	4L	6 - 7.7 oz

- Callisto (mesotrione) can be applied preplant or preemergence for control of many annual broadleaf weeds, including lamb-squarters (including triazine-resistant), Pennsylvania smartweed, pigweeds, waterhemp, velvetleaf, and black nightshade. Callisto has limited activity on giant ragweed, cocklebur, and morningglory, but may help control these weeds in mixtures with atrazine.
- Mode of action: group 28 (see pages 12-13).
- Callisto does not control grass weeds, and should be applied in combination with Harness, Dual, TopNotch, or another acetamide grass herbicide, or an acetamide/atrazine premix (Bicep II, Magnum, Degree Xtra, etc.).
- Can be applied preplant, preemergence, or postemergence to field corn, seed corn, sweet corn, and yellow popcorn. Do not apply to white popcorn.
- Postemergence rate should not exceed 3 oz/A. To avoid crop injury, do not apply postemergence with emulsifiable concentrate herbicides or MSOs. To avoid injury to yellow popcorn, apply with COC (do not add UAN) after crop emergence.

<b>Herbicide</b>	<b>Formulation</b>
Define	4SC

- Define (flufenacet) can be applied preplant or preemergence for control of annual grass weeds, and partial control of black nightshade, pigweed, and waterhemp.
- Mode of action: group 15 (see pages 12-13).
- Can be applied postemergence up to the V5 corn stage.

## Corn: Soil-Applied Herbicides — Preplant or Preemergence

### Define Use Rates (oz/A) for Conventional Tillage Systems When Applied within 2 Weeks of Planting<sup>a</sup>

Soil Texture Group	Less than 3% OM	3% or Greater OM
Coarse	15	17
Medium	17 to 19	19 to 22
Fine	22 to 24	22 to 25

a. Use higher rate in recommended range in areas of high weed infestations, heavy surface plant residues, and/or when soil OM is at upper end of range.

### Define Use Rates (oz/A) for Conservation, Minimum and No-Till Systems; or Conventional Tillage Systems When Applied Greater than 2 Weeks Before Planting<sup>a</sup>

Soil Texture Group	Less than 3% OM	3% or Greater OM
Coarse	16	18
Medium	19 to 22	22 to 24
Fine	24 to 25	24 to 25

a. Use higher rate in recommended range in areas of high weed infestations, heavy surface plant residues, and/or when soil OM is at upper end of range.

Herbicide	Formulation
Guardsman Max	5L

- Guardsman Max is a premix of dimethenamid-P (Outlook) plus atrazine for control of annual grass and broadleaf weeds in corn.
- Mode of action: group 5 (atrazine), group 15 (dimethenamid). See pages 12-13.
- Can be applied early postemergence to corn that is up to 12 inches tall. Weeds should be less than 1 1/2 inches tall, unless other products are mixed with Guardsman Max to control larger emerged weeds.
- Can be applied to emerged corn with surfactant or low rates of liquid nitrogen fertilizer. Do not use liquid fertilizer as the spray carrier after the crop has emerged. COC may be included in postemergence applications only when Guardsman Max is applied alone or in combination with atrazine.

### Guardsman Max Use Rate (pt/A)<sup>a</sup>

Soil texture	Organic Matter	
	Less than 3%	3% or more
Coarse	2.5 to 3	3 to 4
Medium or Fine	3 to 4	4 to 4.6

a. For all preplant applications, use 3.8 to 4.6 pt/A. Do not exceed 3.8 pt/A on highly erodible soils with less than 30% plant residue.

## Corn: Soil Applied Herbicides — Preplant or Preemergence

Herbicide	Formulation
Hornet	78.5WDG

- Hornet is a premix of flumetsulam (Python) plus clopyralid (Stinger). In addition to the broadleaf weeds controlled by Python, Hornet controls cocklebur and common ragweed. Expect partial control of giant ragweed.
- Mode of action: group 2 (flumetsulam), group 4 (clopyralid). See pages 12-13.
- Hornet can be mixed at a rate of 3 to 4 oz/A with atrazine premix products (Bicep, Harness Xtra, etc) to improve control of triazine-resistant lambsquarters, giant ragweed, and other broadleaf weeds.
- Apply preplant, preemergence, or at the spike stage. When using the rates shown here, apply before the corn is 2 inches tall. Preplant application with COC can control emerged Canada thistle and small annual broadleaf weeds, including mustards, shepherd's-purse, ragweeds, and Pennsylvania smartweed.
- Do not apply to sweet corn or popcorn. Inbred lines should be tested for crop tolerance before treating large acreages.
- Preemergence applications of Hornet can occasionally injure corn, primarily when growing conditions are unfavorable soon after application. This injury appears as stunting, temporary yellowing, and reduction in root growth. To avoid injury, plant at least 1 1/2 inches deep and do not use Hornet in soils with an average of less than 1 1/2 percent organic matter.
- Soil-applied organophosphate insecticides may increase the risk of crop injury, especially when applied in-furrow. To avoid injury, apply insecticides in a band or T-band. Do not use Hornet if Thimet has been or will be applied to the corn.
- Corn treated with Hornet that is stressed or damaged by herbicide or other factors should not be treated with Accent, Permit, Basis, Beacon, or other ALS-inhibiting herbicides.
- Do not apply where soil pH is greater than 7.8. Do not apply to soils with a combination of pH less than 5.9 and organic matter content greater than 5%.

### Hornet WDG Use Rates (oz/A)<sup>a</sup>

Soil Texture Group	Less than 3% OM	3% or Greater OM
Coarse	4	4 to 5
Medium or Fine	4 to 5	5 to 6

a. Use higher rate in recommended range in areas of high weed infestations.

Herbicide	Formulation
Lumax	4L
Lexar	3.7L

- Lumax and Lexar are premixes of atrazine plus s-metolachlor (Dual II Magnum) plus mesotrione (Callisto) for control of grass and broadleaf weeds in corn. A use rate of Lexar contains a higher amount of atrazine per acre, compared with Lumax, and a lower amount of s-metolachlor.
- Mode of action: group 5 (atrazine); group 15 (s-metolachlor); group 28 (mesotrione). See pages 12-13.
- Controls most annual broadleaf weeds, but expect partial control of giant ragweed, cocklebur, and annual morningglory.
- Lexar and Lumax have been among the most effective preplant burndown treatments for no-till corn in OSU and Purdue University research, for control of dandelion and most winter annual weeds.
- Lexar use rates: soils with less than 3% organic matter - 3 qts/A; soils with more than 3% organic matter - 3.5 qts/A. Lumax use rates: soils with less than 3% organic matter - 2.5 qts/A; soils with more than 3% organic matter - 3.0 qts/A.
- Can be applied preplant or preemergence, or postemergence on field corn and seed corn. Can be applied preplant or preemergence on yellow popcorn and sweet corn.
- Lumax and Lexar can be applied preplant, preemergence, or postemergence before field and seed corn exceeds 12 inches in height. Broadleaf weeds should be less than 3 (Lumax) or 5 (Lexar) inches tall at the time of postemergence application. Control of emerged grasses (up to 1.5 inches tall) will require additional atrazine.
- NIS can be used when Lumax or Lexar is applied to emerged corn. AMS can be added when mixed with glyphosate or Liberty. Use of COC may result in temporary crop injury. Otherwise, do not apply with MSO or nitrogen based adjuvants (AMS, UAN, etc) or use fertilizer solution as the carrier after corn has emerged.
- Lumax/Lexar may be applied postemergence in a mixture with glyphosate on glyphosate-resistant corn at a rate as low as 2 qts/A (Lumax) or 2.25 qts/A (Lexar).
- Do not apply postemergence to corn treated with Counter insecticide at planting. Postemergence application following the use of other organophosphate insecticides can result in temporary crop injury. Do not apply in a mixture with an organophosphate or carbamate insecticide or within 7 days before or after an application of these types of insecticides.
- If applied after June 1, plant only corn or sorghum the following year.

## Corn: Soil Applied Herbicides — Preplant or Preemergence

Herbicide	Formulation
S-metolachlor	7.64E
Metolachlor	7.8E

- S-metolachlor (Dual II Magnum, Cinch) and metolachlor (Stalwart C, Parallel) control annual grasses and pigweed, and control or suppress waterhemp, black nightshade, and yellow nutsedge.
- Mode of action: group 15 (see pages 12-13).
- Can be applied preplant or preemergence before the crop and weeds emerge. Can be applied broadcast with atrazine up to 5-inch corn or as a directed spray up to 12-inch corn, and before grass and broadleaf weeds exceed the 2-leaf stage. Do not apply using fertilizer solution as the spray carrier after the corn has emerged.
- May be applied up to 30 days before planting as a single application.
- Incorporation to a depth of 2 inches will improve yellow nutsedge control and reduce dependence upon rainfall.

### Dual II Magnum, Cinch, Parallel, and Stalwart Use Rates (pts/A)

Soil Texture Group	Less than 3% OM	3% or Greater OM
Coarse	1 to 1.33	1.33
Medium	1.33 to 1.67	1.33 to 1.67
Fine	1.33 to 1.67	1.67 to 2

Herbicide	Formulation
S-metolachlor + atrazine	5.5L
Metolachlor + atrazine	5.5L

- S-metolachlor plus atrazine (Bicep II Magnum, Brawl II ATZ, Cinch ATZ) and metolachlor plus atrazine (Stalwart Xtra, Parallel Plus, Trizmet) control annual grass and broadleaf weeds in corn.
- Mode of action: group 5 (atrazine), group 15 (s-metolachlor/metolachlor). See pages 12-13.
- Can be applied preplant, preemergence, and after corn emergence until corn plants are 5 inches tall and before weeds exceed the 2-leaf stage. Do not apply using fertilizer solution as the spray carrier after the crop emerges.
- Bicep/Cinch ATZ can be applied postemergence in rescue situations (large weeds) to corn that is 4 to 12 inches tall in combination with Spirit.
- Expert is a premix of glyphosate, s-metolachlor, and atrazine for preemergence use in no-till. See Expert description in "Burn-down Herbicides" section for more information.

### Bicep II Magnum, Cinch ATZ, and Stalwart<sup>a</sup> Use Rates Up to 14 Days Before Planting (qts/A)

Soil Texture Group	Less than 3% OM	3% or Greater OM
Coarse	1.3	1.6
Medium	1.6	2.1
Fine	2.1	2.1 <sup>b</sup> or 2.1 to 2.58

- a. When using Stalwart, use 2.1 to 2.6 qts/A on fine-textured soils when applying on non-erodible land with 30% or more residue cover.
- b. Do not exceed this rate on highly with less than 30% plant residue cover.

## Corn: Soil Applied Herbicides — Preplant or Preemergence

Herbicide	Formulation	Product Rate Range
Metribuzin	75DF	2 - 5 1/3 oz
	4L	3 - 8 oz

- Metribuzin (Dimetric, Tricor) is labeled for application with other corn herbicides to improve residual control of broadleaf weeds, including lambsquarters, pigweed, common ragweed, Pennsylvania smartweed, and velvetleaf. In mixtures with 2,4-D, Gramoxone, and/or atrazine, metribuzin can also improve burndown of emerged weeds in no-till.
- Mode of action: group 15 (see pages 12-13).
- Apply before or after planting, but before corn emergence. Application rates increase when applied more than 10 days before planting.
- Observe the following precautions to avoid corn injury: Do not apply where soil pH is 7.0 or greater or on coarse-textured soils with less than 1 1/2% organic matter; do not apply more than 4 ounces/A of metribuzin 75DF on soils with less than 2% organic matter; plant corn seed at least 1 1/2 inches deep.
- Metribuzin can be used on field corn and in hybrid seed corn production fields. Both inbred lines should have known tolerance to metribuzin before using in seed production.

Herbicide	Formulation
Outlook	6EC

- Outlook (dimethenamid-P) controls annual grasses and pigweed, and controls or suppresses yellow nutsedge and black nightshade.
- Mode of action: group 15 (see pages 12-13).
- Can be applied after crop emergence, but must be applied before weed emergence, or in a tank mixture with herbicides that control emerged weeds. Do not apply to corn that is more than 12 inches tall.
- May be applied after corn has emerged with surfactant or low rates of liquid nitrogen fertilizer. Do not use liquid fertilizer as the spray carrier after the crop has emerged. COC should not be added after the crop has emerged unless specified for a particular tank mixture.

Outlook Use Rates (floz/A) <sup>a</sup>		
Soil Texture Group	Less than 3% OM	3% or Greater OM
Coarse	12 to 14	14 to 18
Medium and fine	14 to 18	18 to 21

a. When making applicaitons 15 to 45 days before planting or applying on muck soils, use 21 floz/A.

Herbicide	Formulation
Princep/simazine	4L
	90DF

- Simazine is often applied at reduced rates in combination with atrazine or atrazine premix products to improve or extend grass control.
- Mode of action: group 5 (see pages 12-13).
- Simazine rates will vary depending upon the herbicides in the mixture, but when used alone, rates are as follows (for simazine 4L): sand, silt, ot loam with low OM - 4 pts/A; soil with moderate amounts of clay and organic matter - 4.8 pts/A; loams high in OM and clay - 6 pts/A.
- Simazine is more effective than atrazine for control of fall panicum and crabgrass, but is less effective for control of cocklebur, quackgrass, yellow nutsedge, velvetleaf, and giant ragweed.
- Can be applied at a rate of 1 lb active ingredient/A in the fall prior to corn planting for control of winter annual weeds such as chickweed, mustards, and deadnettle. Apply with 2,4-D for best results. If weeds are more than an inch or two tall, apply with Gramoxone or glyphosate.

## Corn: Soil Applied Herbicides — Preplant or Preemergence

Herbicide	Formulation
Python	80WDG

- Python (flumetsulam) controls annual broadleaf weeds, including triazine-resistant lambsquarters and velvetleaf. Control of common ragweed and cocklebur is variable, and control of giant ragweed and annual morningglory is usually poor.
- Mode of action: group 2 (see pages 12-13).
- Python use rates range from 0.8 to 1 oz/A in coarse-textured soils, and 0.9 to 1.33 oz/A in medium or fine-textured soils. Reduced rates of Python can be mixed with atrazine premix products (Bicep, Harness Xtra, etc) to improve control of triazine-resistant lambsquarters.
- Do not apply to soils with a combination of pH less than 5.9 and organic matter content greater than 5%. Do not apply where soil pH is greater than 7.8.
- Preemergence applications of Python can occasionally injure corn, primarily when growing conditions are unfavorable soon after application. This injury appears as stunting, temporary yellowing, and reduction in root growth. To avoid injury, plant at least 1 1/2 inches deep and do not use Python in soils with an average of less than 1 1/2 percent organic matter.
- Soil-applied organophosphate insecticides may increase the risk of crop injury, especially when applied in-furrow. To avoid injury, apply insecticides in a band or T-band. Do not use Python if Thimet has been or will be applied to the corn.
- Corn treated with Python that is stressed or damaged by herbicide or other factors should not be treated with Accent, Permit, Basis, Beacon, or other ALS-inhibiting herbicides.
- Do not apply to sweet corn or popcorn. Inbred lines should be tested for crop tolerance before treating large acreages.

Herbicide	Formulation
Radius	4L

- Radius is a premix of flufenacet (Define) plus isoxaflutole (Balance) that controls annual grasses and many annual broadleaf weeds. Radius is weak on giant ragweed, cocklebur, and annual morningglories, and should be mixed with atrazine to improve control of these weeds. See Balance and Define descriptions for more information.
- Mode of action: group 15 (flufenacet), group 28 (isoxaflutole). See pages 12-13.
- Apply to field corn or corn grown for silage only.
- Do not apply after corn has emerged or severe injury may occur.
- Radius can injure corn under adverse environmental conditions and on coarse-textured soils. To avoid injury, do not exceed recommended rate for soil type, plant corn at least 1 1/2 inches deep, and make sure seed furrow is closed.
- In accompanying rate tables, use the higher rate within each range under any of the following conditions: high soil OM, heavy surface residues, dense weed pressure, or when applying early preplant or no-till. Use the lower rate within a range under any of the following conditions: low soil OM, soil pH >7.5, more intensive tillage, or herbicide applied closer to time of planting.

<b>Radius Use Rates (oz/A) – applied 8 to 21 days before planting</b>			
Soil Texture	Less than 1.5% OM	1.5 to 3% OM	3% or more OM
Coarse	8 to 10	10 to 16	14 to 18
Medium	13 to 23	14 to 24	20 to 28
Fine	20 to 28	20 to 28	20 to 28

<b>Radius Use Rates (oz/A) – applied no earlier than 7 days before planting</b>			
Soil Texture	Less than 1.5% OM	1.5 to 3% OM	3% or more OM
Coarse	7 to 9	9 to 14	13 to 18
Medium	12 to 21	12 to 22	17 to 27
Fine	19 to 28	19 to 28	19 to 28

## Corn: Soil Applied Herbicides — Preplant or Preemergence

Herbicide	Formulation	Product Rate Range
Resolve	25Df	0.5 - 2 oz

- Resolve (rimsulfuron) can provide residual control of annual grasses, pigweeds, and lambsquarters when applied at rates of 1 to 1.5 oz/A. Can be combined with atrazine for residual control of additional weeds. Preplant or preemergence application of Resolve or Resolve plus atrazine should be followed with a broad-spectrum postemergence herbicide program.
- Mode of action: group 2 (see pages 12-13).

Herbicide	Formulation	Product Rate Range
SureStart	4.25L	1.5 - 2 pts

- SureStart is a premix of acetochlor, clopyralid (Stinger), and flumetsulam (Python) that provides residual control of grass and broadleaf weeds.
- Mode of action: group 2 (flumetsulam); group 4 (clopyralid); group 15 (acetochlor). See pages 12-13.
- This product is labeled for use only in glyphosate-resistant and Liberty Link corn, and is intended for use in a planned preemergence followed by postemergence program. Preemergence or preplant application of SureStart should be followed by a postemergence application of glyphosate (glyphosate-resistant corn) or Liberty (Liberty Link) corn as needed.
- Preplant/preemergence application rates: coarse texture - 1.5 pts; medium texture with <3% OM - 1.5 to 1.75 pts; medium texture with >3% OM - 1.75 pts; fine texture - 2 pts.
- SureStart can also be applied early postemergence (up to 11-inch corn) in a mixture with glyphosate or Liberty, using the appropriate type of corn. This mixture will control emerged weeds and provide residual weed control after application.
- To reduce risk of crop injury, plant corn at least 1 1/2 inches deep, and make sure seed furrow is closed. Do not use where soil pH is greater than 7.8 or soil organic matter is less than 1.5%.
- Do not apply Counter insecticide to corn that has been or will be treated with SureStart. Apply other organophosphate insecticides in a T-band. Do not mix SureStart with organophosphate insecticides in postemergence applications.

Herbicide	Formulation	Product Rate Range
Valor SX	51WDG	2 oz

- Valor (flumioxazin) can be applied between 14 and 30 days prior to planting field corn. Valor controls lambsquarters (including triazine-resistant), black nightshade, and pigweeds. Valor suppresses or provides partial control of common ragweed, morningglory, velvetleaf, waterhemp, smartweed, and some annual grasses.
- Mode of action: group 14 (see page 12-13).
- Do not apply to popcorn, sweet corn, or corn grown for seed.
- Use only in no-till fields where last year's crop residue has not been incorporated into the soil. Do not conduct any tillage operations after the Valor has been applied.
- Do not apply in a mixture with any of the following herbicides unless following directions on a Valent supplemental label: flufenacet, metolachlor or s-metolachlor, alachlor, dimethenamid-p, or acetochlor.
- Valor has limited foliar activity on emerged weeds, and should generally be applied with 2,4-D and glyphosate for most effective control of emerged weeds.

## Corn: Soil Applied Herbicides — Preemergence Only

Herbicide	Formulation	Product Rate Range
Lorox	50DF	2/3 - 3 lb
Linex	4L	2/3 - 3 pts

- Lorox/Linex (linuron) controls broadleaf weeds. Linuron is generally applied at a rate of 3/4 to 1 lb/A in combination with other corn herbicides for control of triazine-resistant pigweed and lambsquarters.
- Mode of action: group 7 (see pages 12-13).
- Do not use on soils with more than 3 percent organic matter.
- Apply after corn planting, but before emergence.
- To avoid injury, corn should be planted at least 1 3/4 inches deep and adequately covered with soil.
- Do not spray over the top of emerged corn.

Herbicide	Formulation	Product Rate Range
Pendimethalin/Pendimax/Pendant/others	3.3EC	
Prowl H2O	3.8CS	

- The active ingredient in these products, pendimethalin, controls annual grasses, pigweed, and lambsquarters (including triazine-resistant biotypes), and helps control smartweed, velvetleaf, and seedling johnsongrass. Pendimethalin is often combined with atrazine for control of grass and broadleaf weeds where triazine-resistant pigweed and lambsquarters are a problem.
- Mode of action: group 3 (see pages 12-13).
- Can be applied postemergence until field corn is in the V8 stage or is 30 inches tall, and other types of corn are 20 to 24 inches tall. Where the corn canopy prevents spray particles from reaching the soil, use drop nozzles and apply as a directed spray. Postemergence applications provide residual control only, not control of emerged weeds.
- Apply only after planting. Do not incorporate or severe corn injury may result.
- To reduce the risk of corn injury, plant at least 1 1/2 inches deep and ensure good seed to soil contact. Combining pendimethalin with dicamba may increase the potential for crop injury, especially when corn is under stress from cool, wet conditions.

<b>Prowl H2O Use Rates (pt/A)</b>		
Soil Texture	Soil Organic Matter Content <sup>a</sup>	
	Less than 3%	More than 3%
Coarse	1.5	1.5
Medium	2.0	2.0
Fine	2.0	2.0

<b>Pendimethalin 3.3EC Use Rates (pt/A)</b>		
Soil Texture	Soil Organic Matter Content	
	Less than 3%	More than 3%
Coarse	1.2 to 1.8	1.8
Medium	1.8 to 2.4	1.8 to 2.4
Fine	1.8 to 2.4	2.4 to 3

The high rates for each soil texture above should be used if heavy weed populations are anticipated, extensive crop residues were present prior to seedbed preparation, or in no-till.

## Corn: Postemergence Herbicides — Contact

Herbicide	Formulation	Product Rate Range
Aim	2EC	0.5 -1 oz

- Aim (carfentrazone-ethyl) is a contact herbicide that controls black nightshade, velvetleaf, redroot pigweed, and small annual morningglories and lambsquarters. Aim is often added to herbicide programs to improve control of velvetleaf.
- Mode of action: group 14 (see pages 12-13).
- Apply when weeds are 1 to 4 inches tall for best results. Velvetleaf can be controlled up to 36 inches tall. Apply broadcast before corn exceeds the 8-collar stage, and as a directed spray with drop nozzles up to the 14-collar stage.
- Apply with NIS (0.25% v/v). UAN (2 to 4 gallons/100 gallons) or AMS (2 to 4 lbs/A) can be added if recommended for use with other herbicides in a mix with Aim. The label does allow use of COC under dry conditions and in specific tank mixtures. Application with Buctril may cause unacceptable crop injury.
- Aim can be applied with drop nozzles to seed corn production fields. Avoid directing herbicide into the whorl.
- Aim can be applied to sweet corn, but the user assumes all responsibility for herbicide tolerance. Consult seed supplier about sweet corn tolerance to Aim prior to use.
- Apply in a spray volume of 10 to 20 gpa with a pressure of 20 to 40 psi. Flat fan nozzles are recommended for adequate spray coverage.
- Add Aim to the spray tank before adding other products.
- Aim usually causes leaf speckling and necrosis. The severity of injury varies with environmental conditions, adjuvants, and other herbicides in the mixture. To reduce injury, 1) do not apply within 6 to 8 hours of rain, 2) make sure spray nozzles are positioned at least 18 inches above the crop, and 3) avoid direction of excessive amounts of herbicide into corn whorls.

Herbicide	Formulation	Product Rate Range
AAAtrex/atrazine	4L	1 1/2 - 2 qt
	90DF	1.67 - 2.22 lb

- Mode of action: group 5 (see pages 12-13).
- Maximum rate for postemergence application to fields without soil-applied atrazine in the same year is 2 pounds active ingredient/A. When applied postemergence to fields with soil-applied atrazine the same year, total amount of atrazine applied may not exceed 2.5 pounds active ingredient.
- Annual broadleaf weeds are more susceptible than annual grasses.
- For grass control, apply when grasses are no more than 1 1/2 inches tall. Rates of 2 pound active ingredient/A are generally required for grass control. Atrazine will not control fall panicum.
- For control of broadleaf weeds, rates of 1.2 pounds active ingredient may be sufficient. Apply until broadleaf weeds are 4 inches tall.
- Apply atrazine with 1 quart per acre COC for best results. Mix atrazine with water first, and add oil last.
- Postemergence applications must be made before the crop reaches 12 inches in height.

Herbicide	Formulation	Product Rate Range
Basagran	4L	1 1/2 - 2 pt

- Basagran (bentazon) is a contact herbicide that controls annual broadleaf weeds, including cocklebur, velvetleaf, and Pennsylvania smartweed. Basagran controls or suppresses Canada thistle and yellow nutsedge.
- Mode of action: group 6 (see pages 12-13).
- For best results, apply with COC when weeds are in the 2- to 6-leaf stage.
- Apply in combination with atrazine for control of pigweed, lambsquarters, and ragweeds.

## Corn: Postemergence Herbicides — Contact

Herbicide	Formulation	Product Rate Range
Bromoxynil	2S	1 - 1 1/2 pt

- Bromoxynil is sold under various trade names, including Buctril, Moxy, and Broclean. Bromoxynil is a contact herbicide that controls many annual broadleaf weeds, including black nightshade, cocklebur, ragweeds, lambsquarters, and smartweed, but is weak on pigweed and large velvetleaf.
- Mode of action: group 6 (see pages 12-13).
- Apply at a rate of 1 pint per acre from corn emergence until tassel emergence. The 1 1/2-pint rate may be applied after corn reaches the 4-leaf stage and before tassel emergence. Maximum corn size at the time of application varies with the tank-mix partner.
- Do not apply to seed corn inbreds or popcorn prior to the 3-leaf stage.
- Do not use surfactant or crop oil when applying bromoxynil alone or with most other herbicides. NIS and UAN are allowed in some tank mixtures.
- Apply in a minimum volume of 10 gpa at a minimum pressure of 30 psi using flat fan nozzles.
- May cause corn leaf burn, but effects are usually temporary.

Herbicide	Formulation	Product Rate Range
Bromoxynil + atrazine	3L	1 1/2 - 3 pt

- Bromoxynil plus atrazine is sold under various trade names. It controls most annual broadleaf weeds.
- Mode of action: group 5 (atrazine); group 6 (bromoxynil). See pages 12-13.
- Can be applied at a rate of 1 1/2 to 2 pints per acre after corn emergence and before corn is 12 inches tall. The 3-pint rate may be applied after corn reaches the 4-leaf stage and before corn is 12 inches tall.
- Do not use surfactant, crop oil, liquid fertilizers, or other additives when applying Buctril/atrazine or Moxy/atrazine alone or with most other herbicides. NIS and UAN are allowed in some tank mixtures.
- Apply in a volume of at least 10 gallons per acre at a minimum pressure of 30 psi using flat fan nozzles.

Herbicide	Formulation	Product Rate Range
Cadet	0.91EC	0.4 - 0.9 oz

- Cadet (fluthiacet-methyl) is a contact herbicide that controls velvetleaf, and controls or suppresses small lambsquarters, pigweeds, black nightshade, and annual morningglory at the 0.9 oz rate.
- Mode of action: group 14 (see pages 12-13).
- Can be applied to field corn, popcorn, seed corn, and sweet corn from the 2-collar stage up to 48 inches tall. Apply before tassel emergence.
- Apply with NIS (0.25% v/v), or a COC or MSO (1 to 2 pts/A). UAN (1 to 2 qts/A) or AMS can be added. When combined with other herbicides, Cadet can generally be applied with any adjuvants required for those herbicides.
- Apply in a minimum spray volume of 15 gpa and pressure of 20-40 psi. Increase volume and pressure in dense crop and weed canopies.

Herbicide	Formulation	Product Rate Range
Laddok S-12	5L	1 1/3 - 2 1/3 pt

- Laddok/Headline is a 1:1 premix of bentazon (Basagran) plus atrazine for control of most broadleaf weeds, and suppression or control of yellow nutsedge, Canada thistle, and some perennial vines.
- Mode of action: group 5 (atrazine); group 6 (bentazon). See pages 12-13.
- Application rate varies with weed species and size. Apply with UAN, AMS, or nonphytotoxic oil concentrate. The label allows combinations of spray additives, which vary with the weed species present. UAN or AMS should be added when velvetleaf is the target weed, and may also improve control of cocklebur and Pennsylvania smartweed. COC should also be added when common lambsquarters, common ragweed, Canada thistle, yellow nutsedge, or field bindweed is present.
- Apply in a spray volume of at least 10 gpa with a minimum pressure of 40 psi. Increasing the spray volume (up to 50 gpa) will improve control when the crop and weed foliage is dense.
- To suppress Canada thistle, apply 2 1/3 pints when thistle plants are 8 to 10 inches tall until the bud stage.
- A single application of 2 1/3 pints of Laddok can suppress yellow nutsedge that is 1 to 4 inches tall.
- Provides better control of velvetleaf, annual morningglory, lambsquarters, and pigweed than Basagran alone, but is no more effective on triazine-resistant lambsquarters.

## Corn: Postemergence Herbicides — Contact

Herbicide	Formulation	Product Rate Range
Resource	0.86EC	4 to 6 oz (broadcast) 4 to 8 oz (directed)

- Resource (flumiclorac) is a contact herbicide that controls velvetleaf (up to 10 inches tall) and pigweeds. Control of lambsquarters is variable, and some other broadleaf weeds will be suppressed.
- Mode of action: group 14 (see pages 12-13).
- Apply when corn is in the 2- to 10-leaf stage and broadleaf weeds are in the 2- to 3-leaf stage for best results. Use a directed spray if corn size prevents adequate spray coverage of weeds.
- COC should be included when Resource is applied alone. Use 1 pint/A for broadcast application and 1 quart/A for directed application. UAN or AMS can be added to improve control of large velvetleaf. Adjuvant recommendations vary with the other herbicides in the mixture. See the label for more information.
- Apply in a spray volume of at least 10 gpa with a spray pressure of 30 to 60 psi.

## Corn: Postemergence Herbicides — Systemic

Herbicide	Formulation	Product Rate Range
Beacon	75DF	3/8 - 3/4 oz

- Beacon (primisulfuron) is a translocated sulfonylurea herbicide that controls or suppresses annual and perennial grasses and controls annual broadleaf weeds. Beacon provides only partial control of foxtail species and may be less effective than Accent for rhizome johnsongrass and quackgrass control, but is generally more effective than Accent for broadleaf weed control. Does not control ALS-resistant weeds.
- Mode of action: group 2 (see pages 12-13).
- Mixtures of Beacon plus dicamba or 2,4-D will suppress a number of perennial broadleaf weeds.
- Beacon is labeled for use on field corn, popcorn, and seed corn. Popcorn and inbred lines grown for seed may be severely injured by Beacon and should be thoroughly tested for potential sensitivity to Beacon before treating large acreage. Do not use Beacon on sweet corn.
- Apply broadcast or as a directed spray when field corn is between 4 and 20 inches tall, and as a directed spray after corn is 20 inches tall and before tassel emergence. All applications to inbred lines and popcorn should be made post-directed or semi-directed (nozzles positioned to avoid placing spray in whorl) after corn is 10 inches tall but before tassel emergence.
- Apply with NIS (0.25% v/v) or COC (1 to 4 pints per acre); COC is generally the preferred additive. Liquid nitrogen fertilizer (2 to 4 quarts/A) or AMS (2 to 4 lbs/A) may be added, but should not substitute for surfactant or oil concentrate. COC plus nitrogen fertilizer can be use when mixing with atrazine, Accent, or 2 oz/A or less of dicamba. Mixtures with most other herbicides should be applied with NIS. See label for detailed information on mixtures with other herbicides.
- Apply when grasses are at the following heights: shattercane and seedling johnsongrass — 4 to 12 inches; rhizome johnsongrass — 8 to 16 inches; quackgrass — 4 to 8 inches; fall panicum — less than 2 inches. Beacon will control common and giant ragweed that are 2 to 9 inches tall. Most other broadleaf weeds should be 1 to 4 inches tall when Beacon is applied.
- Do not make a foliar postemergence or a soil application of any organophosphate insecticide within 10 days before or 7 days after Beacon application.

Herbicide	Formulation	Product Rate Range
Callisto	4L	3 oz

- Callisto (mesotrione) is a systemic herbicide that controls annual broadleaf weeds, including cocklebur, atriplex, lambsquarters (including triazine-resistant), giant ragweed, Pennsylvania smartweed, pigweeds, waterhemp, velvetleaf, and black nightshade. Callisto alone does not provide consistent control of common ragweed or morningglory. The addition of atrazine (1/2 pint) improves control of a number of weeds, and is required for consistent control of common ragweed and morningglory. Where corn is more than 12 inches tall and atrazine cannot be used, a mixture of Callisto plus bromoxynil can improve control of ragweeds.
- Mode of action: group 28 (see pages 12-13).
- Apply when weeds are less than 5 inches tall for best results. Apply with atrazine (1/2 pint) if weeds are more than 5 inches tall.
- Callisto can be applied to field corn, seed corn, and yellow (not white) popcorn up to 30 inches tall or the 8-leaf stage. Callisto plus atrazine can be applied to corn up to 12 inches tall.
- Apply with COC (1% v/v) plus UAN (2.5% v/v) or AMS (8.5 lb/100 gallons). Do not use MSO (MSO) or MSO blend adjuvants. To avoid injury to yellow popcorn, apply with COC alone (do not add UAN) after crop emergence.
- Apply in a spray volume of 10 to 30 gpa, but use a volume of at least 20 gpa if weed foliage is dense.
- Severe crop injury may occur if Callisto is applied postemergence to corn that was previously treated with Counter or Lorsban, and this injury can result in yield loss. Do not mix Callisto with organophosphate or carbamate insecticides. Do not make a foliar application of any organophosphate or carbamate insecticide within 7 days before or after a postemergence Callisto application. Callisto can be applied postemergence in a mixture with pyrethroid insecticides.
- Do not apply Callisto postemergence in a mixture with emulsifiable concentrate grass herbicides, unless specifically addressed under one of the mixture sections of the label, or crop injury may occur.

## Corn: Postemergence Herbicides — Systemic

Herbicide	Formulation	Product Rate Range
Celebrity Plus	75.3DF	4.7 oz

- Celebrity Plus is a premix of nicosulfuron (Accent) plus Distinct (dicamba plus diflufenzopyr) that controls annual grass and broadleaf weeds in corn.
- Mode of action: group 2 (nicosulfuron), group 4 (dicamba), group 19 (diflufenzopyr). See pages 12-13.
- Apply with NIS (1 to 2 qts/100 gallons) and 28% UAN (1 to 2 qts/A) or AMS (1 to 2 lbs/A).
- Can be applied broadcast or as a directed spray to field corn that is up to 24 inches tall or up to 6 collars (whichever comes first). As with any dicamba product, risk of corn injury increases when corn exceeds 8 to 10 inches in height. To reduce risk of injury, make sure nozzle spacing and spray boom height are set to minimize interception of spray by the corn plants.
- Where Celebrity Plus is applied to corn previously treated with soil applications of organophosphate insecticides, temporary crop injury may occur.
- Most of the guidelines and restrictions on Accent and Distinct labels also apply to this product.

Herbicide	Formulation	Product Rate Range
Dicamba	4L	1/2 - 1 pt

- Dicamba is sold under a number of trade names, including Banvel, Clarity, Sterling Blue, and Oracle. Dicamba is a translocated herbicide that controls many annual broadleaf weeds, including pigweeds, ragweeds, black nightshade, cocklebur, and Pennsylvania smartweed. Control of velvetleaf can be variable. Dicamba will control or suppress perennial broadleaf weeds, especially when applied with ALS inhibitor herbicides.
- Mode of action: group 4 (see pages 12-13).
- Apply 1/2 to 1 pint when corn is in the spike to five-leaf stage, or until corn is 8 inches tall, whichever occurs first. Do not apply more than 1/2 pint on coarse-textured soils. If the 6th true leaf is emerging from the whorl, or corn is more than 8 inches tall, a rate of 1/2 pint can be applied until corn is 36 inches tall, or until 15 days before tassel emergence. Apply as a directed spray when corn leaves prevent proper spray coverage, or sensitive crops are growing nearby.
- The 1 pint rate provides limited residual broadleaf weed control.
- Apply with 1/2 to 1 gallon per acre of UAN (28%) when velvetleaf is a target weed. Can be applied with surfactant or crop oil to improve control in dry growing conditions. Do not apply with crop oil when corn exceeds 5 inches in height.
- With any dicamba product, risk of corn injury increases when corn exceeds 8 to 10 inches in height. To reduce risk of injury, make sure nozzle spacing and spray boom height are set to minimize interception of spray by the corn plants.
- Soybeans and vegetables are extremely susceptible to dicamba drift and vapors. Apply in a spray volume of 20 gpa at a pressure of less than 20 psi to reduce drift. Do not apply where sensitive crops are growing nearby if winds over 5 MPH are moving in the direction of sensitive crops, corn is more than 24 inches tall, soybeans are more than 10 inches tall, or soybeans have begun to bloom. Most dicamba products should not be applied when air temperatures on the day of application will exceed 85 degrees.

Herbicide	Formulation	Product Rate Range
Dicamba + atrazine	3.2L	3 1/2 pt

- Dicamba plus atrazine is sold under a number of trade names, including Marksman, Sterling Plus, Banvel-K+atrazine, and Stratos. These products control most annual broadleaf weeds, and suppress or control perennial broadleaf weeds.
- Mode of action: group 5 (atrazine), group 4 (dicamba). See pages 12-13.
- Apply when corn is in the spike to five-leaf stage, or until corn is 8 inches tall, whichever comes first. The rate is 3 1/2 pints on medium- or fine-textured soils with at least 2 percent organic matter, and 2 pints on coarse-textured soils. Provides some residual broadleaf weed control.
- The addition of crop oil, surfactant, or liquid nitrogen fertilizer may improve control, especially when weeds are drought-stressed. Apply with UAN if velvetleaf is a target weed. Application with crop oils may cause crop injury. Do not apply with crop oil after corn exceeds 5 inches in height.
- Precautions on spray drift, volatility, and corn injury are the same as for dicamba. See dicamba description for more information.

## Corn: Postemergence Herbicides — Systemic

Herbicide	Formulation	Product Rate Range
Distinct	70 WDG	4 - 6 oz

- Distinct is a premix of dicamba plus diflufenzopyr for control of most annual broadleaf weeds in corn. Distinct can be weak on velvetleaf, although it is more effective than dicamba alone.
- Mode of action: group 4 (dicamba), group 19 (diflufenzopyr). See pages 12-13.
- Distinct can control or suppress small annual grasses that have escaped preemergence herbicide treatments. Effectiveness on grasses is variable, and can be reduced under dry conditions.
- Distinct is generally more effective than other dicamba products on perennial broadleaf weeds, and has provided excellent control of Canada thistle and hedge bindweed in OSU research.
- Apply 6 oz/A when corn is 4 to 10 inches tall, and 4 oz/A when corn is 10 to 24 inches tall. As with any dicamba product, risk of corn injury increases when corn exceeds 8 to 10 inches in height. To reduce risk of injury, make sure nozzle spacing and spray boom height are set to minimize interception of spray by the corn plants.
- Apply with NIS (0.25% v/v) plus UAN (1.25% v/v) or AMS (5 lbs/100 gallons). To avoid mixing problems, add Distinct to spray tank before adding AMS.
- Volatility of Distinct is similar to Clarity. Take precautions to avoid contact of Distinct with sensitive plants via drift or volatility. Exposure of soybeans to Distinct via sprayer contamination or spray particle drift will result in more severe injury compared to other dicamba products.

Herbicide	Formulation	Product Rate Range
Hornet	78.5WDG	2 to 5 oz

- Hornet is a premix of flumetsulam (Python) plus clopyralid (Stinger), translocated herbicides, that controls annual broadleaf weeds and suppresses perennial broadleaf weeds. Hornet controls ragweeds, velvetleaf, cocklebur, Pennsylvania smartweed, and small marehail, but is not effective for control of lambsquarters, pigweeds, black nightshade, and annual morningglory. The higher rates can suppress or control some perennial weeds, including dandelion and Jerusalem artichoke.
- Mode of action: group 2 (flumetsulam), group 4 (clopyralid). See pages 12-13.
- Hornet will control the above-ground growth of Canada thistle, but may be less effective than labeled rates of Stinger for long-term control of thistle. Mixing Hornet with Stinger will improve long-term control. Apply before thistle plants are in the bud stage for best results.
- Apply broadcast when weeds are 2 to 8 inches tall and field corn is up to 20 inches tall or at the 6-collar stage, whichever occurs first. Hornet can be applied as a directed postemergence application using drop nozzles to corn that is 20 to 36 inches tall.
- Apply with NIS (1 quart/100 gallons) or COC (1 gallon/100 gallons). Under dry conditions, the addition of UAN (2 1/2 gallons/100 gallons) may improve control.
- Apply in a spray volume of 10 to 40 gpa with a spray pressure of 20 to 40 psi.
- To avoid severe crop injury, do not apply to corn previously treated with Thimet. Application to corn treated with other organophosphate insecticides may cause temporary crop injury. Do not mix with foliar organophosphate insecticides, or apply insecticides within 10 days before or after Hornet application.
- Do not apply to corn that shows symptoms of injury from previously applied herbicides.
- Do not apply to popcorn or sweet corn. Corn inbred lines may be injured by Hornet.

Herbicide	Formulation	Product Rate Range
Impact	2.8L	0.75 oz

- Impact (topramezone) controls many broadleaf weeds, including biotypes resistant to ALS inhibitors, glyphosate, and triazines. Impact controls or suppress small annual grasses. Impact is most effective when applied in combination with 0.25 to 1.5 lbs active ingredient /A of atrazine. The higher atrazine rates will provide residual weed control.
- Mode of action: group 28 (see pages 12-13).
- Can be applied to field corn, seed corn, popcorn, and sweet corn. Inbreds vary in their tolerance to Impact. Users should check with seed supplier for information on tolerance prior to use when applying to inbreds grown for seed production.
- Apply when most broadleaf weeds are emerged and less than 6 inches tall.
- Impact can be applied postemergence up to 45 days before crop harvest. Apply with drop nozzles if the crop canopy prevents adequate spray coverage on weeds.

## Corn: Postemergence Herbicides — Systemic

- For best results, apply with a MSO (1 to 1.5% v/v) plus either UAN (1.25 to 2.5% v/v) or AMS (8.5 to 17 lbs/100 gallons of water). NIS can be used instead of methylated seed soil if required in mixtures with other herbicides.
- Apply in a minimum spray volume of 10 gpa, and apply in 15 gpa when treating large weeds or high-density weed infestations.
- Impact should not be relied upon to provide complete control of grasses, but can control small (less than 3-inch) grasses that escape preemergence herbicides.

Herbicide	Formulation	Product Rate Range
Laudis	3.5L	3 oz

- Laudis (tembotrione) controls many broadleaf weeds, including biotypes resistant to ALS inhibitors, glyphosate, and triazines. Impact controls or suppress small annual grasses. Laudis is most effective when applied in combination with 0.5 lbs active ingredient /A of atrazine.
- Mode of action: group 27 (see pages 12-13).
- Can be applied to field corn, seed corn, popcorn, and sweet corn. Users should check with seed supplier for information on hybrid tolerance prior to use on popcorn, sweet corn, or inbreds grown for seed production.
- Apply when broadleaf weeds are less than 6 inches tall. For most grass species, grasses should be less than 3 inches tall at time of application.
- Apply broadcast up to the V8 stage of field corn and popcorn, and V7 stage of sweet corn.
- Apply with a MSO (1% v/v, minimum of 1.25 pt/A) plus either UAN (1.5 qt/A) or AMS (1.5 lb/A). When mixing with atrazine, COC (1% v/v) should be used instead of MSO.
- Apply in a minimum spray volume of 10 gpa, and apply in 15 to 20 gpa in dense weed populations or under adverse environmental conditions. Use nozzles and pressure that result in medium spray droplets, and increase application volume when using nozzles that produce coarse spray droplets. Flat fan nozzles of 80 or 110 degrees will provide optimum postemergence spray coverage.
- Laudis should not be relied upon to provide complete control of grasses, but can control small (less than 3-inch) grasses that escape preemergence herbicides.

Herbicide	Formulation	Product Rate Range
Nicosulfuron (active ingredient)		
Accent	75DF	2/3 oz (1 packet per 4 acres)
NIC-IT	2L	2 oz
Samson	0.33L	12 oz

- These products contain nicosulfuron, a translocated sulfonylurea herbicide. Nicosulfuron controls annual and perennial grasses and a few annual broadleaf weeds, including foxtails, fall panicum, johnsongrass, quackgrass, shattercane, Pennsylvania smartweed, pigweed, and annual morningglory. Does not control crabgrass.
- Mode of action: group 2 (see pages 12-13).
- Accent and NIC-IT are labeled for use on field corn, popcorn, seed corn, and some sweet corn hybrids grown for processing and fresh market. Growers should contact seed suppliers for recommendations and information on crop tolerance and use of soil-applied organophosphate insecticides prior to application to popcorn or seed corn. Do not apply to any white popcorn inbred or hybrid unless approved by the seed supplier. Accent and NIC-IT can be used on High Lysine, Waxy, White or other Food Grade hybrids. A list of approved processing sweet corn hybrids is available from DuPont. With regard to use of Accent on fresh market sweet corn, the user assumes all risk based on recommendations from university or seed company personnel, or other experts.
- All three products can be applied broadcast or as a directed spray to field corn that is up to 20 inches tall or up to 6 collars (whichever occurs first). Apply as a directed spray when corn is 20 to 36 inches tall. Do not apply to corn that is at or past the 10-collar stage or more than 36 inches tall.
- Accent and NIC-IT can be applied broadcast to popcorn or seed corn that is less than 20 inches tall or up to 5 collars (whichever occurs first).
- Samson can be applied to corn grown for seed, but not to popcorn, sweet corn, or food grade hybrids. For seed corn, apply when corn is less than 20 inches tall or up to 5 collars (whichever occurs first).

## Corn: Postemergence Herbicides — Systemic

- OSU research has shown it can be difficult to achieve adequate season-long weed control with a single postemergence application of herbicides with limited residual activity (such as Accent). Applying a reduced rate of a preplant or preemergence herbicide prior to postemergence herbicide application will result in more consistent control of longer duration.
- For best results, apply Accent and NIC-IT with COC (1 gallon/100 gallons spray) plus UAN (2 to 4 quarts/A) or AMS (2 to 4 lbs/A). Substituting a MSO for COC can improve control under drought-stressed conditions. NIS (1 to 2 qts/100 gallons spray) can be used instead of crop oil if required in a mixture with another herbicide. The Samson formulation contains adjuvants, and the label does not specify the addition of adjuvants to the spray mix.
- Apply in a spray volume of at least 10 gpa with a pressure of 20 to 40 psi. Increase volume to at least 15 gpa in heavy weed pressure. Avoid spraying excessive amounts of herbicide directly into the corn whorl.
- Apply when grasses are at the following heights: foxtails and fall panicum — 2 to 4 inches; quackgrass — 4 to 10 inches; shattercane and seedling johnsongrass — 4 to 12 inches; rhizome johnsongrass — 8 to 18 inches.
- Control of yellow and green foxtail may be reduced in mixture with some broadleaf herbicides. Consult the label for spray additive recommendations when mixing with broadleaf herbicides, and follow the most restrictive label with regard to maximum corn size at the time of application.
- Control may be reduced if applied during conditions of drought stress, abnormally hot or cold weather, when daytime temperatures do not exceed 50 degrees, or following periods of large day/night temperature fluctuations.
- Where nicosulfuron is applied to corn previously treated with soil applications of organophosphate insecticides, temporary crop injury may occur. Do not mix nicosulfuron with foliar-applied organophosphate insecticides or with Basagran, Laddok, or 2,4-D. Do not apply these materials within 7 days before through 3 days after applying nicosulfuron.

Herbicide	Formulation	Product Rate Range
NorthStar	47DF	5 oz

- NorthStar is a premix of primisulfuron (Beacon) plus dicamba (Banvel) for control of most annual broadleaf weeds and suppression or control of annual and perennial grasses. NorthStar will suppress a number of perennial broadleaf weeds. See Beacon and dicamba descriptions for more information and precautions on use.
- Mode of action: group 2 (primisulfuron), group 4 (dicamba). See pages 12-13.
- Can be applied broadcast or directed to field corn that is between 4 and 20 inches tall. Apply using drop nozzles when corn is 20 inches (V6) up to 36 inches tall or 15 days before tassel emergence, whichever occurs first.
- For popcorn and seed corn inbreds, apply as a directed spray using drop nozzles when corn is between 10 and 36 inches tall or 15 days before tassel emergence, whichever occurs first. Inbred lines and popcorn hybrids should be thoroughly tested for sensitivity to NorthStar before treating large acreages.
- Apply with NIS (0.25% v/v) or COC (1 to 4 pints/A), but do not use COC if corn is more than 12 inches tall. UAN (2 to 4 qts/A) or AMS (2 to 4 lbs/A) may also be added.

Herbicide	Formulation	Product Rate Range
Option	35WDG	1 1/2 to 1 3/4 oz

- Option (foramsulfuron + safener) is a translocated sulfonyleurea herbicide that controls annual grasses and a few small annual broadleaf weeds. Option should generally be mixed with another herbicide that has activity on broadleaf weeds unless grass weeds are the sole target.
- Mode of action: group 2 (see pages 12-13).
- Apply broadcast when field corn is in the V1 to V6 stage. Can be applied as a directed spray using drop nozzles when corn is 16 to 36 inches tall. Do not apply to sweet corn, popcorn, or seed corn.
- Apply when grass weeds are at the following heights: foxtails, fall panicum - up to 3 inches tall; barnyardgrass - up to 4 inches; quackgrass, wirestem muhly - up to 10 inches; shattercane - up to 12 inches; johnsongrass - up to 16 inches.
- Apply is a spray volume of 10 to 20 gpa with a MSO (1.5 pts/A) plus UAN (1.5 to 2 qts/A) or AMS (1.5 to 3 lbs/A). For spray volumes of 15 gpa or more, the MSO rate can be 1% v/v.
- Do not use Option in the same season as Thimet. Application of Option following an at-planting Lorsban application may result in temporary crop injury. Foliar applications of an organophosphate insecticide should not occur within 7 days of Option application.

## Corn: Postemergence Herbicides — Systemic

Herbicide	Formulation	Product Rate Range
Permit/Sandea	75DF	2/3 to 1 1/3 oz

- Permit/Sandea (halosulfuron) is a translocated sulfonylurea herbicide that controls yellow nutsedge and annual broadleaf weeds, including velvetleaf, ragweeds, cocklebur, and redroot pigweed. Permit is weak on lambsquarters and annual morning-glories. A combination of Permit plus dicamba will improve control of these weeds and control or suppress perennial broadleaf weeds. Does not control ALS-resistant weeds.
- Mode of action: group 2 (see pages 12-13).
- Apply when field corn is in the spike through layby stage and most annual weeds are 1 to 6 inches tall for best results. When corn is more than 24 inches tall, mixtures of Permit with other postemergence corn herbicides should be applied with drop nozzles to ensure weed coverage and avoid spraying directly into the whorl. Follow the most restrictive label with regard to maximum corn size when mixing with other herbicides.
- Permit can be applied broadcast (2/3 oz/A) to sweet corn and popcorn in the spike through layby stage. Two applications are allowed per year, but the second should be applied with drop nozzles. Sweet corn and popcorn hybrids should be thoroughly tested for sensitivity to Permit before treating large acreages. Do not apply to the sweet corn variety 'Jubilee'. Do not apply when corn is under stress from environmental conditions.
- For control of yellow nutsedge, apply 1 to 1 1/3 ounces/A when nutsedge is 4 to 12 inches tall. Dense populations of nutsedge may require a second application.
- Apply in a minimum spray volume of 10 gpa with NIS (1 to 2 quarts/100 gallons) or COC (1 gallon/100 gallons). Include UAN (2 to 4 quarts/A) or AMS (2 to 4 lbs/A) when velvetleaf or redroot pigweed is present.
- Tank mixtures may cause temporary crop injury, especially when the other herbicide in the mixture is Accent or Beacon. Do not apply in mixtures if the crop is under stress due to drought, water saturated soils, low fertility, hail, frost, insects, or when the maximum daytime temperature is above 92 degrees.

Herbicide	Formulation	Product Rate Range
Resolve Q	22.4 WDG	1.25 oz

- Resolve Q is a premix of rimsulfuron and thifensulfuron. It also contains a safener, isoxadifen, that reduces risk of corn injury and broadens the application window, compared with other rimsulfuron products.
- Resolve Q controls or suppresses small (1 to 2 inch) annual grass and broadleaf weeds, including foxtails, lambsquarters, and pigweed. When mixed with glyphosate in postemergence treatments to glyphosate-resistant corn, Resolve Q provides residual control of annual grasses and some small-seeded broadleaf weeds.
- Mode of action: group 2 (see pages 12-13).
- Can be applied broadcast to field corn with up to 6 collars, or up to 20 inches tall (whichever is more restrictive).
- No additional adjuvants are needed when applying with a glyphosate product that contains surfactant. Otherwise, Resolve Q should be applied with NIS (0.25% v/v) plus UAN (2 qt/A) or AMS (2 lb/A).

Herbicide	Formulation	Product Rate Range
Shotgun	3.25L	2 - 3 pints

- Shotgun is a premix of atrazine plus 2,4-D for postemergence control of many broadleaf weeds in corn.
- Mode of action: group 5 (atrazine), group 4 (2,4-D). See pages 12-13.
- Apply broadcast in a minimum spray volume of 10 gpa when corn is spike to 8 inches tall, and as a directed spray when corn is 8 to 12 inches tall. Treated corn may be brittle and subject to breakage by wind during the 2 weeks following application.
- Allow 6 hours between application and rainfall.
- Follow precautions to prevent drift and volatility of 2,4-D, which will injure nearby broadleaf plants. Volatility is more likely at air temperatures greater than 85 degrees.

## Corn: Postemergence Herbicides — Systemic

Herbicide	Formulation	Product Rate Range
Spirit	57DF	1 oz (1 packet per 4 acres)

- Spirit is a premix of prosulfuron (Peak) plus primisulfuron (Beacon), translocated sulfonylurea herbicides. Broadleaf weed control is similar to Beacon, although Spirit is more effective on a few broadleaf weeds. Mixing with dicamba, 2,4-D, or bromoxynil will improve annual weed control. Most effective control/suppression of perennial broadleaf weeds will occur when mixed with 2,4-D or dicamba. Spirit is weak on annual morningglories and yellow nutsedge. Does not control ALS-resistant weeds.
- Mode of action: group 2 (see pages 12-13).
- Follow these guidelines to avoid carryover of Spirit to subsequent crops: 1) Avoid use where soil pH is greater than 7.8. If used where soil pH is greater than 7.8, plant only field corn or small grains the following year; 2) where less than one inch of rain occurs within one month of application, or less than 12 inches of rain occurs within 5 months after application, plant only corn, small grains, or STS soybeans the following year ; 2) north of Interstate 80, do not plant soybeans within 18 months of application; 3) south of I-80, soybeans can be planted 10 months after application where soil pH is less than 7.8; and 4) do not apply after June 30. See label for guidelines on rotation to other crops.
- Apply broadcast or directed when field corn is 4 to 24 inches tall. To avoid injury and improve spray coverage on weeds, apply as a directed spray using drop nozzles when corn is more than 20 inches tall.
- For popcorn, apply as a directed spray using drop nozzles when corn plants are 10 to 24 inches tall, and before tassel emergence. For seed corn inbreds, Spirit can be applied broadcast when corn is between 4 and 20 inches tall, or until the 6-collar stage, whichever occur first. Use drop nozzles when seed corn inbreds are 20 to 24 inches tall and before tassel emergence. Inbred lines and popcorn hybrids should be thoroughly tested for sensitivity to Spirit before treating large acreages. Do not apply to sweet corn.
- Apply in a minimum spray volume of 10 gpa. Increasing the volume to at least 20 gpa can improve control in dense weed infestations.
- Apply with COC (1 to 4 pints/A) or NIS (1 to 2 quarts/100 gallons). Liquid nitrogen fertilizer (2 to 4 quarts/A) or AMS (2 lbs/A) may be added to improve control of velvetleaf and other weeds. COC is generally more effective than NIS. Use of a MSO (Meth Oil, Priority MSO, Sun-It II, for example) may improve control when weeds are large or drought-stressed.

Herbicide	Formulation	Product Rate Range
Starane	1.5L	

- Starane (fluroxypyr) is a translocated herbicide that controls hemp dogbane, common ragweed and a few other broadleaf weeds. Due to a relatively narrow spectrum of activity, Starane should be mixed with other herbicides to improve control of specific problem weeds.
- Mode of action: group 4 (see pages 12-13).
- Apply broadcast up to the V5 stage of field corn and when weeds are less than 8 inches tall. Applications when corn is past the V5 stage should be made as a directed spray using drop nozzles.
- Crop injury, including stem curvature, stunting, and brace root injury can occur with some corn hybrids when Starane is applied as a broadcast treatment. Hybrids susceptible to phoxony injury may also be susceptible to injury from Starane.

Herbicide	Formulation	Product Rate Range
Status	56 WDG	2.5 - 5 oz

- Status is a premix of dicamba plus diflufenzopyr plus a safener, for control of most annual broadleaf weeds in corn. Addition of the safener results in reduced risk of injury to corn, compared with Distinct and other dicamba products. Status can be weak on velvetleaf, although it is more effective than dicamba alone.
- Mode of action: group 4 (dicamba), group 19 (diflufenzopyr). See pages 12-13.
- Status can control or suppress small annual grasses that have escaped preemergence herbicide treatments. Effectiveness on grasses is variable, and can be reduced under dry conditions.
- Status is generally more effective than other dicamba products on perennial broadleaf weeds, and has provided excellent control of Canada thistle and hedge bindweed in OSU research.
- Apply when corn is 4 to 36 inches tall. The 5 oz rate should be used when Status is applied postemergence following preemergence herbicides. The 2.5 oz rate can be used to improve control in mixtures with glyphosate, Lightning, or Liberty, but rate should be increased to 5 oz where weeds are resistant to any of these herbicides.

## Corn: Postemergence Herbicides — Systemic

- Status can be applied with NIS (0.25% v/v), COC (1% v/v), or a methylated seed soil (1.25% v/v) plus UAN (1.25% v/v) or AMS (5 lbs/100 gallons). To avoid mixing problems, add Status to spray tank first, and make sure it is fully suspended in water before adding AMS.
- Take precautions to avoid contact of Status with sensitive plants via drift or volatility. Exposure of soybeans to Distinct via sprayer contamination or spray particle drift will result in more severe injury compared to other dicamba products. Thoroughly clean spray equipment, including tank, hoses, and screens, to make sure it is free of Status prior to using the same equipment in soybeans.

Herbicide	Formulation	Product Rate Range
Steadfast	75DF	3/4 oz

- Steadfast is a 2:1 premix of nicosulfuron (Accent) plus rimsulfuron, translocated sulfonylurea herbicides, that controls annual and perennial grasses, including foxtails, fall panicum, quackgrass, and shattercane. Steadfast will control large crabgrass up to one inch tall. Steadfast also controls small annual morningglory, pigweed, Pennsylvania smartweed, and sunflower. Application of Steadfast with dicamba or dicamba plus atrazine will suppress or control many perennial broadleaf weeds.
- Mode of action: group 2 (see pages 12-13).
- Can be applied broadcast or as a directed spray to field corn that is up to 20 inches tall or up to 6 collars (whichever comes first).
- Do not apply to popcorn, or sweet corn, or corn grown for seed (inbreds).
- OSU research has shown it can be difficult to achieve adequate season-long weed control with a single postemergence application of herbicides with limited residual activity (such as Steadfast). Applying a reduced rate of a preplant or preemergence herbicide prior to postemergence application of Steadfast will result in more consistent control of longer duration.
- For best results, apply with COC (1 gallon/100 gallons spray) plus UAN (28% - 2 quarts/A) or AMS (2 lbs/A). Substituting a MSO (Meth Oil, Priority MSO, Sun-It II, for example) for COC can improve control under drought-stressed conditions. NIS (1 to 2 qts/100 gallons spray) can be used instead of crop oil if required in a mixture with another herbicide, but grass control may be reduced.
- Apply in a spray volume of at least 15 gpa with a pressure of 20 to 40 psi. Avoid spraying excessive amounts of herbicide directly into the corn whorl.
- Apply when grasses are at the following heights: foxtails, fall panicum, and barnyardgrass — up to 4 inches; quackgrass — 4 to 8 inches; shattercane — up to 6 inches; seedling johnsongrass — up to 8 inches.
- Control may be reduced if applied during conditions of drought stress, abnormally hot or cold weather, when nighttime temperatures are less than 40 degrees, or following periods of large day/night temperature fluctuations.
- Where Steadfast is applied to corn previously treated with soil applications of organophosphate insecticides, temporary crop injury may occur. Application of Steadfast to corn treated with Thimet may cause severe crop injury.
- Do not apply Steadfast with foliar-applied organophosphate insecticides or with Basagran, Laddok, or 2,4-D. Do not apply these materials within 7 days before through 3 days after applying Steadfast.

Herbicide	Formulation	Product Rate Range
Steadfast ATZ	89.3DF	14 oz

- Steadfast ATZ is a premix of nicosulfuron, rimsulfuron, and atrazine for control of broadleaf and grass weeds.
- Mode of action: group 2 (nicosulfuron, rimsulfuron); group 5 (atrazine). See pages 12-13.
- Can be applied to field corn up to 12 inches tall or up to and including 6 collars (whichever occurs first).
- Do not apply to popcorn, sweet corn, or corn inbreds.
- Steadfast ATZ controls many annual broadleaf and grass weeds up to 4 inches tall. Mix with another herbicide for taller weeds or broader spectrum of control.
- See atrazine and Steadfast descriptions for other information and precautions.

## Corn: Postemergence Herbicides — Systemic

Herbicide	Formulation	Product Rate Range
Stinger	3L	1/4 - 2/3 pt

- Stinger (clopyralid) is a translocated herbicide that controls ragweeds, cocklebur, jimsonweed, and Canada thistle. Controls or suppresses Jerusalem artichoke and suppresses sowthistle.
- Mode of action: group 4 (see pages 12-13).
- Apply after corn emergence until corn is 24 inches tall in a spray volume of at least 10 gallons per acre.
- For annual weed and Jerusalem artichoke control, apply 1/4 to 1/2 pint when weeds have 5 or fewer leaves.
- For Canada thistle control, apply 1/3 to 2/3 pint when thistles are at least 4 inches tall or across, but before the bud stage. The higher rate provides more complete plant kill and better control of dense patches. Do not cultivate prior to or for 14 to 20 days following application. Although control of thistle with Stinger during the season of application may appear similar to that from other corn herbicides, Stinger provides more complete kill of the entire plant (at a greater cost).

Herbicide	Formulation	Product Rate Range
WideMatch	1.5L	1.3 pts

- WideMatch is a premix of clopyralid (Stinger) plus fluroxypyr (Starane) for control of broadleaf weeds in corn, including hemp dogbane, ragweeds, Canada thistle, marestalk, and cocklebur. WideMatch is registered for use in Ohio, but not in Indiana.
- Mode of action: group 4 (see pages 12-13).
- Apply broadcast up to the V5 stage of field corn and when weeds are less than 8 inches tall. Applications when corn is past the V5 stage should be made as a directed spray using drop nozzles.
- Crop injury, including stem curvature, stunting, and brace root injury can occur with some corn hybrids when WideMatch is applied as a broadcast treatment. Hybrids susceptible to phenoxy injury may also be susceptible to injury from WideMatch.
- For most effective Canada thistle control, apply after the majority of the basal leaves have emerged and before bud stage.

Herbicide	Formulation	Product Rate Range
Yukon	67.5WG	4 to 8 oz

- Yukon is a premix of halosulfuron (Permit) plus dicamba for control of most annual broadleaf weeds and yellow nutsedge. Yukon will also suppress/control some perennial broadleaf weeds, primarily during the growing season of application.
- Mode of action: group 2 (halosulfuron); group 4 (dicamba). See pages 12-13.
- Can be applied broadcast or with drop nozzles from the spike stage through 36 inch-tall corn. Weeds should generally be less than 6 inches tall for best results. Use a rate of 6 to 8 oz for yellow nutsedge control.
- Apply with NIS (1 to 2 quarts/100 gallons) or COC (1 gallon/100 gallons). COC may cause injury at the higher Yukon rates. UAN (28% UAN, etc - 2 to 4 quarts/A) or AMS (2 to 4 lbs/A) can be added to improve control of certain weeds or if required for another herbicide in the spray mix. Apply in a spray volume of at least 10 gpa.
- Most of the precautions and restrictions on use of Permit and dicamba apply to Yukon also. See Permit and dicamba descriptions for more information.

## Corn: Postemergence Herbicides — Systemic

Herbicide	Formulation	Product Rate Range
2,4-D LV Ester	Various	0.17 - 0.25 lb ai/A
2,4-D Amine	Various	0.34 - 0.5 lb ai/A

- Mode of action: group 4 (see pages 12-13).
- Controls many annual broadleaf weeds, including ragweeds, cocklebur, lambsquarters, and pigweed. Will control or suppress perennial broadleaf weeds, especially when applied with Beacon, Exceed, Spirit, or Permit.
- For best results, apply when weeds are small.
- If corn is more than 8 inches tall, use drop nozzles to reduce the risk of crop injury. Do not apply from the tasseling stage to the dough stage.
- Use precautions to prevent drift. The ester forms of 2,4-D can volatilize and injure nearby susceptible plants, including soybeans and vegetable crops. Amine formulations are less volatile than ester formulations, and should generally be used for postemergence applications in corn.
- Injury may result when applied to corn growing rapidly under high temperatures and high humidity. Corn may be brittle for 7 to 10 days after application, and is susceptible to stalk breakage from high winds or cultivation.

## Clearfield Corn: Postemergence Herbicides

Herbicide	Formulation	Product Rate Range
Lightning	70DF	1.28 oz

- Lightning is a premix of imazethapyr (Pursuit) plus imazapyr for postemergence use on field corn hybrids that are tolerant to Pursuit and other imidazolinone herbicides. Use only on hybrids labeled as "Clearfield" or "imidazolinone-tolerant".
- Mode of action: group 2 (see pages 12-13).
- Lightning is similar to Pursuit in weed control spectrum, but has longer residual activity and is more effective on lambsquarters. Control of common and giant ragweed is variable. Mixing Lightning with Distinct will improve control of ragweeds, lambsquarters, and perennial broadleaf weeds. Lightning does not control ALS-resistant weeds when applied alone.
- OSU research has shown it can be difficult to achieve adequate season-long weed control with a single postemergence application of herbicides with limited residual activity. Applying Lightning with atrazine or following a reduced rate of a preplant or preemergence herbicide will result in more consistent control of longer duration. In fields with heavy grass pressure, use of a preemergence grass herbicide prior to postemergence use of Lightning is recommended.
- Apply before most annual weeds exceed 3 inches in height. Cocklebur, pigweed, shattercane, and seedling johnsongrass can be up to 8 inches tall. For control or suppression of Jerusalem artichoke, apply when plants are 6 to 10 inches tall.
- Apply with NIS (1 quart/100 gallons spray) plus UAN (1 to 2 quarts/acre) or AMS (2.5 lbs/A). Control of drought-stressed weeds will be maximized when the higher rates of fertilizer are used.
- Apply broadcast to corn up to 20 inches tall or the V6 stage, and as a directed spray until 45 days before harvest. Broadcast applications of Lightning when corn is more than 20 inches tall or past the V6 stage can result in poor kernel set and reduced yield. When mixing Lightning with other herbicides, always follow the more restrictive label with regard to spray additives, maximum crop size, and other precautions.
- Control may be reduced when weeds are growing slowly under cold or dry conditions. If possible, wait for rain and resumption of active weed growth before applying Lightning. If air temperatures reach or stay below 50 degrees F for 10 or more hours, delay application for 48 hours from the time temperatures increase above 50 degrees F.

## Liberty Link Corn — Postemergence Herbicides

Herbicide	Formulation	Product Rate Range
Ignite	2.34L	22 oz

- Ignite (glufosinate) is a contact, broad-spectrum herbicide for postemergence use only on Liberty Link (glufosinate-resistant) corn.
- Mode of action: group 10 (see pages 12-13).
- Ignite controls many annual grass and broadleaf weeds up to 3 to 6 inches tall when applied at a rate of 22 oz per acre. Mixing with atrazine improves control of many weeds, including pigweeds, waterhemp, velvetleaf, annual morningglories, and lambsquarters, and provides several weeks of residual control.
- OSU and Purdue University research indicates that Ignite is most effective in a combined preemergence plus postemergence program, where the preemergence herbicide will provide control of grass and broadleaf weeds for several weeks to a month after corn planting. Examples of preemergence herbicides used in this approach include Balance plus atrazine, simazine + atrazine, and reduced rates of premix products such as Bicep, Degree Xtra, etc. Postemergence applications of Liberty in this program should include atrazine (1 lb ai/A) where possible.
- Maximum height for grass weeds at the 22 oz/A rate: barnyardgrass, crabgrass, yellow foxtail, fall panicum - 3 inches; woolly cupgrass, shattercane, and green, giant, and robust foxtails - 6 inches; volunteer corn - 10 inches. Yellow foxtail and crabgrass should be treated prior to tiller initiation for best results.
- Maximum height for broadleaf weeds at the 22 oz/A rate: velvetleaf, pigweeds - 3 inches; lambsquarters, waterhemp - 4 inches; burcucumber, cocklebur, annual morningglories, black nightshade, ragweeds, and Pennsylvania smartweed - 6 inches.
- Ignite plus atrazine (1 lb ai/A) will control or suppress some perennial weeds, including dandelion, Canada thistle, Jerusalem artichoke, and wirestem muhly. Ignite has activity on above-ground growth only, so regrowth of perennials may occur and retreatment may be necessary.
- Apply with AMS at the rate of 3 lbs/A, or 17 lbs/100 gallons. When air temperatures are above 85 degrees, the rate can be reduced to 1.5 lbs/A, or 8.5 lbs/100 gallons, to reduce the risk of leaf burn. Applying with surfactants or crop oils may increase the risk of crop injury.
- Apply broadcast from corn emergence through the V5 stage (5 collars).
- Apply in a minimum spray volume of 15 gpa. Use a volume of 20 to 40 gpa in dense weed/crop canopies. Ignite should be applied with a nozzle type and spray pressure that results in medium spray droplets (250 to 350 microns).
- Ignite is most effective when applied under warm, sunny conditions. Effectiveness may be reduced if applied when heavy dew, fog and mist/rain are present, or if weeds are under stress due to drought, cool temperatures, or extended periods of cloudiness. To avoid reduced weed control, apply between dawn and two hours before sunset.

## Glyphosate-Resistant Corn — Postemergence Herbicides

Herbicide	Formulation
Expert	4.88L

- Expert is a premix of glyphosate, s-metolachlor (Dual II Magnum), and atrazine that can be applied early postemergence to glyphosate-resistant corn. See descriptions of glyphosate and metolachlor/s-metolachlor plus atrazine for more information on these herbicides.
- Mode of action: group 9 (glyphosate), group 5 (atrazine), group 15 (s-metolaachlor). See pages 12-13.
- Use rates provide the equivalent of 0.4 to 0.75 lbs of glyphosate acid and 1.75 to 2.6 quarts/A of Bicep II Magnum. Use rate ranges from 2.5 to 3.75 qts/A on coarse-textured soils with less than 3% organic matter, and from 3 to 3.75 on all other soils.
- Apply before corn exceeds 12 inches in height.
- Use water as the spray carrier for postemergence applications. Do not mix other products with Expert when applying to emerged corn. Can cause minor corn leaf burn.

Herbicide	Formulation	Product Rate Range
Glyphosate	Various - see Table 24	0.56 - 1.12 lb ae/A

- Glyphosate is a translocated herbicide that controls emerged annual and perennial grass and broadleaf weeds. Table 24 contains a list of currently available glyphosate products. Variations in the formulation may result in differences in product rate and adjuvant recommendations, and specified rainfast intervals. Users should consult labels and local product use guides for more specific information.
- Apply postemergence only to glyphosate-resistant corn hybrids (Roundup Ready, Agrisure GT, etc).
- Mode of action: group 9 (see pages 12-13).
- The general recommendation on most labels for the initial postemergence glyphosate application is a rate of 0.56 to 0.75 lbs of glyphosate acid per acre (lbs ae/A) when weeds are less than 4 inches tall, or before weeds become competitive with the crop (see Table 24 for product rates). Rates should be increased to 1.1 lbs ae/A where weeds are more than 6 inches tall. Multiple postemergence applications of glyphosate are allowed. The maximum rate per application is 1.1 lbs ae/A of glyphosate and the total amount that can be applied postemergence in one season should not exceed 2.25 lbs ae/A. There are exceptions to this depending upon the glyphosate product used and the type of glyphosate-resistant corn planted, and in some situations the maximum rate and amount that can be applied may be lower. Consult seed supplier and glyphosate product label prior to use.
- University research has shown that postemergence glyphosate treatments should be applied when weeds are no more than 2 to 4 inches tall in order to avoid corn yield loss from early-season weed competition. Where preemergence herbicides are applied, there may be more flexibility in the timing of postemergence glyphosate treatments.
- The following management practices are most effective for minimizing the risk of glyphosate resistance in weeds, maintaining adequate weed control, and preserving maximum crop yield: 1) start weed free at planting through use of tillage or a preplant burndown herbicide application; 2) Apply preplant/preemergence herbicides at rates that provide 4 to 6 weeks of residual weed control; 3) make the first postemergence glyphosate application when weeds are less than about 4 inches tall; and 4) make a second postemergence glyphosate application about 3 weeks later as needed to control late-emerging weeds and weeds that were not completely killed by the initial application.
- A total postemergence approach can be effective in glyphosate-resistant corn, but only when: 1) the field is weed free at the time of crop planting through use of tillage or preplant burndown herbicides; 2) the postemergence treatment is applied soon enough after planting to small weeds (less than 2 to 4 inches tall), in order to avoid yield loss from weed interference; and 3) when the postemergence treatment includes not only glyphosate, but also residual herbicides that will control later-emerging weeds for several weeks to a month.
- For Roundup Ready Corn 2, most glyphosate products can be applied broadcast or as a directed spray using drop nozzles from corn emergence through the 8-collar stage or until corn is 30 inches tall, whichever occurs first. When corn is 24 to 30 inches tall, use of crop nozzles will generally improve spray coverage on weeds. Drop nozzles can be used to apply glyphosate to Roundup Ready Corn 2 up to 48 inches tall, but should be adjusted to keep spray out of corn whorls. Similar guidelines apply to the use of Touchdown on Agrisure GT corn. However, not all glyphosate products are labeled similarly with regard to use on Agrisure GT corn. Consult seed supplier and glyphosate product label prior to use.
- Glyphosate resistance has developed in populations of marestalk and common and giant ragweed in Ohio and Indiana, and some lambsquarters populations appear to have become less sensitive to glyphosate. Consider use of a preemergence herbicide that provides residual control of these weeds, and avoid use of herbicide programs consisting solely of multiple glyphosate applications. In fields with a history of poor glyphosate performance on lambsquarters and giant and common ragweed, include another postemergence herbicide (Status, Callisto, etc) with the glyphosate to improve control.

## Glyphosate-Resistant Corn — Postemergence Herbicides

- Velvetleaf is most easily controlled when less than 4 inches tall and actively growing. Large velvetleaf can be difficult to control with glyphosate, especially when drought-stressed. The addition of AMS (8.5 to 17 lbs/100 gallons) will improve control of velvetleaf and some other weeds. AMS will also improve control when using hard water or under unfavorable environmental conditions.
- Annual morningglory, groundcherry, lambsquarters, and Pennsylvania smartweed are more difficult to control than other annual weeds, and glyphosate should be applied when weeds are less than 6 inches tall for best results.
- Control of perennial weeds will require higher rates than annual weeds. Application when perennials are in the bud to bloom stage (or boot to seedhead for grasses) will provide the most complete control of the entire plant. Minimum size of various perennial weeds for most effective control through the growing season: quackgrass, Canada thistle, wirestem muhly, and yellow nutsedge - 6 inches; field bindweed and common milkweed -12 inches; johnsongrass and hemp dogbane - 18 inches.
- Apply in a spray volume of 5 to 20 gpa. Using a volume of 15 to 20 gpa, selecting the appropriate nozzles, and reducing spray pressure will reduce the potential for spray drift. Take precautions to reduce spray drift, since corn, soybeans, and other sensitive crops are likely to be growing in areas surrounding treated fields.

Herbicide	Formulation	Product Rate Range
Halex GT	4.38L	3.6 - 4 pts

- Halex GT is a premix of glyphosate, mesotrione (Callisto), and s-metolachlor (Dual II Magnum) for postemergence use in glyphosate-resistant corn (Agrisure GT, Roundup Ready, etc). This product controls emerged grass and broadleaf weeds, and provides approximately 4 weeks of residual weed control.
- Mode of action: group 9 (glyphosate); group 13 (mesotrione); group 15 (s-metolachlor). See pages 12-13.
- Weeds should be less than 2 to 4 inches tall at the time of application to minimize risk of yield loss from early-season weed interference. Apply with atrazine if weeds are more than 4 inches tall, or where weeds are resistant to glyphosate.
- Apply to glyphosate-resistant corn up to 30 inches tall or the 8-leaf stage, whichever occurs first. When mixed with atrazine, apply to corn up to 12 inches tall.
- Apply with AMS (8.5 to 17 lbs/100 gallons), using water as the spray carrier.

## Corn: Harvest Aids

Herbicide	Formulation	Product Rate Range
Aim	2EC	1 - 2 oz

- Aim (carfentrazone) can be applied prior to harvest of corn for desiccation of velvetleaf, morningglory, pigweeds, and other weeds. Apply at least 3 days before harvest when the crop is mature and grain has begun to dry down.
- Mode of action: group 14 (see page 12-13).
- The total amount of Aim that can be applied to small grains in one season, including postemergence and harvest aid treatments, cannot exceed 2 oz/A. UAN or AMS can be added.
- Use a spray volume that results in complete coverage of foliage. Apply with NIS (0.25% v/v) or a COC (1 to 2% v/v). UAN or AMS may also be added.

Herbicide	Formulation	Product Rate Range
Glyphosate	Various	See labels.

- Many glyphosate products can be applied as a preharvest treatment to control perennial and annual weeds in corn. Application rate varies with glyphosate product, type of application (ground vs aerial), type of corn (glyphosate-resistant corn vs other), and amount of glyphosate previously applied. Consult labels for specific recommendations.
- Preharvest applications of glyphosate may provide a good opportunity to control perennial weeds, such as pokeweed, because their growth is undisturbed compared to postharvest applications.
- Mode of action: group 9 (see pages 12-13).
- Apply when grain moisture is 35 percent or less. Corn should be physiologically mature (black layer formed) with maximum kernel fill complete. Apply at least 7 days before harvest.
- Depending upon the glyphosate product, the label prohibits or recommends avoiding preharvest application to corn grown for seed, due to the potential for a reduction in germination or vigor.

Herbicide	Formulation	Product Rate Range
Gramoxone Inteon	2L	1.2 - 2 pt
Parazone	3SL	0.8 - 1.3 pt

- Gramoxone and Parazone (paraquat) may be used for drying weeds in field corn, seed corn, and popcorn just before harvest. Apply when corn is mature - after the black layer has formed at the base of the kernels.
- Mode of action: group 22 (see pages 12-13).
- Mature cocklebur and lambsquarters are tolerant of paraquat and may not desiccate completely.
- For aerial application, use a spray volume of 5 gallons per acre; for ground application, use 20 gallons per acre. Add NIS (0.25% v/v) or COC (1% v/v).
- Apply at least 7 days before harvest.

Herbicide	Formulation	Product Rate Range
Rage D-Tech	4.06L	16 - 32 oz

- Rage D-Tech is a premix of 2,4-D plus carfentrazone (Aim) that can be applied prior to harvest of corn for desiccation of velvetleaf, morningglory, ragweeds, pigweeds, and other weeds. Apply at least 3 days before harvest when the crop is mature.
- Mode of action: group 14 (carfentrazone); group 4 (2,4-D). See pages 12-13.
- Do not graze dairy or meat animals for 14 days after application.
- Use a spray volume that results in complete coverage of foliage. Apply with NIS (0.25% v/v) or a COC (1.5 to 2% v/v). UAN or AMS can also be added.