

# Sweet Corn

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## Culture

### Site Selection and Planting

Sweet corn may be grown on a wide range of soil types. However, matching soil type with other cultural management factors is required to provide the best chance for success in growing sweet corn. Fields planted before soil temperatures at four to six inches reach 50°F have a greater potential of sub-optimal stand establishment. Cold, wet soils are subject to compaction and contribute to delayed emergence, low seedling vigor, and possibly reduced yield and crop quality. Problems associated with planting in cold, wet soils are magnified when using varieties or seed lots with suspect germination percentages or seedling vigor. Growers are encouraged to consider the risks of premature planting (in cold, wet soils) against the potential market advantage of early harvest. In general, first-planted bare-soil crops perform best when planted on light, well-drained soils. Heavier soils should be allowed to warm and dry (reach a crumbly texture) before being planted with fuller season varieties.

### Variety Selection

Selecting varieties adapted to local growing conditions and with suitable market value is critical to successful sweet corn production. Varieties differ in maturity, ear characteristics (e.g. ear and shank length), ear height, ability to hold quality in storage and shipment, and disease and insect pest resistance. Varieties may also differ in seedling vigor or their response to sub-optimal soil conditions. Growers may choose from among numerous varieties differing in endosperm type (e.g., se, sh<sub>2</sub>) and kernel color (e.g. white, yellow, bi-color). The Ohio State University, in cooperation with seed companies, completes annual variety evaluations. Consult Contributing Authors on page 7 for more information on these evaluations. See the table on page 255 for currently popular se- and sh<sub>2</sub>-type varieties. Some varieties produce their own insecticide; see page 258 for more information.

### Plastic and Plant Residue Mulch

Use of a plastic mulch may offer several potential benefits in sweet corn production. Soils covered with a clear plastic mulch often reach optimal planting temperatures earlier in the spring, allowing mulched crops to mature 7-10 days sooner than unmulched corn. Use of black plastic mulch does little to raise soil temperature and speed maturity but it can reduce weed growth in the row. Mulches may also retain soil moisture. When using plastic mulch, place herbicides and fertilizer prior to laying the plastic. Generally, two rows are planted 18-24 inches apart under each plastic strip. Do not allow temperatures under the plastic to get above 90°F. When plants reach 4 inches in height, cut the plastic to allow plants to grow through. Benefits of clear plastic mulch greatly diminish when the corn reaches knee height. Remove plastic at this time as it becomes more difficult to do so at the end of the season.

Several disadvantages may be associated with the use of plastic mulch. Additional material and management costs may be expected with the use of plastic mulch. The costs of purchasing, laying (possibly requiring additional equipment), opening to permit plant growth, and disposing of non-biodegradable mulches must be weighed against the benefits of using clear plastic mulch. Clear plastic mulch is used primarily to “shorten the season” of early-planted crops and gain access to early markets. Black plastic mulch is used primarily to reduce weed pressure and conserve soil moisture.

Growers and scientists continue to explore the use of plant residue mulches and reduced tillage systems in vegetable production, including sweet corn. Plant residue mulches are typically the remains of a cover crop which has been killed mechanically or chemically and left in the field entirely or in part. Winter rye or wheat stubble which is not turned in during field preparation or planting is an example of a plant residue mulch.

Plant residue mulches are not likely to replace clear plastic mulch in sweet corn production. Yet, plant residue mulches may offer some benefits. For example, by shading the soil, plant residue mulches may assist in reducing weed pressure and loss of soil moisture. Reduced tillage and the use of plant residue mulches may also help to increase soil organic matter. Raising soil organic matter levels tends to improve soil tilth, with beneficial effects on soil moisture modulation and crop vigor.

## Sweet Corn Variety Listing and Reactions to Common Diseases\*

Genotype and Variety	Stewart's Wilt	Common Rust	Maize Dwarf Mosaic Virus (MDM)	Genotype and Variety	Stewart's Wilt	Common Rust	Maize Dwarf Mosaic Virus (MDM)
<b>se white</b>				<b>sh2 white</b>			
Argent	2 <sup>10</sup>	4 <sup>11</sup>	9	Devotion	5		
Imaculata	3 <sup>1</sup>	6 <sup>1</sup>	9	Mirai 421 W	4		
Sugar Queen	3			WSS 0987 (Attribute)	3		
WhiteOut	5			Ice Queen	4 <sup>3</sup>	D <sup>5</sup>	3 <sup>2</sup>
WH0807	6			Xtra Tender 372A	4		
WH0809				Xtra Tender 382A	3		
WH1163				Symmetry			
Sweet Ice	5 <sup>3</sup>	7 <sup>5</sup>	9	ACXMS 727 W			
Sugar Pearl	5			<b>sh2 yellow</b>			
Cinderella (trial)	3			Passion	4		
<b>se yellow</b>				Mirai 131Y	6		
Bodacious	5 <sup>4</sup>	4 <sup>15</sup>	9	Sweet Sunrise	5		
Incredible	3 <sup>13</sup>	4 <sup>16</sup>	9	Bandit	6 <sup>3</sup>	D <sup>5</sup>	2 <sup>2</sup>
Kandy King	5 <sup>3</sup>	6 <sup>3</sup>	-	Fortune	4 <sup>3</sup>	* <sup>4</sup>	-
Seneca DayBreak	4 <sup>3</sup>	3 <sup>3</sup>	-	Prime Plus	3 <sup>5</sup>	D	9
Tuxedo	3 <sup>4</sup>	3 <sup>5</sup>	9	Mirai 005 (requires warm and good soil) (trial)	6		
Ogunquit	5			Mirai 117Y (requires warm and good soil) (trial)	6		
<b>se bi-color</b>				Garrison			
Temptation	6 <sup>3</sup>	7 <sup>3</sup>	9	<b>sh2 bi-color</b>			
Renaissance	5			Fantastic	5		
Montauk	6			ACX725BC (trial) (pick early for roadside)			
Monomy				Amazingly Sweet	8 <sup>2</sup>	* <sup>2</sup>	9
Precious Gem	3	5 <sup>2</sup>	9	BSS 0982			
Providence	6			Candy Corner	6 <sup>4</sup>	D <sup>6</sup>	3 <sup>3</sup>
BC0808 (trial) (Triplesweet, Attribute)	5			Candy Store	3 <sup>6</sup>	5 <sup>5</sup>	9
BC0805 (Triplesweet, Attribute)	7			Obsession	3		
Sparkler				272 A	5		
Valiant				274 Xtra Tender			
Sumptious				277 A	4		
Cameo	4			282 Xtra Tender			
Navajo (trial)	7			Holiday	3		
Kristine				Optimum	6		
Luscious TSW	5			Sweet Surprise			
HMX0351 BES	8			BSS 3495	7		
Sensor	5 <sup>11</sup>	3 <sup>10</sup>	9	BSS 0809			
Accord	3			Awesome			
				XTH2673			
Trinity (trial) Roadside, 7-inch ear, low to ground, good flavor	6			Triumph	4		
EXP 5994 (early, good flavor) (trial)				Tantalizing Too			
Vitality				Tango	3		
<p>*Reactions of sweet corn hybrids to common diseases from Dr. Jerald Pataky et al. in the University of Illinois disease nursery from 1984 to 2004.</p> <p>Classification of hybrid disease reaction: 1—resistant, 3—moderately resistant, 5—moderate, 7—moderately susceptible, 9—susceptible</p> <p>Superscript—number of years each hybrid was evaluated for each disease</p> <p>An asterisk or “D” in the rust column refers to the reaction of the Rp gene. D refers to ineffective resistance against the new rust race. An asterisk indicates varieties not evaluated for resistance to the new race.</p> <p>†See insect control page 258.</p>				Fortune	6 <sup>2</sup>	2 <sup>2</sup>	5 <sup>2</sup>
				Headliner	-	D <sup>2</sup>	-
				Double UP (shipping)	7		
				Mirai 308BC (requires warm and good soil)	6		
				Mirai 327 (requires warm and good soil)	7		
				Mirai 336			
				Mirai 301BC (requires warm and good soil)	3		
				Mirai 350BC			
				77747 Mirai			

Identifying ways to successfully use plant residue mulches and reduced tillage in sweet corn production remains a challenge. Changes in soil, planting, nutrient, and irrigation management are likely to be necessary in using plant residue mulches. Growers are encouraged to explore the potential of these approaches on a small scale. Reducing the frequency of plowing, planting cover crops, and applying soil amendments (e.g. compost, manure) are reliable ways to promote soil organic matter accumulation.

## Seeding and Spacing

Row (inch)	In-row (inch)
30-36	8-12

The most commonly used spacing is 30 inches between rows with an in-row spacing of 9 inches for main season. Closer in-row spacing may be used in early plantings while wider in-row spacing can be used for late plantings.

## Irrigation

Sweet corn crop vigor and market quality are impacted by soil moisture availability. Ohio generally receives enough rainfall to produce abundant, high quality sweet corn crops. However, the total amount of rainfall in a season may be less important to crop yield and quality than the timing of rainfall. Sweet corn quality may be reduced by temporary water shortages, especially if they occur during kernel fill. Inadequate tip fill or poorly developed kernels and ears may result from low soil moisture levels during later stages of crop development. High nighttime temperatures worsen the effects of low soil moisture availability. Therefore, maintaining an adequate level of soil moisture during critical periods of crop development is important to ensuring high sweet corn crop quality in many seasons. Irrigation is one way to protect against the damaging effects of low rainfall.

Center pivots or traveling guns are preferred irrigation methods for large fields. Decline in the cost and improvement in drip and low pressure sprinkler head technology make these methods attractive, especially for smaller fields. Regardless of the method used to irrigate, the goals are similar: maintenance of soil moisture levels at levels optimal for plant growth and ear development. The amount and frequency of irrigation will depend on soil type, weather conditions, and sweet corn variety. Yield and quality tend to be highest when soil moisture does not remain below 30%-40% of the maximum available (field moisture capacity) for an extended period. Many growers assess the need for irrigation by feeling the soil near root depth. A soil that clumps in the palm of the hand when squeezed gently contains adequate moisture. A soil that does not clump when squeezed or that has clumps that break apart very easily may be moisture deficient. A more complete description of irrigation and mulches is provided on page 25.

## Chemigation

Some insecticides are allowed for application through overhead sprinkler irrigation systems that apply water uniformly to the crop. Products marked with a \* in the chart on page 260 are allowed for chemigation. Specific systems allowed are listed on each product label; systems useable for most products are center pivot, solid set, lateral move, end tow, side roll, or traveler.

## Harvest

Of course, sweet corn is an “immature” crop since the crop should be taken before kernels reach full maturity. Harvesting one to three days too early or late will reduce the quality of the crop. The reported maturity or days to harvest of a sweet corn variety alone is insufficient to schedule harvest. The optimal harvest date is determined by the variety’s response to the environment and may differ from the reported maturity by up to seven days in some seasons. Therefore, it is important to monitor crop development regularly, especially after tassels and silks emerge. Sweet corn kernel sugar levels may be highest approximately twenty one days after silks emerge.

The eating quality of corn declines rapidly after harvest. The loss of sugar is more rapid at higher temperatures. At 90°F, the rate of sugar loss is 20 times greater than the rate at 32°F. It is important to cool or hydro-cool corn as soon as possible after harvest.

The new “supersweet” varieties are alternatives for growers without sufficient ground cooling facilities. These new types tend to hold quality longer because of their slower conversion of sugar to starch. Examples are Florida StaySweet, Early Extra Sweet, Candybar and Wondersweet.

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# Disease Control

## Damping off

Buy commercial fungicide-treated seed.

## Leaf blight (*Helminthosporium*): Northern corn blight and Southern corn blight

Application of fungicides is seldom economically feasible. If necessary, spray at weekly intervals with one of the following:

**Dithane F45** 4F 2.4 pt/A (7 days-PHI).

**Bravo Ultrex** 0.7-1.8 lb/A (14 days-PHI).

**Bravo Weather Stik** 0.75-2.0 pt/A (14 days-PHI).

**Mancozeb** 75DF 1.0-1.5 lb/A (7 days-PHI).

Use Bravo for fresh market only (see label directions).

Before applying EBDC fungicides check with potential buyers to ascertain if crops treated with this fungicide will be commercially acceptable.

\***Quadris** 9.2-15.4 oz/A (7 days-PHI). Do not apply more than two sequential applications of Quadris before alternating with a fungicide with a different mode of action.

\***Headline** 6.0-12.0 fl oz/A (7 days-PHI).

\***Stratego** 10.0 fl oz/A (14 days-PHI).

## Smut

No fungicides are available for control. Late varieties are reported to be more tolerant than early varieties.

## Stewart's Wilt

Stewart's wilt is a bacterial disease that usually arises following mild winters. It is spread by corn flea beetles. Control flea beetles early with a recommended insecticide to control seedling wilt. Use resistant cultivars where available.

## Viruses

Sweet corn in Ohio may be affected by maize dwarf mosaic virus (MDMV), which is vectored by aphids, and maize chlorotic dwarf virus (MCDV), which is vectored by leafhoppers. These viruses are usually a problem in southern Ohio or on late planted sweet corn in northern Ohio. Both viruses are harbored in Johnsongrass. Control of either of the vectors with insecticides does *not* prevent these diseases, but control of Johnsongrass in southern areas will help control these diseases.

Although all varieties are susceptible, some are reported to have tolerance. Sweet corn varieties with high quality and good tolerance are under development. Consult seed catalogs for current information.

## Rust

If rust develops on early plantings, fungicide applications should be considered for later plantings. Spray at 7-day intervals with one of the following:

**Dithane F45** 2.4 pt/A (7 days-PHI).

**Bravo Ultrex** 0.7-1.8 lb/A (14 days-PHI).

**Bravo Weather Stik** 0.75-2.0 pt/A (14 days-PHI).

**Tilt** 4 fl oz/A, 7-14 day schedule (14 days-PHI).

\***Quadris** 6-9 fl oz/A, 7-14 day schedule (7 days-PHI). Do not make more than two sequential applications of Amistar before alternating with a fungicide with a different mode of action.

Before applying Dithane (or other EBDC fungicides) check with potential buyers to ascertain if crops treated with this fungicide will be commercially acceptable.

\*Follow fungicide resistance management guidelines on the product label (see pages 58-59).

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# Insect Control

See the tables on pages 259-260 for overview of insecticides used to control sweet corn pests.

## • Caterpillar-resistant varieties

A few sweet corn varieties are now available that internally produce the same toxin found in microbial insecticides made of the bacterium *Bacillus thuringiensis* (BT). The BT toxin kills only caterpillars. Currently available varieties of BT sweet corn are Attribute 0966, a yellow sh2 similar to Prime Plus; Attribute 0977, a bicolor sh2 similar to Big Time; Attribute 0805, a bicolor similar to Serendipity; and Attribute 0987, a white sh2. The BT corn varieties provide excellent control of European corn borer and good control of corn earworm and fall armyworm when these pests are light to moderate in abundance. If corn earworm or fall armyworm populations are large, as common in late August and September, then insecticide spray is needed to produce pest-free ears. The BT toxin has no effect on beetles, so fields infested by sap beetles or Japanese beetles can require insecticide spray during early silking. If sap beetles or large populations of corn earworm are present, an effective insecticide program is two sprays 4 days apart starting when 75% of the field has fresh silks.

## • Insect monitoring procedures and action thresholds

**During the seedling stage**, scout once per week for *cutworms* by looking at 100 consecutive plants in each of 3 areas of the field, up to the 6-leaf stage. Control is justified if at least 3 to 5% of seedlings are cut; use the 3% threshold if larvae are small, or the 5% threshold if larvae are medium to large. Treatment is most effective in the evening.

For plantings where systemic insecticide was *not* used on seed or in soil at planting, then scout 3 times per week during the seedling stage for *corn flea beetle*. For hybrids that are very *susceptible* to Stewart's wilt (Earlyvee, Jubilee, Impulse, Amazingly Sweet, Snowbird), treat if there are at least 6 corn flea beetles per 100 plants. For hybrids that are *tolerant* of wilt (Eliminator, Sweet Sue, Miracle, Ambrosia, Buckeye, Encore, Lancelot, Seneca Nation, Table Treat, Argent), treat only when there is an average of at least 2 corn flea beetles per plant and 25% of seedlings are severely damaged. Control of flea beetles is not needed after the 7-leaf stage.

*Armyworm* is not present most years in Ohio sweet corn. It can infest no-till corn planted into grass, or corn that borders mature wheat. Treat if 35% of plants are infested during seedling or early whorl stages.

**During the whorl stage**, scout once per week for *fall armyworm*. Examine 50 plants in small plantings (< 2 acres) or 100 plants in large plantings (> 2 acres). Record the number of plants with fresh feeding damage. European corn borers chew small holes in leaves while fall armyworms chew large ragged holes. Fall armyworm should be treated if at least 15% of whorls are infested.

If you are able to apply granular insecticides to whorl stage corn, then also scout for *European corn borer's first brood larvae* (only in June and early July). Treat with granules if 30% of plants are infested during the whorl stage.

If you plan to apply insecticide by airplane, then scout for European corn borer *egg masses*. Treat when egg masses are found on at least 4% of plants.

**During the emerging-tassel (green tassel) stage**, scout once per week for *fall armyworm* (all season), *European corn borer's first brood* (in June and early July only), and *corn leaf aphid*. Examine 50 plants in small plantings (< 2 acres) or 100 plants in large plantings (> 2 acres). Spray if 10% or more of plants are infested with European corn borer and/or fall armyworm. For corn leaf aphid, treat if 50% of the stand is infested with more than 50 aphids per plant, and natural predators are not present.

**During the silking stage**, the most important monitoring is for *corn earworm* moths using traps. If corn earworm moths are caught, then corn should be treated with insecticide during silking, and monitoring for other pests is not needed. Corn earworm moths are best monitored with a cone-shaped trap such as the Scentry Heliothis trap, with a pheromone lure such as those made by Hercon. For sources of traps and lures, see page 63 in this bulletin, or the internet (<http://www.ag.ohio-state.edu/~vegnet/vegtraps.htm>). Traps should be set up at least 10 days before first silking is expected, and checked at least every 5 days in June and July, and every 2 days in August and September. For the best decisions, corn earworm moths should be monitored on individual farms, but similar trends are often seen throughout a region. Trap data from several locations in Ohio are posted weekly on the internet ([http://bugs.osu.edu/welty/veg\\_traps1/Veg\\_traps.html](http://bugs.osu.edu/welty/veg_traps1/Veg_traps.html) or <http://extension.osu.edu/~vegnet/vegipm.htm>).

If corn earworm moths are present, then start the spray schedule as indicated in the table on the next page. This chart shows that treatment should be more frequent if pest populations are heavy or temperatures are high. Continue to monitor traps during silking, and adjust the spray schedule if the moth catch increases or decreases. No sprays are needed during the last 6 days before harvest.

<b>Insecticide Spray Schedule for Corn Earworm Based on Number of Moths Caught per Week in Pheromone Trap (Scentry Heliothis model)</b>				
Average number of corn earworm moths per trap			Spray interval (depending on maximum daily air temperature)	
Per day	Per 5 days	Per week	< 80 degrees F	> 80 degrees F
< 0.2	< 1	< 1.4	No spray	No spray
0.2 - 0.5	1.0 - 2.5	1.4 - 3.5	Every 6 days	Every 5 days
0.5 - 1	2.5 - 5	3.5 - 7	Every 5 days	Every 4 days
1 - 13	5 - 65	7 - 91	Every 4 days	Every 3 days
> 13	> 65	> 91	Every 3 days	Every 2 days

If corn earworm moths are not present or are present in very low numbers, then the status of *European corn borer* needs to be known. European corn borer is monitored with the same style of pheromone trap as corn earworm, but with a different lure. Ohio populations of this species are attracted to the 'Iowa' type of lure, not the 'New York' type. If European corn borer is present, as found by pheromone traps that catch more than 1 moth per day (7 moths per week), then a 5- to 7-day spray schedule is needed. It is critically important to make the first application as soon as silks are first seen in a planting (on 10-20% of plants), even if many plants do not yet have silk. The 5-day schedule is best during peak egg hatch (during peak moth catch and for one week after peak) or when temperatures are high (> 80F), while the 7-day schedule is adequate during non-peak activity or when temperatures are lower (< 80F). This pest can also be monitored with a blacklight trap. Data on European corn borer from pheromone and blacklight traps at several Ohio locations are posted weekly on the internet site mentioned above for corn earworm.

<b>Insecticides for Use in Ohio on Sweet Corn for Soil Applications</b>									
(E = excellent; G = good; F = fair; P = poor; ✓ = pest listed on label but efficacy uncertain; - = pest not on label; rating in parentheses = pest not on label but product known to provide some control)									
Pest >>	Corn flea beetle	Corn root worm	Cutworms	Wire worms	White grubs	Seedcorn maggot	Seedcorn beetle	Garden symphylan	Impact on beneficial insects
<i>How often an insecticide has been needed on Ohio farms for this pest in the past &gt;&gt;</i>	most years <sup>1</sup>	rare or often <sup>2</sup>	occasional	rare	rare	rare	rare	rare	
<b>ORGANOPHOSPHATES</b>									
Counter (terbufos)	F/G	E	P	G	✓	✓	✓	✓	moderate
diazinon	-	-	✓	✓	-	✓	-	-	moderate
Fortress (chlorothoxyfos)	-	F	F	✓	✓	✓	-	✓	moderate
Lorsban 15G (chlorpyrifos)	-	G	G	✓	✓	G	✓	✓	moderate
Mocap (ethoprop)	-	✓	✓	✓	-	-	-	✓	moderate
Thimet (phorate)	F	F	-	✓	✓	✓	✓	-	moderate
<b>PYRETHROIDS</b>									
Brigade, Capture (bifenthrin)	-	F	G	✓	✓	✓	✓	-	disruptive
Force 3G (tefluthrin)	-	G	G	✓	✓	✓	✓	-	disruptive
Pounce 1.5G (permethrin)	-	-	G	-	-	-	-	-	disruptive
Proaxis (gamma-cyhalothrin)	-	✓	✓	-	✓	✓	✓	-	disruptive
Warrior 1EC (lambda-cyhalothrin)	-	✓	G	-	✓	✓	-	-	disruptive
<b>MIXES</b>									
Aztec (tebupirimphos + cyfluthrin)	-	G	G	✓	✓	G	✓	-	disruptive
<sup>1</sup> for corn varieties susceptible to Stewart's bacterial wilt.									
<sup>2</sup> rare if corn planted after non-corn; every year if continuous corn.									

## Insecticides for Use in Ohio on Sweet Corn for Foliar Applications

(E = excellent; G = good; F = fair; P = poor; ✓ = pest listed on label but efficacy uncertain; - = pest not on label; rating in parentheses = pest not on label but product known to provide some control)

Pest >>	Pre-harvest interval (days)	Ear pests							Leaf Pests			Impact on beneficial insects
		European corn borer	Corn earworm	Fall army-worm	Corn leaf aphid	Japanese beetle	Root-worm beetles	Sap beetles	Cut-worms	True army-worm	Corn flea beetles	
<i>How often an insecticide has been needed on Ohio farms for this pest in the past &gt;&gt;</i>		every year in June & August	most years especially late season	occasional	occasional, in July & August	occasional	rare	occasional	occasional	rare	most years <sup>1</sup>	
<b>ORGANOPHOSPHATES</b>												
*diazinon	7	-	✓	-	F	-	✓	✓	-	-	✓	moderate
*Lorsban (chlorpyrifos)	35	✓	✓	-	F	-	✓	✓	-	✓	✓	moderate
*malathion (Cythion)	5	-	-	-	F	(F)	✓	✓	-	-	-	low/moderate
MSR (oxydemetonmethyl)	7, 21	-	-	-	G	-	✓	✓	-	-	-	moderate
*PennCap-M (methyl parathion)	3	G	(P)	(P)	G	G	G	F	✓	✓	✓	disruptive
<b>CARBAMATES</b>												
Lannate (methomyl)	0	F	F	F	F	-	✓	G	-	✓	G	disruptive
*Larvin (thiodicarb)	0	G	G	G	-	-	-	-	✓	✓	-	moderate
*Sevin (carbaryl)	2	✓	✓	✓	-	G	✓	✓	-	✓	G	disruptive
<b>ORGANOCHLORINES</b>												
Thionex (endosulfan)	1	-	✓	-	F	-	-	-	-	-	-	moderate
<b>PYRETHROIDS</b>												
*Asana (esfenvalerate)	1	F	G	(P)	F	-	✓	✓	✓	✓	G	disruptive
*Baythroid (cyfluthrin)	0	G	G	G	-	-	✓	-	✓	✓	-	disruptive
*Brigade (bifenthrin)	1	G	G	G	F	G	✓	✓	✓	-	G	disruptive
Delta Gold (deltamethrin)	1	G	G	G	-	G	✓		✓	✓	G	disruptive
Hero (bifen. + zeta-cy.)	3	✓	✓	✓	-	✓	✓	✓	-	-	-	disruptive
*Mustang (z-cypermethrin)	3	G	G	G	-	G	G	F	G	G	G	disruptive
*permethrin (Pounce)	1	G	F/G	G	-	-	✓	-	G	✓	G	disruptive
*Proaxis (gamma-cyhalothrin)	1	G	G	G	-	G	G	✓	✓	✓	G	disruptive
*Warrior (lambda-cyhalothrin)	1	G	G	G	-	G	✓	✓	✓	✓	G	disruptive
<b>MISCELLANEOUS</b>												
Avaunt (indoxacarb)	3	G	-	G	-	-	-	-	-	-	-	low/moderate
<i>B. thuringiensis</i> (B.t.)	0	F	P	(F)	-	-	-	-	✓	✓	-	very low
Belt (flubendiamide)	1	✓	✓	✓	-	-	-	-	✓	✓	-	low
Intrepid (methoxyfenozide)	3	✓	-	-	-	-	-	-	-	✓	-	low
Pyronyl, PyGanic (pyrethrins)	0	✓	✓	-	-	✓	✓	✓	✓	✓	✓	moderate
M-Pede (soap)	0	-	-	-	F	-	-	-	-	-	-	low
Radiant (spinetoram)	1	✓	✓	✓	-	-	-	-	-	✓	-	-
*SpinTor (spinosad)	1	G	G	G	-	-	-	-	-	G	-	low

<sup>1</sup> for corn varieties susceptible to Stewart's bacterial wilt.

\*Allowed for chemigation via sprinkler irrigation systems.

*Fall armyworm* occasionally infests corn during silking. If neither corn earworm nor European corn borer are detected in traps, then monitor fall armyworm moths with a green Unitrap baited with a pheromone lure. Spray every 5-7 days during silking if more than 3 moths per week are trapped.

If neither corn earworm, European corn borer, or fall armyworm are detected in traps (as sometimes happens in July), then scout for *sap beetles*, *picnic beetle*, *Japanese beetle*, and *corn rootworm beetles*. Examine 50 ears in small plantings (< 2 acres) or 100 ears in large plantings (> 2 acres). Treatment to prevent silk clipping by corn rootworm beetles and Japanese beetles is needed during the early-silk stage if there are at least 2 Japanese beetles per ear or 5 corn rootworm beetles per ear. Western corn rootworm beetles (yellow with black stripes) and southern corn rootworm beetles (yellow with black spots) are less damaging to silks than northern corn rootworm beetles (solid light green). Treat every 4-5 days during silking if more than 10% of ears are infested with adults or larvae of sap beetles or picnic beetles.

## • Seed-box treatment

### **Diazinon + lindane**

For seedcorn beetles, seedcorn maggot, wireworms.

Kickstart, Germate Plus: 1.5 oz per 42 lbs seed.

### **Imidacloprid**

For flea beetle (up to first true leaf), wireworm, seedcorn maggot, seedcorn beetle, white grub.

Latitude (25% imidacloprid plus carboxin 14% and metalaxyl 1%): 1.5 oz per 42 lbs seed.

Concur (25% imidacloprid plus 1% metalaxyl): 1.8 oz per 50 lbs seed, or 1.5 oz per 42 lbs seed.

### **Permethrin**

Kernel Guard Supreme (10.42% a.i.): 1.5 oz per 42 lbs of seed.

## • Commercial seed treatment

### **Clothianidin**

For systemic control of flea beetles, seedcorn maggot, white grubs, wireworms, corn leaf aphid.

Poncho 250 (= 0.25 mg rate of Poncho 600): registered and recommended for sweet corn.

Poncho 1250 (= 1.25 mg rate of Poncho 600): registered for sweet corn but not yet recommended.

### **Imidacloprid**

For systemic control of wireworm, seedcorn maggot, corn leaf aphid, corn flea beetle.

Gaucho 480 (4F): 1-2 fl oz per cwt seed for wireworm (seed protection); 2-4 fl oz per cwt seed for seedcorn maggot (seed protection); 4-8 fl oz per cwt seed for early season corn leaf aphid, seedcorn maggot, and wireworm; 8 fl oz per cwt seed for flea beetle.

### **Thiamethoxam**

For systemic control of wireworm, seedcorn maggot, corn flea beetle, white grubs, chinch bug.

Cruiser 5FS: 1.28-5.1 fl oz per 100 lbs seed (0.125-0.8 mg per kernel).

## • Preplant broadcast treatment

### **Diazinon**

For all formulations, incorporate 1-3 inches for surface cutworms, 3-6 inches for subterranean cutworms, 4-8 inches for wireworms, or 2 inches for seedcorn maggot.

Diazinon AG500 (4EC): 2-4 qt/A.

Diazinon AG600: 51-102 fl oz/A.

Diazinon 50WP: 4-8 lb/A.

Diazinon 14G: 14-28 lb/A.

### **Ethoprop**

For cutworm control, broadcast and incorporate 2 inches.

Mocap 15G: 20 lb/A.

### **Permethrin**

For armyworms and cutworms.

Pounce 1.5G: 6.7-13.3 lb/A. Apply from 5 days prior to planting up to emergence of crop.

## • At-planting treatment

### **Bifenthrin**

For rootworms, cutworms, other soil pests.

Brigade 2EC, Capture 2EC, Discipline 2EC, Fanfare 2EC, Sniper 2EC, Tundra 2EC: 0.15-0.30 fl oz/1,000 ft.

Capture 1.15G: 3.2-8 oz/1,000 ft for cutworm, wireworm, seedcorn maggot, white grubs; 6.4-8 oz/1,000 ft for rootworms.

### **Chlorethoxyfos**

For rootworms, wireworms, cutworms, seedcorn maggot, white grubs, symphylans.

Fortress 5G: 3 oz/1,000 ft.

### **Chlorpyrifos**

Lorsban 75WG: 1.6 oz per 1,000 ft of row.

Lorsban 15G: Rates given per 1,000 ft of row. Band treatment: 8 oz for rootworms, cutworms, seedcorn maggot; 8-12 oz for garden symphylans; 8-16 oz for seedcorn beetles; 16 oz for wireworms and white grubs. In-furrow treatment: 8 oz for seedcorn maggot; 8-16 oz for grubs and seedcorn beetles; 16 oz for cutworms and wireworms. Incorporate 1 inch. Limit 16 oz/1,000 ft per crop season.

### **Ethoprop**

For rootworms, rootworms, wireworms, garden symphylans; will also suppress white grubs. Apply in band over closed seed furrow; incorporate 1/2 inch.

Mocap 6EC: 1.4-2.9 fl oz/1,000 ft.

Mocap 15G: 8 oz/1,000 ft (8.8 lb/A for 30-inch rows).

### **Gamma-cyhalothrin**

For rootworms, cutworms, white grubs, seedcorn maggot, seedcorn beetle.

Proaxis (0.5EC): 0.66 fl oz per 1,000 ft of row. Apply as T-band or in-furrow.

### **Lambda-cyhalothrin (21 days-PHI)**

For rootworms, cutworms, seedcorn maggot, white grubs.

Warrior II 2.1 SC: 0.33 fl oz per 1,000 ft.

Warrior 1EC, Silencer 1EC, Taiga Z 1CS: 0.66 fl oz per 1,000 ft. Apply as T-band or in-furrow.

### **Permethrin**

For armyworms and cutworms.

Pounce 1.5G: 8-16 oz/1,000 ft. Apply from 5 days prior to planting up to emergence of crop.

### **Phorate**

For seedcorn maggot, seedcorn beetle, corn rootworms, wireworms, white grubs, garden symphylans, and flea beetles.

Apply in band and lightly incorporate. Do not place granules in direct contact with seed.

Thimet 20G; Phorate 20G: 6 oz/1,000 ft.

### **Tebupirimphos + cyfluthrin**

For rootworms, cutworms, wireworms, seedcorn maggot and beetle, white grubs.

Aztec 2.1G: 6.7 oz/1,000 ft (limit 7.3 lb/A per year).

### **Tefluthrin**

For rootworms, cutworms, other soil pests.

Force 3G: 3-5 oz/1,000 ft of row.

### **Terbufos**

Counter 15G: 8 oz/1,000 ft (Limit 8.7 lb/A) for seedcorn maggot, seedcorn beetle, rootworms, garden symphylans, and flea beetles. Will also suppress cutworms. Apply in band and lightly incorporate, or apply in seed furrow.

Counter 20CR: 6 oz/1,000 ft. Limit 6.5 lb/A.

## • Bait treatment

### **Carbaryl (2 days-PHI)**

For cutworms, armyworms.

Sevin 5% Bait: 20-40 lb/A or 7.3-14.7 oz/1,000 sq ft.

### **Metaldehyde**

For slugs. Apply to soil surface around plants.

Deadline MP (4B): 20-40 lb/A.

## • **Treatment at cultivation**

### **Chlorpyrifos** (35 days-PHI)

For corn rootworms (larvae).

Lorsban 75WG: 1.33 lb/A.

Lorsban 4E, Warhawk 4EC, Yuma 4E: 2 pt/A. Limit 15 pt/A per season.

Lorsban 15G: 8 oz/1,000 ft. Limit 16 oz/1,000 ft per season.

### **Ethoprop**

For corn rootworms (larvae).

Mocap 10G: 10.5 oz/1,000 ft.

### **Phorate**

For corn rootworms (larvae).

Thimet 20G; Phorate 20G: 6 oz/1,000 ft (6.5 lb/A for 30-inch rows).

### **Tefluthrin**

For rootworms (larvae).

Force 3G: 4-5 oz/1,000 ft of row.

### **Terbufos**

For corn rootworms (larvae).

Counter 15G: 8 oz/1,000 ft. Limit 8.7 lb/A.

Counter 20CR: 6 oz/1,000 ft. Limit 6.5 lb/A.

## • **Granular treatment in whorls**

### **Chlorpyrifos** (35 days-PHI)

For European corn borer.

Lorsban 15G: 6-8 oz/1,000 ft, or 5-6.5 lb/A broadcast.

### **Permethrin** (1 day-PHI)

For European corn borer, armyworm, cutworms, stalk borer.

Pounce 1.5G: 8-16 oz/1,000 ft (6.7-13.3 lb/A). Limit 80 lb/A per season.

## • **Foliar treatment to whorls**

### **Bifenthrin** (18 days-PHI)

For European corn borer (first generation), fall armyworm, true armyworm.

Capture 1.15G: 3.5-8.7 lb/A.

### **Chlorpyrifos** (35 days-PHI)

For cutworms, armyworm, flea beetle, aphid, European corn borer, rootworm beetles.

Lorsban 4E, Warhawk 4EC, Yuma 4E: 1-3 pt/A. Limit 15 pt/A per season.

### **Indoxacarb** (3 days-PHI)

For fall armyworm, European corn borer.

Avaunt 30WG: 2.5-3.5 oz/A.

## • **Foliar treatment (primarily during silking)**

### **Bacillus thuringiensis (B.t.)** (0 days-PHI)

For cutworms, armyworm, corn earworm, European corn borer.

Agree WG (3.8% a.i.): 1-2 lb/A.

Biobit XL FC (2.1% a.i.): 1.5-5.5 pt/A for armyworm; 1.5-4 pt/A for corn borer.

CryMax WDG (15% a.i.): 0.5-1.5 lb/A.

DiPel ES (3.5% a.i.): 1.5-2.5 pt/A for European corn borer.

DiPel DF (10.3% a.i.): 0.5-2 lb/A.

Javelin WG (6.4% a.i.): 0.5-1.25 lb/A for armyworm.

Lepinox WDG (15% a.i.): 1-2 lb/A.

**Bifenthrin** (1 day-PHI)

For fall armyworm, corn borer, corn earworm, aphids, beetles, cutworms.

Brigade 2EC, Capture 2EC, Discipline 2EC, Fanfare 2EC, Sniper 2EC, Tundra 2EC: 2.1-6.4 fl oz/A. Limit 12.8 fl oz/A per season.

**Bifenthrin + zeta-cypermethrin** (3 days-PHI)

For corn earworm, European corn borer, fall armyworm, sap beetles.

Hero 1.24EC: 4-10.3 fl oz/A.

**Carbaryl** (2 days-PHI)

For cutworms, armyworm, European corn borer, fall armyworm, corn earworm, Japanese beetle, sap beetles, rootworm beetles.

Carbaryl 90DF: 1.1-2.2 lb/A.

Carbaryl 4L; Sevin 4F; Sevin XLR Plus (4EC): 2 qt/A for cutworm; 1-2 qt/A for armyworm, flea beetle, corn earworm, fall armyworm, silk-clipping beetles; 1.5-2 qt/A for European corn borer.

Sevin 80S: 2.5 lb/A for cutworm; 1.9-2.5 lb/A for corn borer; 1.25-2.5 lb/A for other pests.

Sevin 50WP: 6 oz/1,000 ft (4-13 lb/A) for cutworm; 2-4 lb/A for other pests.

**Cyfluthrin and beta-cyfluthrin** (0 days-PHI)

For European corn borer, corn earworm, cutworms. Limit 10 applications or 28 fl oz/A per season.

Baythroid 2EC: 1.6-2.8 fl oz/A for borers or earworms; 0.8-1.6 fl oz/A for cutworms.

Baythroid XL 1EC: 0.8-2.8 fl oz/A.

**Deltamethrin** (24 hours-PHI)

Delta Gold 1.5EC: 1.0-1.5 fl oz/A for cutworms, flea beetles, grasshoppers. 1.5-2.4 fl oz/A for armyworms, corn earworm, corn rootworm adult, European corn borer, Japanese beetle, stalk borer, stink bugs. Limit 38.4 fl oz/A per season.

**Diazinon** (7 days-PHI)

For flea beetle, aphid, corn earworm, sap beetles, grasshoppers, rootworm beetles.

Diazinon AG500 (4EC): 1 pt/A for flea beetle, grasshoppers; 1-2 pt/A for aphid; 1-1.25 qt/A for corn earworm; 0.5-1 pt/A for rootworm beetles; 2-2.5 pt/A for sap beetles.

Diazinon 50WP: 1 lb/A for flea beetles, grasshoppers; 1-2 lb/A for aphid; 2-2.5 lb/A for corn earworm, sap beetles.

**Endosulfan** (1 day-PHI)

For aphids, corn earworm.

For use on fresh-market corn only.

Thionex 3EC; Endosulfan 3EC: 1.3 qt/A for aphids; 2 qt/A for corn earworm. Limit 4 qt/A per year or 3 applications per year.

Thionex 50WP: 2 lb/A for aphids; 3 lb/A for corn earworm. Limit 6 lb/A per year.

**Esfenvalerate** (1 day-PHI)

For cutworms, armyworm, flea beetle, aphid, corn earworm, European corn borer, sap beetles, rootworm beetles.

Asana XL 0.66EC, Adjourn 0.66EC: 5.8-9.6 fl oz/A. Limit 96 fl oz/A per season.

**Flubendiamide** (1 day-PHI)

For black cutworm, armyworms, corn earworm, European corn borer, fall armyworm, western bean cutworm.

Belt 4SC: 2-3 fl oz/A. Limit 4 applications or 12 fl oz/A per crop.

**Gamma-cyhalothrin** (1 day-PHI)

For corn earworm, European corn borer, early instars of fall armyworm; rootworm beetles, Japanese beetles.

Proaxis (0.5EC): 2.56-3.84 fl oz/A. Limit 61.4 fl oz/A per crop.

**Lambda-cyhalothrin** (1 day-PHI)

For corn earworm, European corn borer, early instars of fall armyworm; rootworm beetles, Japanese beetles.

Warrior II 2.1 SC: 0.96-1.92 fl oz/A.

Warrior 1CS, Silencer 1EC, Taiga Z 1CS: 2.56-3.84 fl oz/A. Limit 61.4 fl oz/A per year.

**Malathion** (5 days-PHI)

For Japanese beetle.

Malathion 5EC: 2 pt/A. Injury may occur in the whorl or to the silks.

**Methomyl** (0 days-PHI)

For cutworms, armyworm, flea beetle, aphid, European corn borer, corn earworm, fall armyworm, rootworm beetles, picnic beetles.

Certain hybrids are susceptible to methomyl injury; treat a small area to determine crop safety before full-scale spraying.

Use high end of rate for cutworms.

Limit 28 applications/crop.

Lannate 90SP: 0.25-0.5 lb/A.

Lannate LV (2.4EC): 0.75-1.5 pt/A.

**Methoxyfenozide** (3 days-PHI)

For European corn borer, true armyworm.

Intrepid 2F: 4-8 fl oz/A. Limit 64 fl oz/A per year.

**Methyl parathion** (12 days-PHI)

For black cutworm, armyworm, flea beetle, aphid, corn earworm, European corn borer, rootworm beetles, sap beetles.

For use only on mechanically harvested corn. Do not apply to blooming crops or weeds when bees are foraging.

PennCap-M (2F, encapsulated): 4 pt/A for black cutworm; apply under moist soil conditions. 2-3 pt/A for armyworm, flea beetle, aphid. 2-4 pt/A for corn earworm, European corn borer, sap beetles; 1-2 pt/A for rootworm beetles.

**Oxydemeton-methyl** (7 or 21 days-PHI: 21 days-PHI if 2 or 3 applications per season; 7 days-PHI if 1 application)

For aphids, rootworm beetles.

Metasystox-R (2SC): 1.5-2 pt/A.

**Permethrin** (1 day-PHI)

For flea beetle, European corn borer, corn earworm, fall armyworm, rootworm beetles.

Pounce 3.2EC, Arctic 3.2EC, Permethrin 3.2EC: 4-8 fl oz/A. Limit 48 fl oz/A per season.

Pounce 25WP, Ambush 25WP: 6.4-12.8 oz/A. Limit 76 oz/A per season.

**Spinetoram** (1 day-PHI)

For European corn borer, corn earworm.

Radiant 1SC: 3-6 fl oz/A. Limit 6 applications per year.

**Spinosad** (1 day-PHI)

SpinTor 2SC: 1.5-6 fl oz/A for armyworms; 3-6 fl oz/A for corn earworm, corn borer. Limit 29 fl oz/A per year.

Entrust (80WP): 0.5-2 oz/A.

**Thiodicarb** (0 days-PHI)

For fall armyworm, European corn borer, corn earworm.

Larvin 3.2F: 20-30 fl oz/A.

**Zeta-cypermethrin** (3 days-PHI)

For corn borer, corn earworm, beetles.

Mustang 1.5EW: 2.4-4.3 fl oz/A.

Mustang Max (0.8 EC): 2.24-4.0 fl oz/A. Limit 24 fl oz/A per year.

## Weed Control

### Preplant Incorporated

**Alachlor:** Controls annual grasses, yellow nutsedge, and some annual broadleaf weeds. Incorporation improves suppression of yellow nutsedge. Can be tank-mixed with atrazine or cyanazine.

**Lasso 4EC, Micro-Tech:** 4-8 pt/A.

**Partner WDG:** 3-6 lb/A.

**Atrazine:** Atrazine is the pesticide most commonly detected in ground and surface waters in the United States. Because of its extensive use and potential to contaminate water supplies, the following restrictions on application rate are

required. These restrictions on application rate apply to all preplant incorporated applications, all preemergence applications and all postemergence applications.

**1. On highly erodible land with less than 30% residue cover use the following rates:**

**AAtrex 4L, Drexel Atrazine 4L, Helena Atrazine 4L, Riverside Atrazine 4L, Wilbur-Ellis Atrazine 4L:** 3.2 pt/A.  
**Drexel Atra-5:** 2.4 pt/A.

**Aatrex Nine-0, Accu-Pak (WDG), Drexel Atrazine 90DF, Riverside Atrazine 90 DF:** 1.8 lb/A.

**2. On not highly erodible land or land with at least 30% residue cover use the following rates:**

**AAtrex 4L, Drexel Atrazine 4L, Helena Atrazine 4L, Riverside Atrazine 4L, Wilbur-Ellis Atrazine 4L:** 4 pt/A.  
**Drexel Atra-5:** 3.2 pt/A.

**Aatrex Nine-0, Accu-Pak (WDG), Drexel Atrazine 90DF, Riverside Atrazine 90DF:** 2.2 lb/A.

Atrazine controls annual broadleaf weeds. Resistant biotypes are known to occur and must be controlled by herbicides with a different mode of action. Maximum use rate in any year is 2.0 lb/A. Do not apply to ground to be planted to anything other than corn next year. Consult the label for precautionary statements to avoid ground and surface water contamination.

**Bicep Lite II Magnum:** Controls annual broadleaf weeds and grasses. Resistant bio-types of certain broadleaf weeds are known to occur and must be controlled by herbicides with a different mode of action. Apply 0.9 to 1.5 qt/A on soils with less than 3% organic matter and 1.1 to 2.2 qt/A on soils with 3% organic matter or greater. Use lower rates on sandy, coarse textured soils and higher rates on heavy, fine textured soils. Do not use on muck soils.

**Metolachlor/s-metolachlor:** Controls annual grasses, yellow nutsedge and certain broadleaf weeds. Preplant incorporate to improve control of yellow nutsedge. Dual products can be tank-mixed with atrazine. Dual II Magnum contains an additive which enhances crop safety.

**Dual 8E or Dual II:** 1.3-5 pt/A.

**Dual IIG:** 6-12 lb/A.

**Dual II Magnum:** 1-2 pt/A.

**Degree:** Controls annual grasses, certain broadleaf weeds, and suppresses yellow nutsedge. Apply 2.75-5.5 pt/A depending on soil type. Apply within 14 days of seeding, incorporate into the top 1 inch of soil.

**EPTC + antidote:** Controls annual grasses, yellow nutsedge, and suppresses quackgrass. Must be incorporated in two directions, immediately after planting to a depth of 2-3 inches.

**Eradicane 6.7-E:** 4.75-7.33 pt/A.

**Eradicane 25-G:** 16-24 lb/A.

**Frontier/Outlook 6.0:** 1-2 pt/A. Controls annual grasses, yellow nutsedge, and certain annual broadleaf weeds. Rate selection within this range depends upon soil cation exchange capacity or soil texture and % organic matter. Check the label for specific directions. Maximum control of yellow nutsedge, seedling johnsongrass and annual nightshades requires the 2 pt/A rate. Before application verify with your local seed company or supplier the selectivity of Frontier 6.0 on your specific varieties to avoid potential crop injury to sensitive varieties. Do not apply if conditions of high rainfall, water saturated soil or cool weather occur between the period from germination to corn emergence. Application during or prior to such conditions may result in delayed emergence or leaf wrapping. Frontier 6.0 can be tank-mixed with atrazine, Eradicane or Basagran.

**Harness Extra:** Controls annual grasses, certain broadleaf weeds, and suppresses yellow nutsedge. Apply within 14 days of seeding, incorporate into the top 1-2 inches of soil. Maximum use rate is 2.7 qt/A. Harness Extra contains atrazine so carryover potential for next year's crop must be considered.

**Guardman Max:** Controls annual grasses, nutsedge and broadleaf weeds. Apply 2.5-4.6 pt/A depending on soil type. May be used Preplant or PPI. Reduced rates may be used when tank-mixed with other herbicides or a shorter term of control is required. PHI = 45 days.

## Preplant/Preemergence

**Dimetric DF:** Improves control of certain annual broadleaf weeds and grasses when used in conjunction with other registered herbicides including atrazine and s-metolachlor. Apply preplant surface or preemergence as a broadcast or band application. Use rate varies from 1.6 to 4.4 oz/A, depending on soil organic matter content. Do not apply to soils having a ph of 7.0 or greater. Corn seed should be planted at a minimum of 1.5 inches deep. Make sure hybrid used is tolerant to metribuzin.

# Preemergence

**Alachlor:** Controls annual grasses, yellow nutsedge and some annual broadleaf weeds. Incorporation improves suppression of yellow nutsedge. Can be tank-mixed with atrazine.

**Lasso 4EC, Micro-Tech:** 4-8 pt/A.

**Partner WDG:** 3-6 lb/A.

**Atrazine:** See restrictions, application rates and comments under Preplant Incorporated treatments above.

**Bicep Lite II Magnum:** Controls annual broadleaf weeds and grasses. Resistant bio-types of certain broadleaf weeds are known to occur and must be controlled by herbicides with a different mode of action. Apply 0.9 to 1.5 qt/A on soils with less than 3% organic matter and 1.1 to 2.2 qt/A on soils with 3% organic matter or greater. Use lower rates on sandy, coarse textured soils and higher rates on heavy, fine textured soils. Do not use on muck soils.

**Callisto:** Apply 6.0-7.7 fl oz/A for broadleaf weed control. Apply in 10-30 gallons of water per acre. If emerged weeds are present, addition of an adjuvant will improve weed control. Callisto may be tank-mixed with preemergence grass herbicides, including Dual II Magnum and Outlook.

**Camix:** For control of a wide range of annual grasses and broadleaf weeds apply Camix at 2-2.4 qt/A depending on soil organic matter content. Apply after crop seeding but before weed and crop emergence. Camix contains mesotrione and residues remaining in the soil may injure certain crops planted the following year.

**Metolachlor/s-metolachlor:** Controls annual grasses, yellow nutsedge and certain broadleaf weeds. Cultivate or rotary hoe before weed emergence if rainfall or irrigation does not occur after application. Dual products can be tank-mixed with atrazine. Dual II Magnum contains an additive that enhances crop safety.

**Dual 8E or Dual II:** 1.3-5 pt/A.

**Dual IIG:** 6-12 lb/A.

**Dual II Magnum:** 1-2 pt/A.

**Degree:** Controls annual grasses, certain broadleaf weeds, and suppresses yellow nutsedge. Apply 2.75-5.5 pt/A, depending on soil type, after seeding but before crop and weed emergence. Rainfall or irrigation is required to activate the herbicide prior to weed emergence.

**Frontier/Outlook 6.0:** 1-2 pt/A. Controls annual grasses, yellow nutsedge and certain annual broadleaf weeds. Rate selection within this range depends upon cation exchange capacity or soil texture and % organic matter. The 2 pt/A rate is required for maximum control of yellow nutsedge, seedling johnsongrass and annual nightshades. Check the label for specific directions. Before application verify with your local seed company or supplier the selectivity of Frontier 6.0 on your specific varieties so as to avoid potential crop injury to sensitive varieties. Do not apply if conditions of high rainfall, water saturated soil or cool weather occur between the period from germination to corn emergence. Application during or prior to such conditions may result in delayed emergence or leaf wrapping. Frontier 6.0 can be tank-mixed with atrazine, Eradicane or Basagran.

**Guardsman Max:** Controls annual grasses, nutsedge and broadleaf weeds. Apply 2.5-4.6 pt/A depending on soil type. Reduced rates may be used when tank-mixed with other herbicides or a shorter term of control is required. PHI = 45 days.

**Harness Extra:** Controls annual grasses, certain broadleaf weeds, and suppresses yellow nutsedge. Apply after seeding but before crop or weed emergence. Rainfall or irrigation is required to activate the herbicide prior to weed emergence. Maximum use rate is 2.7 qt/A. Harness Extra contains atrazine so carryover potential for next year's crop must be considered.

**Lexar:** For control of a wide range of annual grasses and broadleaf weeds apply Lexar at 3-3.5 qt/A depending on soil organic matter content. Apply after crop seeding but before weed and crop emergence. Lexar contains s-metolachlor, atrazine, and mesotrione. If atrazine was applied in another application, the rate of Lexar applied cannot result in total atrazine applied exceeding 2 lb/A. Residues of Lexar remaining in the soil may injure certain crops planted the following year.

**Lumax:** For control of a wide range of annual grasses and broadleaf weeds apply Lumax at 2.5-3 qt/A depending on soil organic matter content. Apply after crop seeding but before weed and crop emergence. Lumax contains s-metolachlor, atrazine, and mesotrione. If atrazine was applied in another application, the rate of Lumax applied cannot result in total atrazine applied exceeding 2 lb/A. Residues of Lumax remaining in the soil may injure certain crops planted the following year.

# Postemergence

**Accent:** Not all sweet corn varieties are tolerant, and the user assumes liability should crop injury occur! Check with DuPont Crop Protection before applying to a variety for the first time. Accent controls several emerged annual and perennial grasses including Johnson grass, as well as certain broadleaf weeds. Apply Accent at 1/3-2/3 oz/A broadcast or with drop nozzles (post-directed) on sweet corn up to 12 inches tall or up to and including the 5 leaf-collar stage (V5). For sweet corn 12-18 inches tall (do not apply Accent once the crop reaches the 6 leaf-collar [V5] stage) apply only with drop nozzles. Crop oil concentrate plus ammonium nitrogen fertilizer, or non-ionic surfactant plus ammonium nitrogen fertilizer must be included in the spray mixture unless prohibited by the label of additional tank mix pesticides. Accent may interact with some insecticides applied to the crop previously; check with DuPont Crop Protection when in doubt. Do not apply Accent to corn treated with Counter, Lorsban or Thimet. Accent is a persistent herbicide and will severely injure certain crops planted up to 18 months after application.

**Atrazine:** See restrictions, application rates and comments under Preplant Incorporated treatments above.

**Bentazon:** Controls annual broadleaf weeds and suppresses yellow nutsedge, Canada thistle and field bindweed. Controls atrazine resistant biotypes of lamb's quarters and pigweed. Can be tank-mixed with atrazine and a pre-formulated mix with atrazine (**Laddox S-12**) is also available.

**Basagran:** 1.5-2 pt/A. For nutsedge control use two applications approximately 2 weeks apart. Time of application depends on weed height and leaf-stage. A pre-formulated mix with atrazine (**Laddox S-12**) is also available.

**Bicep Lite II Magnum:** Controls annual broadleaf weeds and grasses. Resistant bio-types of certain broadleaf weeds are known to occur and must be controlled by herbicides with a different mode of action. Apply 1.1 to 1.9 qt/A. Use lower rates on sandy, coarse textured soils and higher rates on heavy, fine textured soils.

**Carfentrazone-ethyl:** For postemergent hooded row middle application control of broadleaf weeds. Apply to actively growing weeds up to 4 inches in height. Adjuvants are needed; use NIS at 0.25% or COC at 1-2%. Formulations available include: **Aim EC:** Use 1-2 fl oz/A; **Aim EW HERBICIDE:** (0.5 to 1.6 fl oz/A), and Proclaim.

**Callisto:** Controls annual broadleaf weeds and some perennials. Apply 3.0 fl oz/A + adjuvant applied to weeds that are actively growing. When Callisto is used alone, sweet corn may be up to 30 inches tall or the 8-leaf stage of growth. Tank-mixing Callisto at 3 fl oz/A with atrazine at 1/4 to 1/2 lb a.i./A will improve control of broadleaf weed seedlings that are more than 5 inches tall, but this tank-mix must be applied before corn is 12 inches tall. Crop bleaching may occur with postemergence applications of Callisto but yield is unlikely to be affected. However, sweet corn varieties respond differently to Callisto and not all varieties have been tested for tolerance. Argent is the most sensitive variety to Callisto tested to date by OSU Extension personnel, and crop stunting may occur in addition to bleaching with this variety. Crop bleaching of sweet corn is least when the adjuvant is a non-ionic surfactant (NIS). Crop oil concentrate may improve weed control over that obtained when NIS is used but bleaching may be more severe. Do not use nitrogen containing adjuvants such as UAN or AMS. Callisto does not effectively control grass weeds except large crabgrass.

**Frontier/Outlook 6.0:** 1-2 pt/A. Controls annual grasses, yellow nutsedge and certain annual broadleaf weeds. Apply prior to weed emergence and on corn no more than 7 inches tall. Rate selection within the indicated range depends upon cation exchange capacity or soil texture and % organic matter. Check the label for specific directions. Before application verify with your local seed company or supplier the selectivity of Frontier 6.0 on your specific varieties so as to avoid potential crop injury to sensitive varieties. Do not apply if conditions of high rainfall, water saturated soil or cool weather occur between the period from germination to corn emergence. Application during or prior to such conditions may result in delayed emergence or leaf wrapping. Frontier 6.0 can be tank-mixed with atrazine, Eradicane or Basagran.

**Guardsman Max:** Controls annual grasses, nutsedge and broadleaf weeds. Apply 2.5-4.6 pt/A depending on soil type. Reduced rates may be used when tank-mixed with other herbicides or a shorter term of control is required. PHI = 45 days.

**Impact:** Controls annual broadleaf weeds and grasses. Apply 0.75 fl oz/A when weeds are actively growing. Control of specific weeds varies according to size (see label), but most broadleaves can be controlled at 6 inches or less. Smartweeds must be controlled by 3 inches high. Impact provides maximum weed control when tank-mixed with 0.25-1 lb/A of atrazine. Adjuvant is required; crop oil concentrate, methylated seed oil or non-ionic-surfactant (NIS). NIS is preferred when crop is under stress.

**Laudis:** Controls annual broadleaf weeds and grasses. Apply 3 fl oz/A to actively growing weed seedlings from crop emergence to the V7 stage of corn growth. Always include methylated seed oil (80% active MSO) at 1 g/100 g of spray plus urea ammonium nitrate at 1.5 pt/A or ammonium sulfate at 1.5 lb/A.

**Option:** Controls annual and perennial grasses and broadleaf weeds. Apply 1.5-1.75 oz/A plus MSO plus UAN or AMS to emerged weeds when sweet corn is in the V1 to V6 stage of growth. Can be tank-mixed with atrazine. Not all sweet corn cultivars have been tested for tolerance to Option, and severed injury may occur with certain varieties. Certain OP insecticides applied soon before or after Option may slow down metabolism of the herbicide in sweet corn leading to severe crop injury.

Pendimethalin: Controls most germinating annual grasses and some broadleaf weeds. Pendimethalin should be applied no sooner than the spike stage of sweet corn. Regardless of tillage system, plant corn at least 1.5 inches deep and completely cover with soil. Formulations include: **Prowl 3.3EC** (1.8 to 4.8 pt/A); **Prowl H2O**: 2-3 pt/A. Other similar products include: **Acumen**, **Pendant 3.3 EC**, **Pendimax 3.3**, and **Stealth**.

**Permit:** Controls yellow nutsedge and several common annual broadleaf weeds. Apply Permit at 2/3 oz/A as an over the top or drop-nozzle treatment from the spike to layby stage of corn. Weed control is dependent upon application at the correct stage of weed growth. Do not apply Permit to sweet corn unless the seed company, processor or your State Extension Service has tested the herbicide on the cultivar in question. Do not apply to sweet corn that is under stress or is growing poorly, or that has been treated with an organophosphate insecticide within 7 days before or 3 days after Permit application. Do not use Permit on the cultivar Jubilee.

**Starane:** Controls certain annual and perennial broadleaf weeds. Apply 2/3 pt/A to emerged weeds 8 inches tall or less and up to the V4 growth stage of sweet corn. Not all sweet corn varieties have been tested for sensitivity to Starane. Stem curvature, stunting and brace root injury may occur.

**Stinger:** For control of labeled weeds apply 1/3-2/3 pt/A when weeds are actively growing. Do not apply to sweet corn that is greater than 18 inches tall. Two applications at least 21 days apart and totaling no more than 2/3 pt/A may be made per season (30 days-PHI). Similar formulations include Clopyr Ag and Garrison.