Crop Profile for Corn (Sweet) in Ohio

(*Zea mays*)

Prepared Sept.2000

General Production Information

- Acres in Ohio: 12,708
- Percent of US Acreage/Rank: 1.8%/13th
- Number of Growers: 1324

Location Of Production:(1)
Sweet corn is grown in most of the counties throughout the state. The following counties are the top sweet corn producers in the state: Lucas (1098), Huron (806), Lorain (643), Portage (552), Mahoning (540), Hamilton (510), Summit (454), Greene (441), Washington (400) and Stark (352).

Production Methods:(2)
Sweet corn is grown on many different soil types but well drained soils are optimal. Seed is planted in the field once the temperature at 4-6 inches reaches 50°F. Corn planted earlier in cold, wet soils is more subject to delayed emergence, low seedling vigor and possible reduced yields and crop quality. Sweet corn seeds are planted in rows 36 to 40 inches apart with plants spaced 8 –10 inches apart in the row. Good seedbed preparation helps with successful seed germination and good stand development. Selection of sweet corn variety for local growing conditions and marketability is important for optimal production. Some growers in Ohio have been utilizing plastic and plant residue mulches to raise soil temperatures, help control weed and prevent the loss of moisture from the soil. Irrigation can be necessary to maintain sweet corn vigor if temporary rainfall shortages occur at critical times such as during kernel fill. Sweet corn is harvested before the kernels reach full maturity. The optimal harvest date is determined by the variety's response to the environment and may differ from the reported maturity by up to 7 days in some seasons. Because the quality of sweet corn declines rapidly after harvest, it is important to cool or hydro-cool corn as quickly as possible after harvest.

Insect Pests

European Corn Borer:
There are usually 2-3 generations of European corn borers in Ohio. Because of the timing of their appearance and location in the plant the first and second generation of insect are treated like two

different pests. The European corn borer overwinters as a larvae inside the corn stalk in which it fed. Mature larvae are ¾ to 1 inch long, light pink to tan or gray in color and have conspicuous small dark brown spots on each segment. The adults emerge in late May, begin mating and laying eggs. The adults are moths about 1 inch long, range in color from yellowish brown to dark tan, have two dark irregular bands across the front wings and have a wingspan of about 1inch at rest. The white eggs are laid in masses resembling fish scales of up to 50 eggs on the underside of leaves. The young larvae emerge and feed on the leaf tissue but do not eat through the leaf. The first generation larvae move deep into the whorl. As the tassel develops inside the whorl the larvae feed on it. After the tassels become exposed, the larvae bore into the stalk or they drop to the ear zone and bore into ear tips where they pupate. The new moths begin to emerge in July. The second generation does most of its damage throughout August. It does not feed in the whorls or tassels but go directly to the ears where they will remain until the following spring. Feeding damage from a third generation of European corn borer can be very extensive for growers who still have corn in the field after Labor Day.

Corn Earworm:
The corn earworm generally overwinters in areas from the southern part of the state and southward. Normal prevailing winds will move the adults northward. The first generation of corn earworms appears early in the growing season so they provide little damage to the corn. The adults are robust moths, buff colored with a dark "comma-shaped" spot on the front wing. The females lay their eggs singly on the fresh corn silks. The larvae emerge 2-6 days later and move down into the developing ear where they begin feeding. Ear damage is characterized by extensive excrement at the ear tip. The larvae vary in color from light green to tan, brown, pink maroon or nearly black and have light and dark stripes running the length of the body. Their body is covered by short dense microspines, which distinguish them from the fall armyworm. The larvae will remain feeding in the tip area of the ear until they exit to pupate in the soil.

Fall Armyworm:
The fall armyworm does not overwinter in Ohio. It can only survive the winter in the southernmost states of the US. It migrates north each year arriving in Ohio in July and August. The adult moth has a wingspan of 1 ½ inches long. Their hind wings are grayish-white and the forewings are dark gray with white mottled markings near the tips. The females lay eggs in groups of up to 150 that can be covered with tiny hairs from the female’s body. The eggs hatch in within 10 days and the newly emerged larvae begin feeding voraciously on the whorl, tassels or ears, leaving large, ragged holes and masses of sawdust-like excrement. The larvae are smooth skinned, grow to a length of 1 ½ inches and vary in color from light brown to black. They also have brown stripes running the length of their bodies, four dark spots at the posterior end and a characteristic white inverted "Y" on the front of its dark brown head. The fall armyworm does the most serious economic damage by feeding on the ears, but it is the feeding on the leaves that most commonly noticed injury.

Corn Flea Beetle:
Flea beetles are small black beetles with enlarged segments on their hind legs that enable them to jump long distances when disturbed. They overwinter as adults in leaf litter, hedgerows, windbreaks and wooded areas. In the spring the beetles emerge and the females lay eggs on gnawed-out areas in roots or

the surrounding soil. The small white larvae feed on the roots but cause little damage and then pupate in the soil. Damage is done by the adults that feed on corn leaves and leave streaks or "window pane" scarring. The feeding by the adults can transmit the bacteria that causes Stewart's Wilt, a disease that can cause serious injury in certain varieties, particularly early yellow varieties. There are usually 1-2 generations of flea beetles per year.

Corn Rootworm:
The three types of corn rootworms; the Northern, the Western and Southern can be found in Ohio. The Northern and Western corn rootworms can overwinter in Ohio as eggs. The southern corn rootworm does not overwinter in Ohio but migrates north each spring. The corn rootworm is a beetle larvae ½ inch long, slender and white with brown head capsules and a dark plate on the top side of the last segment. The larvae emerge usually from mid-May to Mid-June and begin feeding on the roots of the corn plants. Larval feeding can cause a reduction in yield since pruned roots are less able to supply water and nutrients to developing ears and by making the roots more susceptible to disease. The adult beetles which first appear in early July also cause damage by clipping the silks, resulting in poor pollination and reduced kernel set.

Corn Leaf Aphid:
The corn leaf aphid is small to medium sized aphid and bluish-green in color. They usually infest the plant whorl, if they arrive early in the season. In Ohio they usually arrive in mid-July when they colonize emerging corn tassels. A heavy infestation can curl leaves and stunt plant growth while an infestation late in the season may completely cover the tassels and upper leaves. The honeydew excreted by the aphids can accumulate on corn plants and allow the development of sooty molds.

Cutworms:
Cutworms are the larvae of moths 1 inch long, a wingspan of 1 ¼ to 2 inches long and of a wide variety of colors. The fully-grown cutworm ranges from 1- 1 ¾ inches in length and will curl into a "C" shape when disturbed. Cutworms are most active early in the growing season and feed heavily on seedlings at or just below the soil surface during the night. Cutworms can cut young plants off at the base or near the ground level.

Chemical Insect Controls:

Permethrin (Pounce, Ambush)

Percent acres treated: 50%
Target pests and timing: Corn Earworm, European Corn Borer, Fall Armyworm and Flea Beetle
Average rate of most common formulation and frequency of application:
Pounce 3.2EC – 5.7 oz/A, 2.5 times
Pounce 1.5G – 6.5 oz/A, 3 times
Ambush 2EC – 7.2 oz/A, 3 times
PHI: 1-14 days

Efficacy rating: Good to Very Good, (except poor on corn earworm)

Thiodicarb (Larvin)

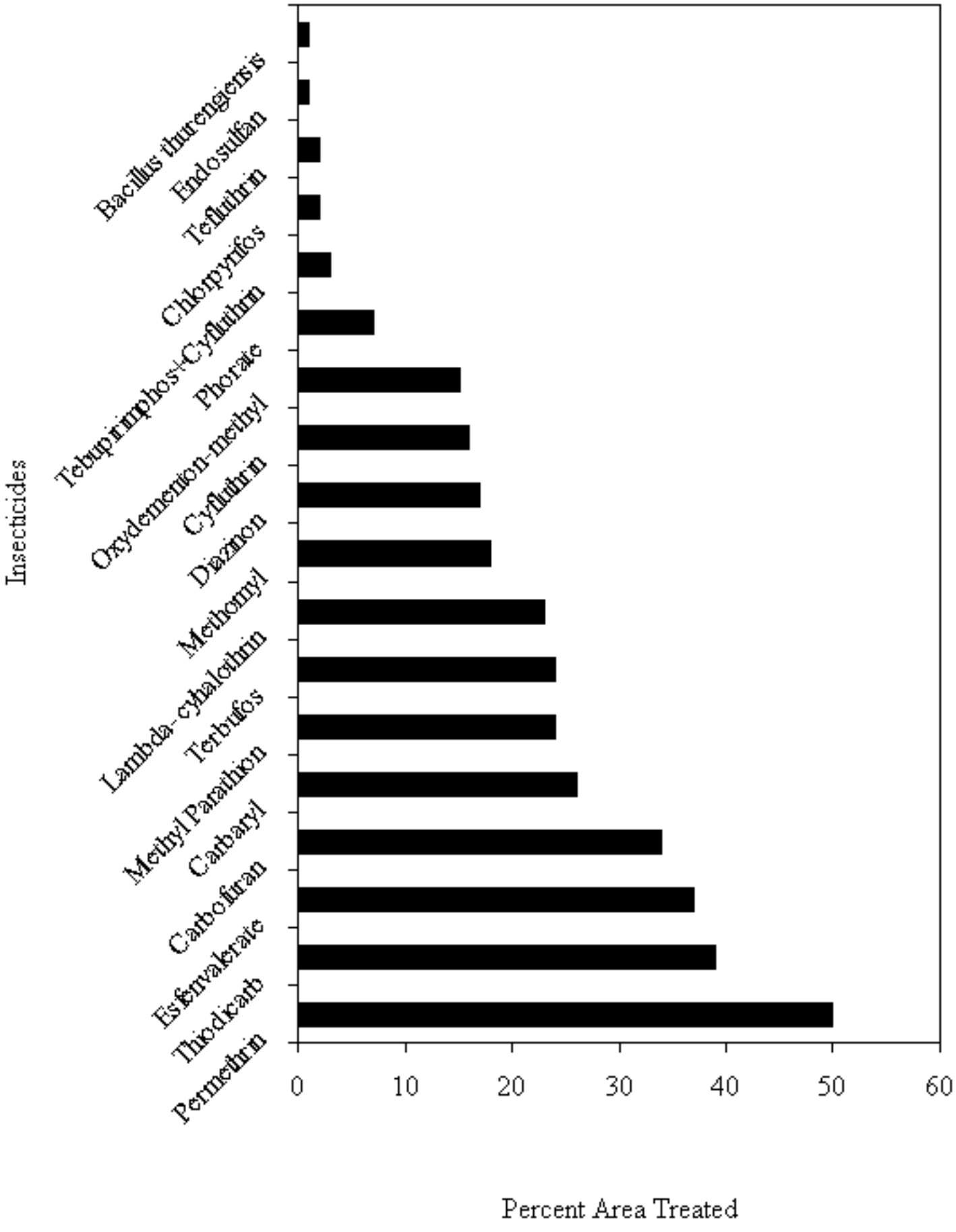
Percent acres treated: 39%
Target pests and timing: European Corn Borer, Corn Earworm, Fall Armyworm
Average rate of most common formulation and frequency of application:
Larvin 3.2F – 24 oz/A, 2.7 times
PHI: 0 days
Efficacy rating: Good to Very Good

Esfenvalerate (Asana)

Percent acres treated: 37%
Target pests and timing: European Corn Borer, Corn Earworm and Fall Armyworm
Average rate of most common formulation and frequency of application:
Asana XL – 5.9 oz/A, 2.4 times
PHI: 1 - 10 days
Efficacy rating: Good to Very Good on Corn Earworm, Poor on European Corn Borer and Fall Armyworm

Carbofuran (Furadan)

Percent acres treated: 34%
Target pests and timing: Flea beetles and Rootworms
Average rate of most common formulation and frequency of application:
Furadan 4F – 2.5 oz/1000 ft, once at planting
PHI: 80 days
Efficacy rating: Good to Very Good


Insecticides
Bacillus thurengiensis
Endosulfan
Tefluthrin
Chlorpyrifos
Tebupirimphos+Cyfluthrin
Phorate
Oxydemeton-methyl
Cyfluthrin
Diazinon
Methomyl
Lambda-cyhalothrin
Terbufos
Methyl Parathion
Carbaryl
Carbofuran
Esfenvalerate
Thiodicarb
Permethrin
0
10
20
30
40
50
60
Percent Area Treated

Carbaryl (Sevin)

Percent acres treated: 26%
Target pests and timing: Flea beetles, European Corn Borers, Corn Earworm and Fall Armyworm
Average rate of most common formulations and frequency of application:(4)
Sevin 80S – 1.6 lbs/A, 3 times
Sevin XLR Plus – 1.3 qt/A, 2.4 times
Sevin 50WP – 1 qt/A, 3 times
PHI: 5 - 14 days
Efficacy rating: Good to Very Good

Methyl Parathion (Penncap-M)

Percent acres treated: 24%
Target pests and timing: European Corn Borer, Corn Earworm and Aphids
Average rate of most common formulation and frequency of application:
Penncap-M 2F encapsulated – 2.2 pt/A, 2.8 times
PHI: 3 days
Efficacy rating: Good to Very Good on European Corn Borer and Aphids, Poor on Corn Earworm

Terbufos (Counter)

Percent acres treated: 24%
Target pests and timing: Rootworms, Wireworms and Flea Beetles
Average rate of most common formulation and frequency of application:
Counter 15G – 9.5 lb/A, once at planting
PHI: 75 – 80 days
Efficacy rating: Good

Lambda-cyhalothrin (Warrior)

Percent acres treated: 23%
Target pests and timing: European Corn Borer, Corn Earworm, Fall Armyworm and Flea Beetle
Average rate of most common formulation and frequency of application:
Warrior 1EC – 3.2 oz/A, 2 times
PHI: 3 – 7 days
Efficacy rating: Good to Very Good

Methomyl (Lannate)

Percent acres treated: 18%

Target pests and timing: European Corn Borer, Corn Earworm and Fall Armyworm
Average rate of most common formulation and frequency of application:
Lannate LV – 1 pt/A, 2.8 times
Lannate 90SP – 0.5 lb/A, 3.8 times
PHI: 1-10 days
Efficacy rating: Good

Diazinon

Percent acres treated: 17%
Target pests and timing: Corn Earworm and Aphids
Average rate of most common formulation and frequency of application:
Diazinon 75W – 1.5 pt/A, 3 times
Diazinon AG500 – 1 qt/A,
PHI: 7 - 10 days
Efficacy rating: Average

Cyfluthrin (Baythroid)

Percent acres treated: 16%
Target pests and timing: European Corn Borer and Corn Earworm
Average rate of most common formulation and frequency of application:
Baythroid 2EC- 2.5 oz/A, 4 times
PHI: 0 days
Efficacy rating: Very Good

Oxydementon-methyl (Metasytox-R)

Percent acres treated: 15%
Target pests and timing: Aphids
Average rate of most common formulation and frequency of application:
Metaxytox-R – 1.75 pt/A, once
PHI: 10 –15 days
Efficacy rating: Good to Very Good

Phorate (Thimet)

Percent acres treated: 7%
Target pests and timing: Flea Beetle and Rootworm
Average rate of most common formulation and frequency of application:
Thimet 15G – 5 lb/A, once at planting
PHI: 80 days

Efficacy rating:

Tebupirimphos + Cyfluthrin (Aztec)

Percent acres treated: 3%
Target pests and timing: rootworms and cutworms
Average rate of most common formulation and frequency of application:
Aztec 2.1G – 6.7 oz/1000ft, once at planting
PHI: 85 days
Efficacy rating: Very Good

Chlorpyrifos (Lorsban)

Percent acres treated: 2%
Target pests and timing: European Corn Borer, Rootworm, Seedcorn Maggot, Wireworm and cutworms
Average rate of most common formulation and frequency of application:
Lorsban 15G – 7 lb/A, once at planting
Lorsban 4E – 3 pt/A, once
PHI: 70 - 85 days for 15 G, 35 days for 4E
Efficacy rating: Good to Very Good

Tefluthrin (Force)

Percent acres treated: 2%
Target pests and timing: Flea Beetle and Rootworm
Average rate of most common formulation and frequency of application:
Force 3G – 3.4 lb/A, once at planting
PHI: 60 days
Efficacy rating: Good

Endosulfan (Thiodan)

Percent acres treated: 1%
Target pests and timing: Corn Earworm and Aphids
Average rate of most common formulation and frequency of application:
Thiodan 50WP – 2 lb/A, 2 times
Thiodan 3EC – 2 qt/A, 2 times
PHI: 7 days

Bacillus thurengiensis (Dipel)

Percent acres treated: 1%
Target pests and timing: European Corn Borer and Corn Earworms
Average rate of most common formulation and frequency of application:
Dipel 2X – 1 lb/A, 3 times
PHI: 0 days
Efficacy rating: Good to Very Good on European Corn Borer and Poor on Corn Earworm

Cultural Controls:(3)
Rotating fields used for sweet corn production helps to disrupt lifecycle of soil dwelling pests. Monitoring dispersal of insect populations is critical to effective management of European corn borer, corn earworm and fall armyworm. Pheromone traps are extremely useful for detecting corn earworm migration. Understanding and using the row tassel benchmark and insect behavior and biology will helps with more efficient use of chemicals.

Diseases

Rust:
Rust is caused by the fungus *Puccinia sorghi*. Disease initiation is dependent upon the reintroduction of spores from southern areas or on the development of special spores on the alternate host, *Oxalis*. Rust first appears as oval or elongated reddish-brown pustules scattered over both surfaces of the leaf. After the pustules rupture, dusty red and then black spores are exposed. The red spores are spread by wind and can infect corn leaves directly. The black spores are overwintering spores which germinate and indirectly infect the alternate host. Rust is promoted by cool temperatures and 100% relative humidity.

Leaf Blight:
The most common leaf blight in Ohio is a fungal disease caused by the fungus *Helminthosporium* spp. The disease is characterized by the development of grayish-green to tan areas 1 – 6 inches in length and ½ inch wide on the leaves, giving the leaves a streaked appearance. Disease development is favored in wet conditions at temperatures between 65-77°F.

Stewart's Wilt:
Stewart's wilt is a disease that has increasingly become a problem for Ohio's sweet corn growers. It is caused by the bacterium *Panotes stewartii*. The bacterium overwinters in flea beetles and is spread to corn when the beetles feed on the plants. Symptoms appear on the leaves first. Pale green to yellow streaks develop, often extending the length of the leaf. The streaks eventually change from pale green to yellow or brown. Young plants that are infected may die, while older ones may be stunted or merely have streaked leaves. Mild winters favor overwintering of flea beetles and usually precedes growing seasons when the disease is prevalent.

Chemical Disease Controls:(2,4)

Propiconazole (Tilt)

Percent acres treated: 15%
Target diseases and timing: Rust
Average rate of most common formulation and frequency of application:
Tilt – 4 oz/A, 6 times
PHI: 30 –40 days
Efficacy rating: Good

Mancozeb (Penncozeb)

Percent acres treated: 2%
Target diseases and timing: Leaf blight
Average rate of most common formulation and frequency of application:
Penncozeb 75DF – 1.3 lbs/A, 2 times
PHI: 20-30 days
Efficacy rating: Good

Chlorothalonil (Bravo)

Percent acres treated: 3%
Target diseases and timing:
Average rate of most common formulation and frequency of application:
Bravo 720 – 2.3 pt/A, 2.8 times
PHI: 14 – 21 days
Efficacy rating: Good

Cultural Controls:(2,5)
Rotate crops and use disease resistant varieties.

Weeds

Broadleaves and grasses

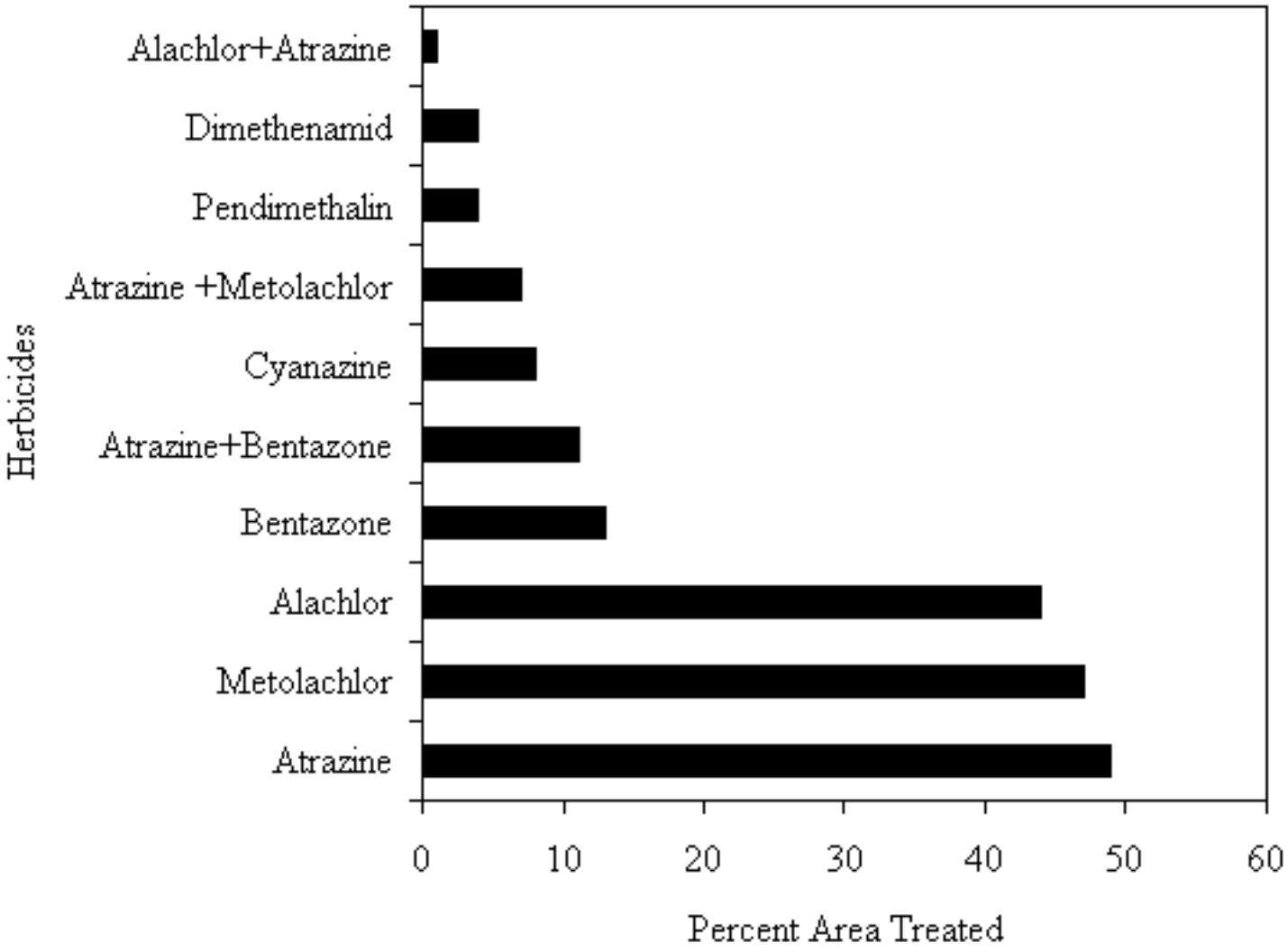
Chemicals Controls:(2,4)

Atrazine

Percent acres treated: 49%
Target weeds: Annual broadleaf weeds
Average rate of most common formulation and frequency of application:
Aatrex Nine-0, Riverside Atrazine 90DF – 1.4 lb/A, once
Aatrex 4L, Riverside Atrazine 4L, Drexel Atrazine 4L – 3pt/A, once
PHI: 65 – 85 days
Efficacy rating: Good

Metolachlor (Dual)

Percent acres treated: 47%
Target weeds: annual grasses, yellow nutsedge and some annual broadleaf weeds
Average rate of most common formulation and frequency of application:
Dual 8E– 2 pt/A, once
Dual IIG – 1.9 pt/A, once
Dual Magnum – 1.5 pt/A, once
PHI: 65 – 85 days
Efficacy rating: Good (8E and IIG) to Very Good (Magnum)



Alachlor (Lasso, Lariat, Partner, Micro-Tech)

Percent acres treated: 44%
Target weeds: Annual grasses, yellow nutsedge and some broadleaf weeds
Average rate of most common formulation and frequency of application:
Lasso 4EC – 2 qt/A, once
Lariat – 3qt/A, once
Partner WDG – 4.8 lb/A, once
Micro-Tech – 2 pt/A, once
PHI: 75 – 90 days
Efficacy rating: Average (Micro-tech and Partner) to Good (Lasso and Lariat)

Bentazone (Basagran)

Percent acres treated: 13%
Target weeds: Annual broadleaf weeds, yellow nutsedge, bindweed, lambsquarter

Average rate of most common formulation and frequency of application:
Basagran – 1.8 pt/A, once
PHI: 40 – 60 days
Efficacy rating: Good

Atrazine + Bentazone (Laddock)

Percent acres treated: 11%
Target weeds: Annual broadleaf weeds
Average rate of most common formulation and frequency of application:
Laddock S-12 – 2 pt/A, once
PHI: 75 – 90 days
Efficacy rating: Good

Cyanazine (Bladex)

Percent of acres treated: 8%
Target Weeds: Annual broadleaf weeds and grasses
Average rate of most common formulation and frequency of application:
Bladex 4L – 1.7 qt/A, once
Bladex 90F – 1lb/A, once
PHI: 80 days
Efficacy rating: Good

Atrazine + Metolachlor (Bicep)

Percent acres treated: 7%
Target weeds: Annual broadleaf weeds
Average rate of most common formulation and frequency of application:
Bicep II – 1.9 qt/A, once
PHI: 70 – 80 days
Efficacy rating: Good

Pendimethalin (Prowl)

Percent acres treated: 4%
Target weeds: Annual grasses
Average rate of most common formulation and frequency of application:
Prowl – 2.3 pt/A, once
PHI:
Efficacy rating: Average

Dimethenamid (Frontier)

Percent acres treated: 4%
Target weeds: Annual grasses
Average rate of most common formulation and frequency of application:
Frontier 6.0 – 1qt/A, once
PHI: 75 days
Efficacy rating: Average

Alachlor+Atrazine (Bullet)

Percent acres treated: 1%
Target weeds: Annual grasses and broadleaf weeds
Average rate of most common formulation and frequency of application:
Bullet – 3 qt/A, once
PHI:
Efficacy rating: Good

Cultural Controls:(3)
Good cultural practices that help manage weeds in sweet corn production include adequate seedbed preparation, providing appropriate nutrients, rotating crops, planting on the proper date, using optimal row width and seeding at the rate required for optimal stands.

Contacts

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