

# Chapter 21.

## Sweet Corn Production in Florida

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### BOTANY

#### Nomenclature

**Family** - Poaceae (Gramineae)

**Sweet corn** - *Zea mays var. rugosa*

#### Origin

Like bean, potato, tomato, pepper, and pumpkin, sweet corn is of New World origin (Fig. 21-1). However, wild corns have not been found. It is believed that corn which evolved from ancestral types in South America was later domesticated in Central America.

#### Related Species

Sweet and popcorn are the only members of the Poaceae family which are classed as vegetables. Nonetheless, this family is one of the most important in providing human sustenance, either directly or as feed for domestic animals, with grains such as wheat, rice, oats, rye, and corn or indirectly as hay and forage grasses for domestic animals. Sugar cane is also an important member of this family.

### VARIETIES

A description of major sweet corn types currently available is given in Table 1. Supersweet (shrunken-2) sweet corn varieties that are in commercial use in Florida are given in Table 2.

**Table 1.** Description of major sweet corn types currently available.

| Type                                      | Genes controlling sweetness   | Storage life <sup>1</sup> (days) | Relative sugar content                 |
|---|---|----------------------------------|--|
| Sugary                                    | Full complement of sugary   | 1 to 3                           | Normal                                 |
| Sugary Enhanced, also "Modified" and "EH" | Full complement of sugary (su) and half or full complement of sugary enhancer (se)              | 3 to 5                           | Slight to moderate or even high levels |
| Supersweet, also "Ultra," "Extra" sweet   | No sugary (su); full complement of shrunken-2 (sh <sub>2</sub> )                                | 5 to 10                          | High                                   |
| Synergistic, also "Sweet-Gene Hybrid"     | Full complement of sugary (su); and half complement of shrunken-2 (sh <sub>2</sub> )            | 3 to 5                           | Moderate                               |
| Improved Supersweet                       | Half complement of sugary (su); and full complement of shrunken-2 (sh <sub>2</sub> )            | 5 to 10                          | Very high                              |
| ADX                                       | No sugary (su) or shrunken-2 (sh <sub>2</sub> ) genes; full complement of ae, du, and wx genes. | 5 to 10                          | Moderate to high                       |

<sup>1</sup> These values are approximations provided for comparison among types. Actual storage time will depend on variety, cultural practices, and postharvest handling methods.

### Pollination

Sweet corn is wind pollinated, i.e. wind is the agent responsible for transfer of pollen from the tassel to the silk to effect the pollination process. Isolation of genetic types, just as isolation of yellow and white corns of a single genetic type, must occur for them to produce their desired characteristics. Isolation strategies include:

**Distance** - about 300 feet should be sufficient isolation to avoid cross pollination.

**Time** - Maturity differences of at least 14 days which can be accomplished by variety selection or successive plantings should be sufficient to avoid cross pollination of genetic types.

### SEEDING AND PLANTING

Planting dates and seeding information are given in Table 3.

### FERTILIZER AND LIME

For mineral soils with subsurface or sprinkler irrigation, band all P<sub>2</sub>O<sub>5</sub> and micronutrients with 20 to 25% of N and K<sub>2</sub>O at planting. Sidedress band remaining N and K<sub>2</sub>O in one or two applications during the early part of growth cycle. After midseason, N and K<sub>2</sub>O can be applied through center-pivot irrigation system at rates of 10 to 20 lbs/A of N and K<sub>2</sub>O in several applications.

For mulched crops with subsurface irrigation, broadcast all P<sub>2</sub>O<sub>5</sub>, micronutrients and 20 to 25% N and K<sub>2</sub>O in bed prior to mulching. For subsurface irrigated crops, band remaining N and K<sub>2</sub>O in groove 2 to 3 inches deep in bed center. For sprinkler irrigation, broadcast all fertilizer in bed.

For organic soils, band all P<sub>2</sub>O<sub>5</sub> and micronutrients at planting. Broadcast all K<sub>2</sub>O. Supplemental N at rate of 40 lbs/A might be needed in cool winter weather or after leaching rain.

Soil test and fertilizer recommendations for mineral soils are given in Table 4. Soil test and fertilizer recommendations for Histosols are given in Table 5.

### PLANT TISSUE ANALYSIS

Plant tissue analysis information for sweet corn is given in Table 6. The analysis was done when the plants were 30 inches tall, using the most recently matured leaf.

### IRRIGATION

Water requirements of sweet corn (see Chapter 3, *Principles and Practices for Irrigation Management of Vegetables*, Table 4 to 6) increase rapidly from about 40% of ETo during early growth to 110% of ETo at peak growth (see Chapter 3, *Principles and Practices for Irrigation Management of Vegetables*, Table 3). Proper water management is essential during the silking and tasseling and the

ear development periods. Water requirements may decrease to 100% of ETo during the final week or two of growth.

### WEED MANAGEMENT

Herbicides labeled for weed control in sweet corn are listed in Table 7.

### DISEASE MANAGEMENT

Chemicals approved for disease management in sweet corn are listed in Table 8.

### INSECT MANAGEMENT

Table 9 outlines the insecticides approved for use on insects attacking sweet corn.

### PRODUCTION COSTS

Average breakeven production costs for sweet corn vary among Florida's production areas. The costs for are outlined for Dade County in Table 10 and Palm Beach County in Table 11.

**Table 3.** Seeding and planting information for sweet corn.

| Planting dates   |                    |
|--|--------------------|
| North Florida  | Feb - Apr          |
| Central Florida  | Jan - Apr          |
| South Florida  | Oct - Mar          |
| Seeding information  |                    |
| Distance between rows (in)   | 28 - 32            |
| Distance between plants (in)   | 6 - 8 <sup>1</sup> |
| Seeding depth (in)   | 1.0 - 1.5          |
| Seed per acre (lb)   | 6 - 15             |
| Days to maturity from seed   | 64 - 90            |
| Plant population (acre)  | 24,000 - 32,000    |
| <sup>1</sup> Wider rows and between plant spacings will yield larger ears. |                    |

**Table 2.** Some supersweet (shrunken-2) sweet corn varieties that are grown in Florida arranged by kernel color.

| Yellow             | White             | Bicolor            |
|--------------------|-------------------|--------------------|
| Beyond Multisweet  | Boreal            | Big Time           |
| Prime Time         | Summer Sweet 6801 | Beyond BC          |
| Prime Plus         | Summer Sweet 7111 | Fantastic          |
| Summer Sweet 6800R | Summer Sweet 7311 | Obsession          |
| Summer Sweet 7100R | Vail              | Summer Sweet 6802  |
| Summer Sweet 7650R |                   | Summer Sweet 7102  |
| Summer Sweet 8100R |                   | Summer Sweet 8102R |
| Winstar            |                   | Tethys             |

**Table 4.** Soil test and fertilizer recommendations for mineral soils for sweet corn.<sup>1</sup>

| Target pH          | N lb/A <sup>2</sup> | $P_2O_5$ <sup>2</sup> |     |     |   |    | $K_2O$ |     |     |   |    |
|--------------------|---------------------|-----------------------|-----|-----|---|----|--------|-----|-----|---|----|
|                    |                     | VL                    | L   | M   | H | VH | VL     | L   | M   | H | VH |
| (lb/A/crop season) |                     |                       |     |     |   |    |        |     |     |   |    |
| 6.5                | 200                 | 150                   | 120 | 100 | 0 | 0  | 150    | 120 | 100 | 0 | 0  |

<sup>1</sup> See Chapter 2 section on supplemental fertilizer application and best management practices, pg 11.

<sup>2</sup> Seeds and transplants may benefit from applications of a starter solution at a rate no greater than 10 to 15 lbs/acre for N and  $P_2O_5$ , and applied through the plant hole or near the seeds.

**Table 5.** Soil test and fertilizer recommendations for Histosol soils for sweet corn, with target pH = 6.5 and N rate 0 lb/A.

| P and K index and fertilizer rate <sup>1</sup> |     |     |     |     |    |    |
|--|-----|-----|-----|-----|----|----|
| P index  | 3   | 6   | 9   | 12  | 15 | 18 |
| $P_2O_5$ (lb/A)                                | 160 | 120 | 80  | 40  | 0  | 0  |
| K index  | 50  | 80  | 110 | 140 |    |    |
| $K_2O$ (lb/A)                                  | 120 | 60  | 0   | 0   |    |    |

<sup>1</sup> Seeds and transplants may benefit from applications of a starter solution at a rate no greater than 10 to 15 lbs/acre for N and  $P_2O_5$ , and applied through the plant hole or near the seeds.

**Table 6.** Plant tissue analysis for sweet corn plants 30 inches tall. Dry wt. basis.

| Status         | N       | P       | K       | Ca      | Mg      | S       | Fe                | Mn     | Zn    | B     | Cu   | Mo      |
|----------------|---------|---------|---------|---------|---------|---------|-------------------|--------|-------|-------|------|---------|
|                | Percent |         |         |         |         |         | Parts per million |        |       |       |      |         |
| Deficient      | <2.5    | 0.2     | 2.5     | 0.5     | 0.2     | 0.2     | 40                | 40     | 25    | 10    | 4    | 0.1     |
| Adequate range | 2.5-4.0 | 0.2-0.4 | 2.5-4.0 | 0.5-0.8 | 0.2-0.4 | 0.2-0.4 | 40-100            | 40-100 | 25-40 | 10-30 | 4-10 | 0.1-0.2 |
| High           | >4.0    | 0.4     | 4.0     | 0.8     | 0.4     | 0.4     | 100               | 100    | 40    | 30    | 10   | 0.2     |
| Toxic (>)      |         |         |         |         |         |         |                   |        | 100   |       |      |         |

**Table 7.** Chemical weed controls: sweet corn.

| Herbicide   | Labeled crops    | Time of application to crop | Rate (lbs. AI./Acre) |                 |
|---|------------------|-----------------------------|----------------------|-----------------|
|   |                  |                             | Mineral              | Muck            |
| Atrazine<br>(AAtrex 4L)<br>(AAtrex Nine-0)  | Sweet corn       | Preemergence                | 1.0 - 2.0            | 2.0 - 3.0       |
| <b>Remarks:</b> Controls germinating annuals. Apply to moist soil. Note label precautions of planting non-registered or sensitive crops for at least one growing season.  |                  |                             |                      |                 |
| Atrazine<br>(AAtrex 4L)<br>(AAtrex Nine-0)  | Sweet corn       | Postemergence               | 1.0 - 2.8            | 1.0 - 2.8       |
| <b>Remarks:</b> Controls emerged weeds. Apply in a minimum of 10 gals. of water before weeds are 1.5 inches tall. Use lower rates when weeds are small. Note replanting precautions listed above.   |                  |                             |                      |                 |
| Atrazine + Oil  | Sweet corn       | Postemergence               | 1.0 - 2.0 + oil      | 1.0 - 2.0 + oil |
| <b>Remarks:</b> Controls emerged weeds. Apply to small test plots to evaluate tolerance of new hybrid corn varieties. Following mixing instructions listed on the label and rates of emulsifiable oil or oil concentrate depending on ground or aerial application methods. Apply before annual grasses are 1.5" and broadleaf weeds are 4". Note replanting precautions. Do not apply to breeding stock or inbred lines of sweet corn. |                  |                             |                      |                 |
| Bentazon<br>(Basagran)  | Corn (all types) | Postemergence               | 0.75 - 1.0           | 0.75 - 1.0      |
| <b>Remarks:</b> Controls actively growing young broadleaf weeds. Recommended for burn down of annual morning glory and yellow nutsedge in corn. Consult label for weeds controlled/weed size table. Corn is tolerant at all stages of growth. Do not apply over 2 lbs ai (4 pts.)/acre per season. Add a crop oil concentrate (coc) at 2 pts/acre maximum.  |                  |                             |                      |                 |

Table 7. Continued.

| Herbicide   | Labeled crops | Time of application to crop                                   | Rate (lbs. AI./Acre)    |                        |
|---|---------------|---|-------------------------|------------------------|
|   |               |   | Mineral                 | Muck                   |
| Carfentrazone (Aim)   | Corn (all)    | Preplant, Preemergence, Postemergence                         | 0.008-0.016             | 0.008-0.016            |
| <b>Remarks:</b> Controls young actively growing broadleaf weeds. May be applied 30 days before planting until corn reaches the 8 leaf collar growth stage. Rate is 0.5 fl oz product per acre. Use a nonionic surfactant in the spray mix. Leaf burn or speckling has been seen on older plants when applied over the top. Directed sprays are much safer. No yield reduction was seen in trials when leaf damage occurred. FMC states that the use is the responsibility of grower due to not being tested on all sweet corn varieties.                        |               |   |                         |                        |
| EPTC<br>(Eradicane 6.7E)  | Sweet corn    | Preplant incorporate  | 4.0 - 6.0               |                        |
| <b>Remarks:</b> Use lower rate in light textured soil (sands). Must be incorporated into soil to prevent loss of herbicide. Thorough mixing is necessary especially in the control of rhizomes of Bermuda grass and yellow and purple nutsedge.   |               |   |                         |                        |
| Glyphosate<br>(Roundup, Durango<br>Touchdown, Glyphomax)  | Sweet Corn    | Chemical fallow<br>Preplant, pre emergence,<br>Pre transplant | 0.3 - 1.0               |                        |
| <b>Remarks:</b> Roundup, Glyphomax and Touchdown have several formulations. Check the label of each for specific labeling directions.   |               |   |                         |                        |
| Halosulfuron (Sempra)<br>(Sanda)  | Sweet Corn    | Postemergence   | 0.032                   | 0.032                  |
| <b>Remarks:</b> Sempra may be applied over-the-top or with drop nozzles from the spike to the layby stage of corn. Applications of $\frac{2}{3}$ oz by weight (.032 lb ai) per acre broadcast may be made with a sequential treatment of $\frac{2}{3}$ oz by wt directed or semi-directed to avoid application into the whorl may be made. Avoid cultivation for 7 days after application. Excellent control of nutsedges and active on cocklebur, pigweeds, ragweed and smartweed. Will not control emerged grasses. Consult label for plantback restrictions. |               |   |                         |                        |
| Mesotrione<br>(Callisto)  | Sweet Corn    | Pre emergence<br>Postemergence                                | 0.188-0.24<br>0.094     | -                      |
| <b>Remarks:</b> Apply Callisto preemergence at 6.0 to 7.7 fl oz/ A. May be tank mixed with a grass herbicide for grass control. Apply at 3 fl oz/A postemergence. It may be tank mixed with herbicides such as atrazine, metolachlor, bentazone, etc. Check the label. Do not apply with a crop oil concentrate (coc), UAN, or AMS postemergence. Corn may be treated up to 30 inches tall. Do not harvest within 45 days after application. In some cultivars, transitory bleaching may occur. In trials, yield has not been affected.                         |               |   |                         |                        |
| S-Metolachlor<br>(Dual Magnum)<br>(Dual II Magnum)  | Sweet Corn    | Pre emergence   | 1.0-1.5                 |                        |
| <b>Remarks:</b> Provides good control of annual grasses and certain broadleaf weeds. Use the lower rate on light sandy soils. Use higher rate on soils with organic matter 3% and greater. May be used as preemergence up to 4 pints (lbs/ai) on soils with 6 to 20% organic matter. May be used as directed spray to the base of corn plants 5 inches tall until corn plants reach 40 inches in height. See Special Local Needs (24c) label for muck soils.  |               |   |                         |                        |
| Paraquat<br>(Gramoxone Inteon)<br>(Firestorm)   | Sweet Corn    | Pre emergence   | 0.56 - 0.94             | 0.56 - 0.94            |
| <b>Remarks:</b> Controls emerged weeds. Apply prior, during, or after planting, but before corn emerges. Use a spreader.  |               |   |                         |                        |
| Paraquat<br>(Gramoxone Inteon)  | Sweet Corn    | Directed spray  | 0.25                    | 0.25                   |
| <b>Remarks:</b> Apply when corn is at least 10" tall. Arrange nozzles to spray no higher than the lower 3 inches of the corn plant. Corn plants shorter than 10" may be injured and not recover. (Corn height measured from soil surface to top of whorl.)  |               |   |                         |                        |
| Pendimethalin (Prowl)<br>+ Atrazine (Several)   | Sweet Corn    | Early Postemergence   | 0.75 - 1.0<br>1.0 - 1.5 | 1.0 - 2.0<br>1.0 - 2.0 |
| <b>Remarks:</b> In Alabama, Florida and Georgia, Prowl 3.3 EC can be applied with atrazine early postemergence. Apply from spike through 4 leaf stage but before weeds exceed 1 inch in height, except for Texas panicum which must be no larger than the 2 leaf stage. Prowl alone will not control emerged weeds. Wait at least 7-10 days before cultivation early postemergence treatments.  |               |   |                         |                        |

Table 7. Continued.

| Herbicide  | Labeled crops | Time of application to crop | Rate (lbs. AI./Acre) |       |
|--|---------------|-----------------------------|----------------------|-------|
|  |               |                             | Mineral              | Muck  |
| Tembotrione (Laudis)   | Sweet Corn    | Post emergence              | 0.08                 | 0.08  |
| <p><b>Remarks:</b> Apply at 3 fl oz/A to sweet corn from emergence to V7 growth stage for the control of a broad spectrum of broadleaf and grass weeds. The use of a methylated seed oil and a nitrogen source (UAN or AMS) is recommended for best weed control. The addition of atrazine plus a COC may increase the weed control spectrum. Check the label for plant-back of sensitive crops.</p> |               |                             |                      |       |
| Topramezone (Impact)   | Sweet Corn    | Postemergence               | 0.016                | 0.016 |
| <p><b>Remarks:</b> Apply to emerged actively growing weeds. Impact is a systemic postemergence herbicide. The addition of 0.25 to 1.0 lb ai of atrazine will enhance control. Not all sweet corn hybrids have been tested. Test each new hybrid before applying to the whole fields.</p>   |               |                             |                      |       |

Table 8. Disease management for sweet corn.

| Chemical (a.i.)   | Fungicide Group <sup>1</sup> | Maximum Rate/Acre/                                |           | Min. Days to Harvest | Pertinent Diseases   | Remarks <sup>2</sup>  |
|---|------------------------------|---|-----------|----------------------|--|---|
|   |                              | Application                                       | Season    |                      |  |   |
| Amistar 80DF (Azoxystrobin)   | 11                           | 5 oz  | 2.5 lb    | 7                    | Common and southern rust<br>Northern corn leaf blight<br>Southern corn leaf blight   | Do not exceed 1 sequential and 6 total appl. of Amistar or other QoI fungicides                   |
| Apron XL LS (Mefenoxam)   | 4                            | 0.64 fl. oz./100 lb seed or 2.2 fl oz/100 lb seed |           |                      | Pythium seedling blight<br>Downy mildew  | Seed treatment only. Use the higher rate if treating seed for prevention of systemic downy mildew |
| Chlorothalonil Products (See individual labels), including Applause 720, Bravo Ultrex, Bravo Weather Stik, Chloronil 720, Echo 720, Echo 90DF, Equus 720, Equus DF, 82.5 WDG (Chlorothalonil)   | M5                           | See label   | See label | 14                   | Common and southern rust<br>Northern corn leaf blight<br>Southern corn leaf blight   | Do not use crop for live-stock feed   |
| Copper-Count-N  | M1                           | 2qt   |           |                      | Bacterial rot,<br>bacterial wilt,<br>Bacterial stripe,<br>Leaf blights,<br>Stalk rot |   |
| Mancozeb Compounds (See individual labels), including Dithane-DF-Rainshield, Dithane -F45 Rainshield, Dithane-M45, Manzate, Manzate 75DF, Manzate Flowable, Manzate Prostik, Penncozeb 4L, Penncozeb 75DF, Penncozeb 80WP (Ethylene bisdithiocarbamate with zinc) | M3                           | See label   | See label | 7                    | Common and southern rust<br>Northern corn leaf blight<br>Southern corn leaf blight   | Do not use crop for live-stock feed   |
| Maneb Compounds (See individual labels), including Maneb 75DF, Maneb 80WP, Manex (Ethylene bisdithiocarbamate)  | M3                           | See label   | See label | 7                    | Common and southern rust<br>Northern corn leaf blight<br>Southern corn leaf blight   | Do not use crop for live-stock feed   |

Table 8. Continued.

| Chemical (a.i.)   | Fungicide Group <sup>1</sup> | Maximum Rate/Acre/            |          | Min. Days to Harvest | Pertinent Diseases   | Remarks <sup>2</sup>   |
|---|------------------------------|-------------------------------|----------|----------------------|--|--|
|   |                              | Application                   | Season   |                      |  |  |
| Kaligreen<br>(Potassium bicarbonate)  |                              | 3 lb                          |          |                      |  | Do not mix with highly acidic pesticides   |
| Fosphite<br>(Potassium phosphite)   |                              | 3 qt                          | 18 qt    |                      | <i>Pythium</i> ,<br><i>Rhizoctonia</i> ,<br><i>Fusarium</i> ,<br>Downy mildew      | Do not exceed 6 appl./per crop. See label for foliar, and irrigation application details   |
| Fungi-phite<br>(Potassium phosphite)  |                              | 2 qt                          | 12 qt    |                      | <i>Pythium</i> ,<br><i>Rhizoctonia</i> ,<br><i>Fusarium</i> ,<br>Downy mildew      | Do not exceed 6 appl./per crop. See label for foliar, and irrigation application details   |
| Headline EC<br>(Pyraclostrobin)   | 11                           | 12 fl oz                      | 72 fl oz | 7                    | Common and southern rust<br>Northern corn leaf blight<br>Southern corn leaf blight | Do not exceed 2 sequential and 6 total appl. of Headline or other QoI fungicides   |
| Maxim 4FS<br>(Fludioxonil)  | 12                           | 0.16 fl oz/<br>100 lb of seed |          |                      | Various seedling diseases  | Seed treatment only  |
| Miconized Gold<br>(Sulfur)  | M2                           | 5 lb                          |          |                      |  | Do not apply during periods of warm weather  |
| Propiconazole Products<br>(See individual labels),<br>including Bumper<br>41.8EC, Tilt 3.6EC<br>Propimax EC | 3                            | 4 fl oz                       | 16 fl oz | 14                   | Common and southern rust<br>Northern corn leaf blight<br>Southern corn leaf blight | Do not apply more than 4 applications per season   |
| Quadris<br>(Azoxystrobin)   | 11                           | 15.4 fl oz                    | 3.75 qt  | 7                    | Common and southern rust<br>Northern corn leaf blight<br>Southern corn leaf blight | Do not exceed 2 sequential and 6 total appl. of Quadris or other group 11 fungicides   |
| Quilt<br>(Azoxystrobin/<br>Propiconazole)   | 11, 3                        | 14 fl oz                      | 56 fl oz | 14                   | Common and southern rust<br>Northern corn leaf blight<br>Southern corn leaf blight | Alternate Quilt with Tilt or another product with a mode of action other than a group 11 fungicide                                 |
| Serenade Max<br>( <i>Bacillus subtilis</i> strain<br>QST 713)   |                              | 3 lb                          |          | 0                    | Common and southern rust<br>Northern corn leaf blight<br>Southern corn leaf blight |  |
| Sonata<br>( <i>Bacillus pumilus</i> strain<br>QST 2808)   |                              | 4 qt                          |          | 0                    | Common and southern rust<br>Northern corn leaf blight<br>Southern corn leaf blight |  |
| Stratego EC<br>(Trifloxystrobin/propiconazole)  | 11, 3                        | 10 fl oz                      | 30 fl oz | 14                   | Common and southern rust<br>Northern corn leaf blight<br>Southern corn leaf blight | Alternate with a fungicide of dissimilar mode of action  |
| Sulfur 90W<br>(Sulfur)  | M2                           |                               |          |                      |  | Do not apply during periods of warm weather  |
| Topaz<br>(Potassium phosphite)  |                              | 3 qt                          | 18 qt    | 0                    | Various (see label)  | Do not make more than six applications per season  |
| Trilogy<br>(Neem oil)   |                              | 2 gal                         |          |                      | Various (see label)  | Apply at a rate of 0.5% - 1.0% in 25 to 100 gallons of water per acre or at 2 pt in a minimum of 5 GPA for low volume applications |
| Yellow Jacket Wettable<br>Sulfur<br>(Sulfur)  | M2                           | 5 lb                          |          |                      | Various (see label)  | Do not apply during periods of warm weather  |

**Table 9.** Selected insecticides approved for use on insects attacking sweet corn.

| Trade Name<br>(Common Name)   | Rate<br>(product/acre)  | REI<br>(hours)                               | Days to<br>Harvest                | Insects  | MOA<br>Code <sup>1</sup> | Notes   |
|---|---|--|-----------------------------------|--|--------------------------|---|
| <b>Agree WG</b><br>( <i>Bacillus thuringiensis</i><br>subspecies <i>aizawai</i> )   | 1.0-2.0 lb  | 4  | 0                                 | lepidopteran larvae (cat-<br>erpillar pests)   | 11B1                     | Apply when larvae are small for<br>best control. OMRI-listed <sup>2</sup> .   |
| <b>*Ambush 25W</b><br>(permethrin)  | 6.4-16 oz   | 12   | 1                                 | aster leafhopper, corn<br>earworm, corn rootworm<br>(adults), cutworms, fall<br>armyworm   | 3                        | Do not apply more than 1.2 lb ai/<br>acre per season.   |
| <b>*Asana XL (0.66EC)</b><br>(esfenvalerate)  | 5.8-9.6 fl oz   | 12   | 1                                 | aphids, armyworms,<br>banded cucumber beetle,<br>beet armyworm (aids in<br>control), chinch bugs,<br>corn borer, corn ear-<br>worm, corn rootworm,<br>corn silk fly, cutworms,<br>flea beetles, grasshop-<br>pers, sap beetle (adults),<br>stalkborers, tarnished<br>plant bug | 3                        | Do not apply more than 0.5 lb ai/<br>acre per season (10 applications<br>at highest rate).  |
| <b>Avaunt</b><br>(indoxacarb)   | 2.5-3.5 oz  | 12, (14<br>days for<br>hand har-<br>vesting) | 3, (35 for<br>fodder &<br>stover) | corn earworm, fall army-<br>worm   | 22                       | Whorl application (before silking)<br>only. No more than 4 applications<br>per<br>season.   |
| <b>Aza-Direct</b><br>(azadirachtin)   | 1-2 pts, up to 3.5<br>pts, if needed                              | 4  | 0                                 | aphids, beetles, cat-<br>erpillars, leafhoppers,<br>leafminers, mites, stink<br>bugs, thrips, weevils,<br>whiteflies   | un                       | Antifeedant, repellent, insect<br>growth regulator. OMRI-listed <sup>2</sup> .  |
| <b>Azatin XL</b><br>(azadirachtin)  | 5-21 fl oz  | 4  | 0                                 | aphids, beetles, caterpil-<br>lars, leafhoppers, leaf-<br>miners, thrips, weevils,<br>whiteflies   | un                       | Antifeedant, repellent, insect<br>growth regulator.   |
| <b>*Baythroid XL</b><br>(beta-cyfluthrin)   | 0.8-2.8 fl oz   | 12   | 0                                 | chinch bugs, common<br>stalk borers, corn ear-<br>worm, corn rootworm<br>adult, corn silk fly, cut-<br>worms, fall armyworm<br>(1st and 2nd instars<br>only), grasshoppers, true<br>armyworm   | 3                        | Maximum number of applications:<br>10. Maximum amount allowed per<br>season: 28 fl oz/acre.   |
| <b>Belt SC</b><br>(flubendiamide)   | 2.0-3.0 fl oz   | 12   | 1                                 | armyworms, black cut-<br>worm, corn earworm,<br>European corn borer  | 28                       | Do not apply more than 12 fl oz/<br>acre per season.  |
| <b>Biobit HP</b><br>( <i>Bacillus thuringiensis</i><br>subspecies <i>kurstaki</i> ) | 0.5-2.0 lb  | 4  | 0                                 | caterpillars (will not con-<br>trol large armyworms)   | 11                       | Treat when larvae are young.<br>Good coverage is essential. Can<br>be used in the greenhouse. OMRI-<br>listed <sup>2</sup> .                          |
| <b>BotaniGard 22 WP,<br/>ES</b><br>( <i>Beauveria bassiana</i> )                    | <b>WP:</b><br>0.5-2 lb/100 gal<br><b>ES:</b><br>0.5-2 qts/100 gal | 4  | 0                                 | aphids, thrips, whiteflies   | --                       | May be used in greenhouses.<br>Contact dealer for recommenda-<br>tions if an adjuvant must be used.<br>Not compatible in tank mix with<br>fungicides. |

Table 9. Continued.

| Trade Name<br>(Common Name)   | Rate<br>(product/acre)  | REI<br>(hours) | Days to<br>Harvest   | Insects  | MOA<br>Code <sup>1</sup> | Notes  |
|---|---|----------------|--|--|--------------------------|--|
| <b>Cobalt</b><br>(chlorpyrifos, gamma-cyhalothrin)                                | 13-38 oz  | 24             | 21   | aphids, armyworms, beetles, billbugs, chinch bugs, grasshoppers, green cloverworm, lesser cornstalk borer, stalk borer, stink bugs   | 1B, 3                    | See label for application methods and restrictions.  |
| <b>*Counter 15G<br/>Lock 'n Load</b><br>(terbufos)                                | 6.0-8.0 oz per 1000 ft of row, banded or in furrow<br>post emergence incorporated, 8 oz per 1000 ft of row at cultivation | 48             | 60   | billbugs, chinch bugs <sup>(1)</sup> , corn rootworm, cutworms (suppression), flea beetles, lesser corn stalk borer (suppression), maize billbug, seedcorn beetle, seedcorn maggot, symphylans, thrips, white grubs, wireworms | 1B                       | <sup>(1)</sup> Early season control of light to moderate infestations. Only one application (at-planting, post-emergence incorporated, or cultivation time treatment) per season. Do not exceed 8.7 lb/acre.                           |
| <b>Crymax WDG</b><br>( <i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i> ) | 0.5-2.0 lb  | 4              | 0  | caterpillars   | 11                       | Use high rate for armyworms. Treat when larvae are young.  |
| <b>Deliver</b><br>( <i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i> )    | 0.25-1.5 lb   | 4              | 0  | caterpillars   | 11                       | Use higher rates for armyworms. OMRI-listed <sup>2</sup> .   |
| <b>DiPel DF</b><br>( <i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i> )   | 0.5-2.0 lb  | 4              | 0  | caterpillars   | 11                       | Treat when larvae are young. Good coverage is essential. OMRI-listed <sup>2</sup> .  |
| <b>Entrust</b><br>(spinosad)  | 0.5-2 oz  | 4              | 1 day - ears<br>7 day - forage                                 | armyworms, beet armyworm, corn earworm   | 5                        | Do not apply more than 9 oz per acre per year. OMRI-listed <sup>2</sup> .  |
| <b>Extinguish</b><br>((S)-methoprene)   | 1-1.5 lb  | 4              | 0  | fire ants  | 7A                       | Slow-acting IGR (insect growth regulator). Best applied early spring and fall where crop will be grown. Colonies will be reduced after three weeks and eliminated after 8 to 10 weeks. May be applied by ground equipment or aerially. |
| <b>*Force 3G</b><br>(tefluthrin)  | depends on row spacing  | 0              | at planting or cultivation within 30 days of seeding emergence | billbugs <sup>(1)</sup> , chinch bugs <sup>(1)</sup> , corn rootworm, cutworms, lesser cornstalk borer, red imported fire ant <sup>(2)</sup> , seedcorn beetle, seedcorn maggot, white grubs, wireworms                        | 3                        | Only one application per crop. Granules must be incorporated.<br><sup>(1)</sup> suppression only<br><sup>(2)</sup> suppression for 28 days   |
| <b>*Furadan 4F, *LFR</b><br>(carbofuran)  | 2.5 oz/1000 ft  | 48             | at planting  | corn rootworms, flea beetles, seedcorn maggot, wireworms   | 1A                       | See restrictions for very sandy soil.  |
| <b>Gaucho 480F</b><br>(imidacloprid)  | 1-8 fl oz/cwt of seed   | 12             | seed treatment   | cornleaf aphid (early season), flea beetles, imported fire ant, seedcorn maggot, wireworms   | 4A                       | See label for detailed directions.   |
| <b>Javelin WG</b><br>( <i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i> ) | 0.12-1.50 lb  | 4              | 0  | most caterpillars, but not <i>Spodoptera</i> species (armyworms)   | 11                       | Treat when larvae are young. Thorough coverage is essential. OMRI-listed <sup>2</sup> .  |

Table 9. Continued.

| Trade Name<br>(Common Name)   | Rate<br>(product/acre)                                   | REI<br>(hours)        | Days to<br>Harvest                         | Insects   | MOA<br>Code <sup>1</sup> | Notes   |
|---|--|-----------------------|--|---|--------------------------|---|
| <b>*Lannate LV, *SP</b><br>(methomyl)   | <b>LV:</b><br>0.75-1.5 pts<br><b>SP:</b><br>0.25-0.50 lb | 48                    | 0 - ears<br>3 - forage<br>21 - sto-<br>ver | aphids, armyworm, beet<br>armyworm, corn ear-<br>worm, corn rootworm<br>adults, fall armyworm,<br>flea beetles, picnic bee-<br>tles, variegated cutworm           | 1A                       | Certain hybrid varieties are sus-<br>ceptible to methomyl injury. Treat<br>a small area to determine safety<br>first.   |
| <b>*Larvin 3.2</b><br>(thiodicarb)  | 20-30 fl oz  | 48                    | 0  | beet armyworm, cut-<br>worms, corn earworm,<br>fall armyworm, southern<br>armyworm  | 1A                       | Do not allow livestock to graze<br>treated field. Do not feed treated<br>corn silage or fodder to livestock.<br>See label for special instructions<br>for cutworms. |
| <b>Lepinox WDG</b><br>( <i>Bacillus thuringiensis</i><br>subspecies <i>kurstaki</i> ) | 1.0-2.0 lb   | 12                    | 0  | for most caterpillars,<br>including beet armyworm<br>(see label)  | 11                       | Treat when larvae are small.<br>Thorough coverage is essential.   |
| <b>*Lorsban 75WG</b><br>(chlorpyrifos)  | 0.33-1.33 lb   | 24                    | 21 (grain<br>or ears)                      | aphids, beet armyworm,<br>chinch bugs, corn ear-<br>worm, corn rootworm<br>adult, cutworms, fall<br>armyworm, grasshoppers  | 1B                       | Do not feed treated corn silage,<br>forage, or fodder, or allow live-<br>stock to graze.  |
| <b>15G, 75 WG</b>   | See label for<br>rates.                                  | 24                    | at plant-<br>ing                           | billbugs, corn rootworm<br>larvae, cutworms, lesser<br>corn stalk borer, seed<br>corn maggot, symphy-<br>lans, wireworms  | 1B                       | See label.  |
| <b>*Mocap 15G</b> (ethop-<br>rop)   | See label.   | 48                    | at plant-<br>ing                           | corn rootworms, cut-<br>worms, symphylans,<br>wireworms, (suppression<br>of white grubs)  | 1B                       |   |
| <b>M-Pede 49% EC</b><br>Soap, Insecticidal  | 1-2% V/V   | 12                    | 0  | aphids, armyworms, leaf-<br>hoppers, mites, thrips  | --                       | OMRI-listed <sup>2</sup> .  |
| <b>*Mustang Max EC,<br/>EW</b><br>(zeta-cypermethrin)                                 | 2.24-4.0 oz  | 12                    | 3  | aphids, armyworms,<br>chinch bug, corn bor-<br>ers, corn earworm, corn<br>silkyfly, cutworms, flea<br>beetles, grasshoppers,<br>leafhoppers, sap beetle<br>adults | 3                        | Maximum of 0.15 lb ai/acre per<br>season.   |
| <b>Neemix 4.5</b><br>(azadirachtin)   | 4-16 fl oz   | 12                    | 0  | aphids, armyworms, corn<br>earworm, thrips  | un                       | OMRI-listed <sup>2</sup> .  |
| <b>Oil, insecticidal</b>  | 1-2 gal/100 gal,<br>depending on<br>brand                | 4                     | 0  | aphids, armyworms, corn<br>earworms, corn root-<br>worms, mites, thrips   | --                       |   |
| <b>*PennCap-M 2EC</b><br>(methyl parathion)   | 1-3 pt   | 4 days -<br>See label | 4  | aphids, corn earworm,<br>corn rootworm adult,<br>cutworms, flea beetles,<br>grasshoppers, sap<br>beetles, silk fly, true<br>armyworm                              | 1B                       | See restrictions on label.  |

Table 9. Continued.

| Trade Name<br>(Common Name)                                    | Rate<br>(product/acre)                            | REI<br>(hours)        | Days to<br>Harvest                           | Insects  | MOA<br>Code <sup>1</sup> | Notes   |
|--|---|-----------------------|--|--|--------------------------|---|
| <b>*Pounce 1.5 G</b><br>(permethrin)                           | 8 oz/1000 ft                                      | 12                    | at plant-<br>ing                             | armyworms, cutworms  | 3                        |   |
|  | 6.7-13.3 lb                                       |                       | pre-emer-<br>gence                           | armyworms, cutworms,<br>stalk borers   | 3                        |   |
|  | 6.7-13.3 lb                                       |                       | foliar - 1                                   | armyworms, corn borers,<br>cutworms, stalk borers  | 3                        |   |
| <b>Proaxis Insecticide</b><br>(gamma-cyhalothrin)              | 2.56-3.84 fl oz                                   | 24                    | 1 - ears<br>21 - for-<br>age or<br>fodder    | beet armyworm, chinch<br>bug, corn earworm,<br>cutworms, fall army-<br>worm(1), flea beetles,<br>grasshoppers, sap bee-<br>tles, southern armyworm,<br>sting bugs, yellowstriped<br>armyworm | 3                        | (1) 1 <sup>st</sup> or 2 <sup>nd</sup> instars  |
| <b>Pyrellin EC</b> (pyrethrin<br>+ rotenone)                   | 1-2 pt  | 12                    | 12 hours                                     | aphids, flea beetles, leaf-<br>hoppers, loopers, mites,<br>thrips  | 3, 21                    |   |
| <b>Radiant SC</b><br>(spinetoram)                              | 3-6 fl oz   | 4                     | 1 - grain<br>3 - forage<br>or fodder         | armyworms, corn ear-<br>worm   | 5                        | No more than 6 applications per<br>year.  |
| <b>Sevin 80S; 4F; XLR</b><br>(carbaryl)                        | <b>80S:</b> 1.25-2.5 lb<br><b>4F; XLR:</b> 1-2 qt | 12                    | 2 - Ears<br>14 -<br>Forage<br>48 -<br>Fodder | armyworms, chinchbugs,<br>corn earworms, corn<br>rootworm adult, cut-<br>worms, fall armyworm,<br>flea beetles, leafhoppers,<br>sap beetles  | 1A                       | Highly toxic to bees.   |
| <b>SpinTor 2 SC</b><br>(spinosad)                              | 1.5-6 fl oz                                       | 4                     | 1  | armyworms, corn ear-<br>worm   | 5                        | Do not apply more than 29 fl oz<br>per acre per year.   |
| <b>*Telone C-35</b> (dichlo-<br>ropropene + chloropi-<br>crin) | See label.  | 5 days -<br>See label | preplant                                     | symphylans, wireworms  | --                       | See supplemental label for use<br>restrictions in south and central<br>Florida.   |
| <b>*Telone II</b><br>(dichloropropene)                         |   |                       |  |  |                          |   |
| <b>*Thimet 20-G</b><br>(phorate)                               | See label. No<br>more than 6.5 lb                 | 48                    | at plant-<br>ing, see<br>label               | corn rootworms, flea<br>beetles, mites, seedcorn<br>beetle, seed corn maggot,<br>white grubs, wireworms  | 1B                       | One application per season.   |
| <b>*Thionex 3EC</b><br><b>*Thionex 50W</b> (endo-<br>sulfan)   | 1.33-2 qt<br>2-3 lb                               | 24                    | 1  | corn earworm, corn leaf<br>aphid, whiteflies   | 2                        | Do not apply to sweet corn to be<br>processed or used to feed live-<br>stock. Do not make more than 3<br>applications per year.               |
| <b>Trilogy</b><br>(extract of neem oil)                        | 0.5-2.0% V/V                                      | 4                     | 0  | aphids, mites, sup-<br>pression of thrips and<br>whiteflies  | un                       | Apply morning or evening to<br>reduce potential for leaf burn.<br>Toxic to bees exposed to direct<br>treatment.<br>OMRI-listed <sup>2</sup> . |

Table 9. Continued.

| Trade Name<br>(Common Name)   | Rate<br>(product/acre)   | REI<br>(hours) | Days to<br>Harvest                | Insects   | MOA<br>Code <sup>1</sup> | Notes  |
|---|--|----------------|-----------------------------------|---|--------------------------|--|
| * <b>Warrior II</b> (lambda-cyhalothrin)  | 0.33 fl oz per 1000 ft of row (at plant)<br><br>0.96-1.92 fl oz (foliar) | 24             | 1<br><br>21 for feeding livestock | aphids <sup>(1)</sup> , aster leafhopper, beet armyworm, chinch bugs, corn earworm, corn rootworm, cutworms, fall armyworm, flea beetles, grasshoppers, mites <sup>(1)</sup> (see label for more details), southern armyworm, stink bugs, tarnished plant bug, yellowstriped armyworm | 3                        | ( <sup>1</sup> ) suppression only.   |
| <b>Xentari DF</b><br>( <i>Bacillus thuringiensis</i> subspecies <i>aizawai</i> )  | 0.5-2.0 lb   | 4              | 0                                 | caterpillars  | 11                       | Treat when larvae are young. Thorough coverage is essential. May be used in the greenhouse. Can be used in organic production. |
| <p><b>The pesticide information presented in this table was current with federal and state regulations at the time of revision. The user is responsible for determining the intended use is consistent with the label of the product being used. Use pesticides safely. Read and follow label instructions.</b></p>   |  |                |                                   |   |                          |  |
| <p><sup>1</sup> Mode of Action codes for vegetable pest insecticides from the Insecticide Resistance Action Committee (IRAC) Mode of Action Classification v. 6.1 August 2008.</p> <p>1A. Acetylcholinesterase inhibitors, Carbamates (nerve action)<br/> 1B. Acetylcholinesterase inhibitors, Organophosphates (nerve action)<br/> 2A. GABA-gated chloride channel antagonists (nerve action)<br/> 3. Sodium channel modulators (nerve action)<br/> 4A. Nicotinic acetylcholine receptor agonists (nerve action)<br/> 5. Nicotinic acetylcholine receptor allosteric activators (nerve action)<br/> 6. Chloride channel activators (nerve and muscle action)<br/> 7A. Juvenile hormone mimics (growth regulation)<br/> 7C. Juvenile hormone mimics (growth regulation)<br/> 9B and 9C. Selective homopteran feeding blockers<br/> 10. Mite growth inhibitors (growth regulation)<br/> 11. Microbial disruptors of insect midgut membranes<br/> 12B. Inhibitors of mitochondrial ATP synthase (energy metabolism)<br/> 15. Inhibitors of chitin biosynthesis, type 0, lepidopteran (growth regulation)<br/> 16. Inhibitors of chitin biosynthesis, type 1, homopteran (growth regulation)<br/> 17. Molting disruptor, dipteran (growth regulation)<br/> 18. Ecdysone receptor agonists (growth regulation)<br/> 22. Voltage-dependent sodium channel blockers (nerve action)<br/> 23. Inhibitors of acetyl Co-A carboxylase (lipid synthesis, growth regulation)<br/> 28. Ryanodine receptor modulators (nerve and muscle action)<br/> un. Compounds of unknown or uncertain mode of action</p> <p><sup>2</sup> OMRI listed: Listed by the Organic Materials Review Institute for use in organic production.</p> <p><b>* Restricted Use Only.</b></p> |  |                |                                   |   |                          |  |

**Table 10.** Breakeven production costs for sweet corn at various yield levels in the Miami-Dade County area, 2005-2006.

|                   | Cost per acre | Yield (crates/acre) |         |         |         |         |
|-------------------|---------------|---------------------|---------|---------|---------|---------|
|                   |               | 250                 | 275     | 300     | 325     | 350     |
| Variable Costs    | \$2,007.93    | \$8.03              | \$7.30  | \$6.69  | \$6.18  | \$5.74  |
| Fixed Costs       | \$1,579.61    | \$6.32              | \$5.74  | \$5.27  | \$4.86  | \$4.51  |
| Harvest Cost/unit |               | \$3.28              | \$3.28  | \$3.28  | \$3.28  | \$3.28  |
| Total Cost/unit   |               | \$17.63             | \$16.33 | \$15.24 | \$14.32 | \$13.53 |

**Table 11.** Breakeven production costs for sweet corn at various yield levels in the Palm Beach County area, 2005-2006.

|                   | Cost per acre | Yield (cwt/acre) |         |         |         |         |
|-------------------|---------------|------------------|---------|---------|---------|---------|
|                   |               | 200              | 225     | 250     | 275     | 300     |
| Variable Costs    | \$1,805.17    | \$9.03           | \$8.02  | \$7.22  | \$6.56  | \$6.02  |
| Fixed Costs       | \$1,528.26    | \$7.64           | \$6.79  | \$6.11  | \$5.56  | \$5.09  |
| Harvest Cost/unit |               | \$3.28           | \$3.28  | \$3.28  | \$3.28  | \$3.28  |
| Total Cost/unit   |               | \$19.95          | \$18.10 | \$16.61 | \$15.40 | \$14.39 |