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UNIVERSITY OF KENTUCKY — COLLEGE OF AGRICULTURE

# Ornamental Corn Production in Kentucky

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There are many kinds of ornamental corn (Table 1) that vary in ear size (none, miniature, large), kernel color, husk, and stalk color. Some of the most popular cultivars are colorful miniature popcorns. Some cultivars have red or purple stalks and leaves that are sold for decorative purposes. Like other types of corn, ornamental corn is easily cross-pollinated, which often results in variable ear color.

**Figure 1.** Miniature Blue, Little Boy Blue, and Cutie Pops all produce attractive shiny blue ears.

**Figure 2.** Miniature Pink, Little Bo Peep, Little Miss Muffet and Cutie Pink produce shiny pink ears.

**Figure 3.** Robust Ruby Red produces deep red medium sized ears.

**Figure 4.** Autumn Explosion produces an attractive array of multicolored ears.

**Figure 5.** Green and Gold Dent has good ear fill and produces attractive gold and green kernels.

Note: These general guidelines for ornamental corn production are based on available literature and guidelines for popcorn and sweet corn production in Kentucky. Currently, ornamental corn production represents a new crop for Kentucky. Grower and University of Kentucky research is limited. Few pesticides have labels specific for ornamental corn. Always check product label for information on what may and may not be used.

There are six major types of corn: sweet, flour, waxy, dent, flint, and pop. Ear color has nothing to do with the way corn is classified. Instead, corn is grouped by the kernel type and, more specifically, the endosperm. The endosperm constitutes the vast majority of the kernel and is responsible for the different characteristics associated with the many different types of corn. Sweet corn varieties, for example, are often grouped by the type of sweetness genes (*su, se,* and *sh2*), which give the endosperm different characteristics. Dent corn has kernel surfaces that are indented due to the shrinkage of the starchy endosperm in the kernels. Popcorn is characterized by small, very hard, and sometimes pointed kernels. Many of the new ornamental corn cultivars have popcorn in their parentage because plant breeders have been trying to get smaller ears suitable for table arrangements and other indoor decorations.

An ear of corn is actually a female flower stalk hidden by a sheath of leaves. The only visible flower part is the silk—one strand per kernel. Most ornamental corns are late to produce pollen and silk. Ornamental corn silks are pollinated about 6 to 7 weeks before ears mature.

**Table 1.** Ornamental Corn Cultivars.

| Variety | Days to Maturity | Ear Color | Ear Size | Comments |
|---|---|---|---|---|
| **Mazes and Brooms** | | | | |
| Maze Corn | Early, Medium, Late | No ears | -- | Used for corn mazes, ears do not produce kernels without cross pollination from another cultivar. Reduces injury if ear is thrown. |
| Broom corn, Mixed Colors | 105 | No ears | -- | Colors include gold, deep brown, rusted wheat and white, looks like sorghum, traditionally used for brooms, nice for arrangements, crafts, brooms. |
| Big Chief | 120 | multicolored | (8 to 12) x 2.0 | Used as a maze corn. Large ears with good tip fill, very large stalks with ear height over 5 ft and plant height to 10-14ft . May lodge badly under wet, windy weather. |
| **Small Ears** | | | | |
| Indian Fingers | 110 | multicolored | (4 to 6.5) x 0.75 | Mini; bright colored shiny kernels, attractive ears. |
| Miniature Blue, Little Boy Blue, Cutie Pops | 100 | Shiny blue | 2 - 4 x 1.25 | Attractive popcorn, tiny shiny blue ears. Good stalks; small seed size may lead to high plant populations (Figure 1). |
| Miniature Pink; Little Bo Peep, Little Miss Muffet, Cutie Pink | 100 | Shiny pink | 2 - 4 x 1.25 | Attractive, tiny shiny pink ears, good stalks. Small seed size may lead to over seeding (Figure 2). |
| Robust Ruby Red | 105 | Burgundy, red | (5 to 6) x 1.2 | Popcorn, attractive ornamental red ears, healthy plant. Makes a pretty white, tender, popped corn (Figure 3). |
| Little Bell Ornamental | 100 | multicolored | (6 to 7) x 1.1 | Attractive ears; tolerant of lodging. Some red coloration in shucks and stalks helps sales as fodder shock. |
| **Larger Ears** | | | | |
| Autumn Explosion | 102 | multicolored | (8 to 9) x 1.4 | Heavy solid stalks, flint corn, some dark red stalks and husks, helps sales as shock (Figure 4). |
| Autumn Splendor | 105 | multicolored | (7 to 10) x 1.5 | Large ears, good yield and tip fill, 50% purple husks, resistant to lodging. |
| Earth Tones Dent | 90 | multicolored | (8 to 10) x 1.9 | Nice big, dark red ears; eye catching; good tip fill; some resistance to lodging. |
| Green and Gold Dent | 95 - 100 | Yellow and green | 8 to 10 x 1.6 | Excellent ear fill, bright yellow and green (Figure 5). |
| Indian Art 104 | 105 | multicolored | 8.6 x 1.5 | Excellent yield and ear fill, good resistance to lodging. |
| Shock Dent Corn | 103 | Dark yellow dent corn | 9 x 2 | Sold as a fodder corn shock; medium tall plant strong stalks with good eye appeal. Very tolerant to lodging. |

## Planting

Ornamental corn can be successfully grown in all areas of Kentucky, but a well-drained soil is essential to achieve high quality ears. A good seedbed is necessary for successful seed germination and a good plant stand. Fields that have been in fescue sod are ideal for ornamental corn production. Plow several weeks before planting to allow the ground to settle and grass or other plant debris to decompose. Planting early and immediately after initial plowing may increase the risk of damage from seedcorn maggots that feed on plant debris and newly planted seeds. (See *Seedcorn Maggots* [EntFact 309] for more information.) Disk the soil three to four times before planting to prepare a good seedbed.

If no-till production is planned, effective weed control will be critical. Although no-till production of ornamental corn has not been evaluated thoroughly, results from research on no-till field corn in Kentucky show increases of 15 to 32 bushels per acre in no-till corn versus conventional production. No-till ornamental corn can be planted into a cover crop such as vetch or a small grain such as rye. To kill the cover crop, spray a contact herbicide such as Roundup (3 pt/acre) tank mixed with Atrazine (2 lb/acre) before seeding. Same-day herbicide application after planting is commonly practiced. Additional information is available in the Sweet Corn section of *Vegetable Production Guide for Commercial Growers* (ID-36) and in *Notill Corn* (AGR-100).

Ornamental corn can also be grown on black plastic mulch, but this is probably not economically advisable. Early sweet corn grown on black plastic receives a price premium because it reaches the market before regular sweet corn. However, ornamental corn is grown for the fall market and would likely receive minimal benefits from the soil warming properties of black plastic mulch.

For best results, ornamental corn seed should be planted after the soil temperature has reached 55° to 60°F. Seed germination percentages of ornamental corn will be lower under cold, wet soil conditions. In most years the soil temperature at planting is adequate, since most ornamental corn should be planted between May 15 and 25 for a mid-September harvest. Sow seed 1 to 2 inches deep and 8 to 10 inches apart in the row for small-eared cultivars and 10 to 12 inches apart for large-eared cultivars. The rows may be 30 to 42 inches apart, depending on the equipment that is available to plant and cultivate. Ten to 15 pounds of seed will usually be required to plant an acre of ornamental corn. Use 6 to 10 pounds per acre for small kernel types, or enough seed to produce a plant population of 22,000 to 26,000 stalks per acre. Plant in blocks of at least 4 rows because corn is wind-pollinated and silks that are not pollinated will not produce kernels.

Isolation distances of 700 feet will give complete isolation from other types of corn (sweet, field). A distance of 250 feet will give some contamination, but not enough to materially affect quality. Isolation may also be maintained if there is a minimum of 14 days difference in the maturities of different types. Irrigation is essential to ensure high quality in the decorative ornamental corn market. A prolonged dry period can reduce pollination and ear fill, as well as ear tip fill. Be prepared to provide an inch of water a week until the silks have dried down and the ears are fully developed.

## Fertilizing

Make all lime, phosphorus ($P_2O_5$), and potassium ($K_2O$) fertilizer applications based on soil test results (Table 2). Ornamental corn is moderately tolerant of a pH range between 5.5 and 6.8. For best results, apply lime to soils to bring the pH to 6.5.

Total fertilizer needs may be applied before seeding, except for nitrogen, part of which is sidedressed when the corn is 12 to 18 inches tall. Where ornamental corn is planted on sod ground, broadcast at least half of the $P_2O_5$ and $K_2O$ fertilizer and plow down. The remaining $P_2O_5$ and $K_2O$ fertilizer can be applied broadcast just before planting and disked in. If banding equipment is available, fertilizer may be banded 2 to 3 inches to the side of the seed and 2 to 3 inches deeper. The amount of fertilizer banded at planting time should not exceed 45 pounds per acre of actual N or $K_2O$. Sidedress with 50 pounds of actual nitrogen (N) when plants are knee high. A total of 100 pounds of nitrogen per acre is all that should be applied to ornamental corn in order to reduce lodging and hasten good ear and husk drying at maturity. Keep in mind that hairy vetch, when used as a winter cover crop in no-till corn, has been found to provide up to 90 pounds of nitrogen per acre in Kentucky.

**Table 2.** Ornamental Corn Fertilizer Recommendations Based on Soil Test Results.

| **Phosphorus** | |
|---|---|
| **Soil test reading (lb/acre)** | **Lb phosphate $P_2O_5$ needed per acre** |
| Low - <30 | 121 - 180 |
| Medium - 31-60 | 61 - 120 |
| High - 61 - 80 | 1 - 60 |
| Very High - above 80 | 0 |
| **Potassium** | |
| Soil Test Reading | Lb Potash $K_2O$ |
| Low - 200 or Less | 151 - 200 |
| Medium - 201 - 300 | 101 - 150 |
| High - above 300 | 100 |
| **Nitrogen** | |
| **Lb actual N needed per acre** | |
| 50 to 60 lb/acre preplant. Apply at least 40 to 50 lb of actual N per acre as a sidedressing when plants are 12 to 24 inches high. A TOTAL of 100 lb N/acre is all that should be applied to ornamental corn. | |

Ornamental corn grown on high pH soils that are also very high in available phosphate may show zinc deficiency during some years. A soil sample should be analyzed for zinc if symptoms occur (Figure 6). Look for bleached or whitish leaves as they emerge, often called "white bud" by farmers. Signs of zinc deficiency may include leaves that have broad yellowish stripes located in from the leaf edge on either side of the midrib, leaves that have a water-soaked appearance, and leaves that become necrotic as the plant matures. A purplish leaf color close to maturity and shortened internodes are also symptoms of zinc deficiency. Shortened internodes are also symptoms of two diseases: corn stunt and maize dwarf mosaic virus.

**Figure 6.** Zinc deficiency symptoms on corn. Zinc deficiency of corn is routinely found on high pH, high phosphate soils in Kentucky. A common characteristic of zinc deficiency in corn is the white striping effect seen on the leaves.

## Reducing Losses to Insects

Since ornamental corn is harvested later in the year, it is subject to greater insect pressure than many types of sweet corn typically harvested earlier in the season (Table 3).

## Reducing Losses to Diseases

The importance of diseases in ornamental corn in Kentucky is largely unknown because of limited production in large plantings. The information below is based on experience with small plantings of ornamental corn in Kentucky, other corn production in Kentucky, and ornamental corn in other states.

It is important for Kentucky ornamental corn growers to identify problems and determine the need for disease control. Growers are urged to scout their plantings and to maintain records of diseases present, the time they occur, and the extent of damage. County Extension offices have access to the Plant Disease Diagnostic Laboratory to properly identify diseases and recommend control strategies.

Once a disease is properly identified and the level of activity has been determined, decide whether adjustments in the management scheme are necessary—both for the current season and for future crops. For example, is immediate replanting necessary? Is a fungicide warranted? Should the crop rotation scheme be changed as a result of the disease present? Will this disease impact harvest timing or harvest management?

Crop rotation is a sound practice for many reasons, but it is especially valuable in disease control. It is particularly important where reduced tillage is used. A minimum of every other year in corn is necessary to prevent pathogen build-up. Even then, some pathogens can blow into the field from adjacent plantings of corn.

Resistant commercial field corn cultivars exist for most major corn diseases. However, such is not the case with ornamental corn. Therefore, from a management standpoint, **assume that ornamental corn is susceptible to many corn diseases, and include cultural management steps designed to minimize diseases.** The two agronomic/horticultural practices most valuable for disease control in ornamental corn are crop rotation and resistant cultivars.

Seed treatment for corn planted in Kentucky is encouraged to prevent poor stand establishment from seed rots and seedling blights, especially in cool soils and minimum tillage situations. Fungicide sprays are seldom used on field corn for economic reasons, but they are used on sweet corn, especially on late plantings in wet seasons. Their value on ornamental corn is not known, but certain fungicides are listed below in case disease pressure and economics justify the need. **However, no labels specifically support the use of foliar fungicides or seed treatments on ornamental corn.** This does not mean the use of the materials listed below is not labeled, but neither does it mean that the pesticide company is providing product liability for the use.

Table 4 lists diseases suspected to cause the greatest concern for ornamental corn planted in Kentucky and some control suggestions.

## Reducing Losses to Weeds

In general, the use of herbicides should supplement good agricultural practices, which include:

- The use of high quality crop seed free of weed seed
- Good seedbed preparation
- High soil fertility and good crop rotation
- Practices that prevent weeds from producing mature seeds

Carefully follow all label recommendations and precautions. It is hazardous and illegal to use herbicides for purposes other than those specified on the approved label. Use herbicides only on crops for which they are approved and recommended. Use only recommended amounts. Besides wasting money, using too much material may damage the crop or leave a soil residue that may harm next season's crop.

Apply herbicides only at the time specified on the label, and observe recommended intervals between the time of treatment and time of planting or harvesting the crop. Guard against possible injury to nearby susceptible crops or plants.

## Precautions on Use of Herbicides Containing Atrazine near Ground or Surface Water

Herbicide products which contain atrazine (i.e., AAtrex, Bicep II, or Bullet) have special label restrictions for use near ground or surface waters. Current label guidelines emphasize the use of low rates, buffer zones, and conservation tillage practices as methods for reducing the risk of contamination of water sources. The maximum rate of these herbicide products for early preplant, preplant incorporated, or preemergence applications depends on soil erodibility as defined by the Natural Resources Conservation Services and on percent of ground covered with plant residue.

### *Rate Restrictions*

**Atrazine.** For soils that are not highly erodible the maximum use rate for atrazine is 2.0 pounds ai (active ingredient) per acre. For highly erodible soils the maximum rate is also 2.0 pound ai per acre if conservation tillage is utilized and at least 30 percent of the soil is covered with plant residue. If ground cover is less than 30 percent, the maximum atrazine rate is 1.6 pound ai per acre for highly erodible soils. If a postemergence treatment is used following a soil-applied atrazine treatment, the total amount of atrazine applied to a field should not exceed 2.5 pounds ai per acre per calendar year. The rate for postemergence applications should not exceed 2.0 pounds ai per acre if no previous atrazine applications were made.

**Setbacks.** Caution is needed when mixing, loading, or applying atrazine near sources of water. According to label directions, these products should not be mixed or loaded within 50 feet of wells (including abandoned wells, drainage wells, or sink holes), rivers, intermittent streams, lakes, or reservoirs. This setback does not apply to the use of properly designed impervious pads and properly diked mixing/loading areas.

These products should not be applied within 50 feet of wells or sink holes, within 66 feet of points where field surface water enters permanent or intermittent streams or rivers, or within 200 feet of lakes or reservoirs. If applied to highly erodible soils, the 66-foot buffer area must be planted to a crop or seeded with grass. When applied near tile riser pipes, applicators can choose to: 1) use a 66-foot setback buffer around the tile riser pipes; 2) apply atrazine if field is no-till and high crop residue management is used; or 3) incorporate atrazine in the soil to a depth of 2 to 3 inches.

Some situations will require a high level of management in order to comply with these restrictions. The maximum labeled rate of atrazine may not be sufficient to provide season-long control of some problem weeds. Therefore, more emphasis may be needed on using postemergence herbicides, tillage, or crop rotation to help manage such problem weeds as burcucumber, cocklebur, morningglory, giant ragweed, and velvetleaf.

## Harvesting and Handling

Ornamental corn must be harvested by hand when the husk is dry. When ears of ornamental corn have lost their green color and begin to dry down, they have reached full maturity. If warm, dry weather is expected, the ears may be left on the plants until sales are expected.

To harvest, break off ears with a quick downward motion. Be careful not to damage the ear or husk attached to it. Pick ears carefully so that the kernels are not damaged. Spread the ears out to dry in a shallow pile where there is good air circulation and under cover if the weather has been damp. Pull the husk back if it is not completely dry at harvest. Be careful not to tear the husks because they contribute to the value of the ears. The husk and ear may become moldy if they are not handled properly. Pulling the husk back allows slightly damp husks and ears to dry quickly. When husks and ears are dry, tie the ears together with twine or rubber bands in bunches of two or three around the base of the ears and allow them to dry in a warm, dark, airy place. If husks are too dry, they tend to pull off or break easily from the ears, decreasing their value. Should this occur, wait for a humid or rainy day to prepare the ears for sale.

**Do not** box or bag ears when they are first harvested, or they may mold. Mold may occur on both the husk and the ear if proper handling and storage techniques are not used.

Ears can be used for ornamental purposes after a week of drying. During and after drying, ornamental corn may be stored in open wooden apple or cabbage bins. Growers with small quantities often suspend the ears in cabbage or onion sacks in a dry location until time for marketing. The ears are usually sold in groups of three. The three ears are held together with rubber bands or with a plastic sleeve similar to that used for dried flower arrangements.

## Marketing

Ornamental corn is a seasonal item that varies substantially in demand from market to market. The corn is often sold in three-ear bunches but can also be sold as individual ears to the craft and decoration markets around Halloween. Direct market prices tend to be substantially higher than larger volume wholesale-type markets, especially in urban areas, often by a factor of four to five times the price. Auction prices in 2007 averaged $3-4.50 per dozen at various Kentucky produce auctions. Farmers' market prices were $6-12 per dozen depending on the market. There are good markets for limited quantities. Obviously you don't want to plant 20 acres. The $2.00 per dozen average price is probably typical for larger volume wholesale-type sales. Experience has shown that product available in late September generally has stronger demand than product coming to market closer to Halloween. Many farmers have had success marketing ornamental corn bundled together with other fall items, such as miniature pumpkins, gourds, miniature hay bales, and the like. These markets, while very profitable on a small to medium scale, can quickly become saturated, considering most individuals just make one purchase (Table 5).

**Table 3.** Ornamental Corn Insect Control Recommendations.

| Insect | Insecticide | Rate Per Acre | Comments |
|---|---|---|---|
| **Preplant** | | | |
| Wireworms | Aztec 4.67G | 3 oz/1000 row ft | Band, T-band or |
| | Capture 2 EC | 0.3 fl oz/1000 row ft | 5 to 7" band over open furrow |
| | Force 1.5 G | 8 to 10 oz/1000 row ft | Infurrow |
| | Fortress 5 G | 3 oz/1000 row ft | Band, T-band, or |
| | Lorsban | 4 pt | |
| | Lorsban | 13.5 lb | |
| | Wireworms are potentially a problem where corn follows grass or legume sod. There are no effective rescue treatments once damage is found in the field. | | |
| Cutworms | Capture 2 EC | 0.3 fl oz/1000 row ft | Apply as a T-band |
| | Cobalt 2.545 EC | 13 to 38 fl oz | |
| | Hero 1.24 EC | 2.6 to 6 fl oz | |
| | Lorsban | 2 to 4 pt | |
| | Lorsban | 6.75 to 13.7 lb | |
| | Mustang Max | 0.16 fl oz/1000 row ft | Banded or T-band |
| | Proaxis | 1.92 to 3.2 fl oz | |
| | Warrior T | 1.92 to 3.2 fl oz | |
| | Cutworms may be present in the field before planting. Early weed control, 2 to 3 weeks before planting, will reduce potential for cutworm problems. | | |
| **Planting Time** | | | |
| Rootworms, | Aztec 4.67 G | 3 oz/1000 row ft | Band, T-band or |
| | Capture 2 EC | 0.3 fl oz/1000 row ft | 5 to 7" band over open furrow |
| | Counter 15G | 8 oz/1000 row ft | Band or furrow. |
| | Force 1.5 G | 8 to 10 oz/1000 row ft | |
| | Fortress 5 G | 3 oz/1000 row ft | T-band or |
| | Lorsban | 8 oz/1000 row ft | Band or furrow. |
| | Corn rootworms are a problem of continuous corn. Rotation is the primary control strategy. | | |

| **Foliar Treatments** | | | | |
|---|---|---|---|---|
| **Insect** | **Insecticide** | **Rate Per Acre** | **Days to Harvest** | **Comments** |
| Armyworm and Fall Armyworm | Asana XL | 5.8 to 9.6 fl oz | 1 | Limit 96 fl oz/acre. |
| | Baythroid | 1.6 to 2.8 fl oz | 21 | |
| | Capture 2 EC | 2.1 to 6.4 fl oz | 30 | |
| | Hero 1.24 EC | 4 to 10.3 fl oz | 30 | |
| | Intrepid 2 F | 4 to 8 fl oz | 21 | |
| | Lannate | 1/4 to 1/2 lb | 0 | |
| | Mustang Max | 3.2 to 4.0 fl oz | 30 | |
| | Pounce 3.2 EC | 4 to 8 oz | 0 | |
| | Proaxis | 2.56 to 3.84 fl oz | 21 | |
| | Radiant 1 SC | 3 to 6 fl oz | 28 | |
| | Sevin | 1.25 to 2.5 lb | 0 | |
| | Tracer 4 SC | 1 to 3 fl oz | 28 | |
| | Warrior T | 2.56 to 3.84 fl oz | 21 | |

**Table 3.** Ornamental Corn Insect Control Recommendations.

**Foliar Treatments**

| Insect | Insecticide | Rate Per Acre | Days to Harvest | Comments |
|---|---|---|---|---|
| Corn Earworm | Asana XL | 5.8 to 9.6 fl oz | 1 | Limit 96 fl oz/acre. |
| | Baythroid | 1.6 to 2.8 fl oz | 21 | |
| | Capture 2 EC | 2.1 to 6.4 fl oz | 30 | |
| | Hero 1.24 EC | 4 to 10.3 fl oz | 30 | |
| | Lannate | 1/4 to 1/2 lb | 0 | |
| | Mustang Max | 1.76 to 4.0 fl oz | 30 | |
| | Pounce 3.2 EC | 4 to 8 fl oz | 0 | |
| | Proaxis | 1.92 to 3.84 fl oz | 21 | |
| | Sevin | 1-1/4 to 2-1/2 lb | 0 | |
| | Warrior T | 1.92 to 3.2 fl oz | 21 | |
| | Corn is potentially at risk to corn earworm egg | | | |
| Cutworms | Asana XL | 5.8 to 9.6 fl oz | 1 | Limit 96 fl oz/acre. |
| | Baythroid | 0.8 to 1.6 fl oz | 21 | |
| | Capture 2 EC | 2.1 to 6.4 fl oz | 30 | |
| | Cobalt 2.545 EC | 13 to 26 fl oz | 21 | |
| | Hero 1.24 EC | 2.6 to 6 fl oz | 30 | |
| | Lorsban | 2 to 3 pt | 35 | |
| | Mustang Max | 1.28 to 2.8 fl oz | 30 | |
| | Pounce 3.2 EC | 4 to 8 fl oz | 0 | |
| | Sevin | 2-1/2 lb | 0 | |
| European Corn Borer | Asana XL | 5.8 to 9.6 fl oz | 1 | Limit 96 fl oz/acre. |
| | Baythroid | 1.6 to 2.8 fl oz | 21 | |
| | B-t products | See labels | 0 | |
| | Capture 2 EC | 2.1 to 6.4 fl oz | 30 | |
| | Cobalt 2.545 EC | 26 to 38 fl oz | 21 | |
| | Hero 1.24 EC | 4 to 10.3 fl oz | 30 | |
| | Intrepid 2 F | 4 to 8 fl oz | 21 | |
| | Lorsban | 5 to 6 lb | 35 | |
| | Pounce 1.5 G | 6.7 to 13 lb | 0 | Limit 67 lb/acre. |
| | Pounce 3.2 EC | 4 to 8 fl oz | 0 | |
| | Proaxis | 2.56 to 3.84 fl oz | 21 | |
| | Radiant 1 SC | 3 to 6 fl oz | 30 | |
| | Sevin | 1-1/4 to 2-1/2 lb | 0 | |
| | Warrior T | 2.56 to 3.84 fl oz | 21 | |
| Flea Beetle | Asana XL | 5.8 to 9.6 fl oz | 1 | Limit 96 fl oz/acre. |
| | Baythroid | 0.8 to 1.6 fl oz | 21 | |
| | Capture 2 EC | 2.1 to 6.4 fl oz | 30 | |
| | Mustang Max | 2.72 to 4.0 fl oz | 30 | |
| | Pounce 3.2 EC | 4 to 8 fl oz | 0 | |
| | Proaxis | 2.56 to 3.84 fl oz | 21 | |
| | Sevin | 1-1/4 to 2-1/2 lb | 0 | |
| | Warrior | 2.56 to 3.84 fl oz | 21 | |

**Table 3.** Ornamental Corn Insect Control Recommendations.

| **Foliar Treatments** | | | | |
|---|---|---|---|---|
| **Insect** | **Insecticide** | **Rate Per Acre** | **Days to Harvest** | **Comments** |
| Grasshoppers | Asana XL | 5.8 to 9.6 fl oz | 1 | Limit 96 fl oz/acre. |
| | Baythroid | 2.1 to 2.8 fl oz | 21 | |
| | Capture 2 EC | 2.1 to 6.4 fl oz | 30 | |
| | Lorsban | 1/2 to 1 pt | 35 | |
| | Mustang Max | 2.72 to 4.0 fl oz | 30 | |
| | Sevin | 2/3 to 1-7/8 lb | 0 | |
| Sap Beetles | Asana XL | 5.8 to 9.6 fl oz | 1 | Limit 96 fl oz/acre. |
| | Baythroid | 1.6 to 2.8 fl oz | 21 | |
| | Capture 2 EC | 2.1 to 6.4 fl oz | 30 | |
| | Cobalt 2.545 EC | 13 to 42 fl oz | 21 | |
| | Hero 1.24 EC | 4 to 10.3 fl oz | 30 | |
| | Lannate | 1/4 to 1/2 lb | 0 | |
| | Mustang Max | 2.72 to 4.0 fl oz | 30 | |
| | Pounce 3.2 EC | 4 to 8 fl oz | 0 | |
| | Proaxis | 2.56 to 3.84 fl oz | 21 | |
| | Sevin | 1-1/2 to 2 lb | 0 | |
| | Warrior T | 2.56 to 3.84 | 21 | |
| Rice and Granary Weevils | Rice and Granary weevils will readily infest decorative and ornamental popcorn. Small quantities can be heat-sterilized in the oven at 155 | | | |
| Angoumois Grain Moth | Angoumois grain moth attacks decorative corn and popcorn in the field and in storage. Intensive sanitation and fumigation are required to maintain control. | | | |

Corn Earworm and European Corn Borer larvae cause ear damage in many unsprayed ornamental corn fields, making the damaged ears unmarketable.

**Table 4.** Disease Control Recommendations.

| Disease | Control Strategies/Remarks |
|---|---|
| Damping-Off, Seed Rot | Early planting is usually not important in Kentucky. Seed decays are favored by poor quality seed and planting deep in cold, wet soils. When planting early, plant seed shallow in warm (above 60°F), well-drained soils. Consider the value of seed commercially pretreated with the fungicides Thiram or Apron 25W. Apron is highly effective against most pythiums, while Thiram has a much broader spectrum, but is less effective than Apron against pythium. Captan 50 WP can be applied at 1 tsp per lb of seed for corn. |
| Stalk and Ear Rots | These are potentially among the most destructive of ornamental corn diseases. Stalk and ear rots are caused by a complex of fungi and/or bacteria. Stalk rot development is favored by warm (82°- 86°F), dry weather early in the growing season followed by extended periods of rainfall shortly after silking. Unbalanced fertility (low K), high plant populations, and plant damage from hail, insects, and other diseases also favor stalk and ear rot development. Pathogens overwinter primarily as saprophytes on crop residue. Early maturing cultivars tend to be more susceptible. Controls include: 1. avoiding very susceptible varieties, 2. crop rotation, 3. sanitation, 4. balanced fertility, especially adequate K, and 5. avoiding high plant populations. Hopi Blue and Red Strawberry popcorn varieties had severe stalk and ear rot problems when tested at Quicksand. |
| Bacterial Wilt (Stewart's Wilt) | In general, ornamental corn is considered to be susceptible to Stewart's Wilt, although little information is available on how different cultivars react to the disease. The causal agent (a bacterium) overwinters in and is spread by adult flea beetles. Control of Stewart's Wilt is based on preventing feeding by the adult flea beetles with an insecticide program, especially following mild winters. Early flea beetle control is most critical because seedling infections are often lethal. The susceptibility of ornamental corn has not been fully researched, so assume they are susceptible. |
| Colonization of Shucks/Husks by Saprophytic and Parasitic Fungi | Since ornamental corn is used for a variety of decorations, the extent of discoloration of the shucks/husks resulting from anything, including fungal (mold) activity, is an important consideration. Ornamental corn for use indoors has the highest requirement for clearness of the shucks/husk, especially the smaller ears used for table decorations. As the shucks/husks age, they become increasingly susceptible to a large number of parasitic and saprophytic fungi, especially during periods of humid weather. It is important to timely harvest, promptly dry, and correctly store the ears to minimize colonization of the shucks/husks. Avoid high humidity and ensure good ventilation to all parts of the ear during handling and storage. Fungicides applied for leaf blights may assist in reducing the potential for molds of the shucks/husks. However, none of the fungicides are labeled specifically for this use or for ornamental corn, so pay special attention to the waiting intervals between application and harvest. |
| Helminthosporium Leaf Blights, Anthracnose Leaf Blight | In general, the potential for leaf spots and blights increases with later planting dates, especially when planting near older corn with active disease. Crop rotation away from corn for 2 to 3 years and clean tillage help greatly to reduce most pathogens involved and thus lower disease risk. However, southern corn leaf blight is also windborne, so fields should be checked regularly for leaf spot diseases. Fungicide sprays may be warranted on problem fields, if significant disease appears, especially before tasselling. Be especially watchful during protracted periods of rainy weather. No fungicide labels were found with specific labels for ornamental corn. However, the following uses are labeled on sweet corn and should give similar levels of disease control in ornamental corn. Spray at 4 to 14 day intervals with any of the following: Maneb 80 WP @ 1.5 lb/A, Mancozeb 80 WP @ 1.5 lb/A or Bravo 720 @ 2 pts/A. (See labels for a number of restrictions.) |
| Rust | In Kentucky, rust is mainly a problem on later plantings because airborne spores arrive annually from further south, so watch early plantings closely to determine risk on later plantings. The ornamental corn plant should be able to tolerate moderate rust (up to 80% of the leaves with pustules) without markedly impacting yield. However, early infections in the plant's life could cause marked damage in a wet season. Apply one of the fungicides listed under leaf blights. Early application may be necessary on late plantings to avoid serious crop damage in hot, humid seasons. Resistance to rust has not been fully described in ornamental corn, so assume susceptibility. |
| Smut | The black smutty spore masses are totally unacceptable in ornamental corn, mainly for appearance reasons. During harvesting and handling be especially careful to avoid any smutted ears because the black spores are oily and are easily spread to clean husks/shucks. Smut potential is greatest in hot, dry weather and following stress, especially hail, and planting on sites with a history of corn. No fungicides are available, and the tolerance of ornamental corn is not fully characterized. Controlling corn borers (especially late season activity) should help reduce smut. The crop rotation intervals used for foliage diseases are helpful, but much longer rotations are required for troublesome sites. |
| Virus Complex (Maize Dwarf Mosaic and others) | Virus diseases could markedly impact ornamental corn because of stunting and poor seed set (nubby ears or no ears at all) from infected plants. The viruses involved are transmitted to corn by insects (aphids and leaf hoppers). Infected corn and sorghum crops and grassy weeds serve as hosts of the viruses. Johnsongrass is a particularly important overwintering source of the main viruses involved. Late plantings have greater risks than early plantings, especially those nearest older corn, sorghum, or Johnsongrass. Control Johnsongrass within and adjacent to the field. Adequate information on resistance among ornamental corn is lacking. Planting early to avoid peak populations of insects is helpful. Attempts to kill the insects involved have little impact on the control of these diseases in corn. |

**Table 5.** Ornamental Corn Weed Control Recommendations.*

| Herbicide (Product Amount per Acre) | Herbicide (lb Active Ingredient per Acre) | General Comments |
|---|---|---|
| **Preplant or Preemergence** | | |
| Dual II Magnum 1.33 to 1.67 pt | s-Metolachlor 1.3 to 1.6 | Apply preplant incorporated or preemergence for control of annual grasses and certain broadleaf weeds. May be applied up to 30 days before planting as a single application or split application and/or tank mixed with atrazine. May also be applied as a broadcast treatment after planting but before weeds have emerged and before corn exceeds 5 inches tall. Small grains may be planted 4.5 months, alfalfa 4 months, and clover 9 months following treatment. Other crops may require a 12-month waiting period. |
| Degree 3.8CS 3.25 to 4.25 pt (others) | Acetochlor 1.5 to 2 | Apply preplant incorporated, preemergence, or early postemergence (for corn up to 11 inches tall) for control of annual grasses and certain broadleaves. May be applied up to 30 days before planting. |
| Prowl 3.3E 2.4 to 3.6 pt | Pendimethalin 1 to 1.5 | Apply to soil surface after corn planting. Plant corn at least 1.5 inches deep. Do not incorporate Prowl or severe corn injury will occur. |
| Outlook 6E 1 4 to 21 oz | Dimethenamid-P 0.66 to 0.98 | Apply preplant incorporated, preemergence or early postemergence for control of annual grasses and certain broadleaves. May be applied up to 30 days before planting as a single or split application and/or when tank mixed with other herbicides. May be applied after planting, but as a broadcast treatment before corn exceeds 12 inches in height but prior to weed emergence. |
| Aatrex 4L 3 to 4 pt or Aatrex Nine-O 1.6 to 2.2 lb | Atrazine 1.5 to 2 | Apply preplant incorporated or preemergence. Follow mixing instructions closely. If applied after June 10, do not rotate with crops other than corn or sorghum the next year or crop injury may occur. Do not plant tobacco or vegetables (including dry beans), spring-seeded small grains, or small-seeded legumes and grasses the year following application, or injury may occur. |
| Bicep II Magnum 1.6 to 2.1 qt | s-Metolachlor 1.0 to 1.3 + Atrazine 1.2 to 1.6 | Apply preplant incorporated, preplant surface, or preemergence. May be applied up to 30 days before planting as a single application. May be applied after planting, but as a broadcast treatment before corn exceeds 5 inches in height and weeds pass the 2-leaf stage. If applied after June 10, do not rotate with crops other than corn or sorghum the next year or crop injury may occur. Do not plant tobacco or vegetables (including dry beans), spring-seeded small grains, or small-seeded legumes and grasses the year following application, or injury may occur. |
| Degree Xtra 4.04CS 2.9 to 3.7 qt (others) | Acetochlor 1.95 to 2.49 + Atrazine 0.97 to 1.23 | Apply preplant incorporated, preemergence, or early postemergence before weed seedlings reach the 2-leaf stage and corn is no more than 11 inches in height. Do not rotate to crops other than corn, soybean, sorghum (milo), wheat, or tobacco. |
| Guardsman Max 5S 3 to 4.6 pt | Dimethenamid-P 0.64 to 0.98 + Atrazine 1.2 to 1.9 | Apply preplant incorporated or preemergence for control of annual grasses and broadleaf weeds. May be applied up to 30 days before planting as a single or split application. May be applied after planting, but as a broadcast treatment before corn exceeds 12 inches in height and weeds are greater than 1.5 inches. Do not plant small grains, small-seeded legumes, grasses, tobacco, or vegetable crops the year following application. |
| **Postemergence Broadcast** | | |
| Aim EW 0.5 to 1 fl.oz. | Carfentrazone 0.008 to 0.016 | Apply from prior to planting up to 14-leaf collar growth stage for control of broadleaf weeds. For corn greater than V8, use directed applications. All non-registered crops may be planted after 12 months of application. |
| Buctril 2EC 1 to 1.5 pt | Bromoxynil 0.25 to 0.38 | Apply to corn after emergence but prior to tassel emergence for control of broadleaf weeds. Use low rate for corn less than 4 leaf stage and higher rates for taller corn. |
| 2,4-D amine 0.5 to 1 pt | 2,4-D amine 0.25 to 0.5 | Make broadcast applications before corn exceeds 8 inches tall for control of broadleaf weeds. Use only directed applications when corn is from 8 inches to tassel emergence. Do not apply when air temperatures are above 85F to avoid injury to sensitive crops such as vegetable crops and flowers. |
| Dicamba 4S 8 to 16 oz (others) | Dicamba 0.25 to 0.5 | Apply as a broadcast application from corn emergence through 5th leaf stage or until corn is 8 inches tall, whichever comes first, for control of broadleaf weeds. Do not apply when air temperatures are above 85F to avoid injury to sensitive crops such as vegetable crops and flowers. |
| Basagran 4S 1 1/2 to 2 pt | Bentazon 0.75 to 1 lb | For control of yellow nutsedge and certain broadleaf weeds, include 1 qt crop oil concentrate per acre. |

* For more detailed information on these products, weeds controlled by them, manufacturer, tank mixes, preharvest intervals, crop rotation guide, etc., see UK publication *Chemical Control of Weeds in Kentucky Farm Crops* (AGR-6).

**Table 6.** Ornamental Corn: Overhead Irrigated Estimated per Acre Costs and Returns.

| | Quantity | Unit | $/Unit | Total $ | Your Farm |
|---|---|---|---|---|---|
| **Gross Returns** | | | | | |
| **Ornamental Corn** | 1300 | doz. | 2.00 | 2600.00 | |
| | | | **VARIABLE COSTS** | | |
| **Production** | | | | | |
| Lime | 0.5 | ton | 22.30 | 11.15 | |
| Fertilizer (50# 10-10-10 preplant with 50# ammonium nitrate sidedressed. | 1 | acre | 30.00 | 30.00 | |
| Seed | 10 | lbs | 7.00 | | |
| 70.00 | | | | | |
| Herbicides | 1 | acre | 30.00 | 30.00 | |
| Insecticides | 1 | acre | 65.00 | 65.00 | |
| Fungicides | 1 | acre | 0.00 | 0.00 | |
| Machine Hire/Rental | 1 | acre | 1.50 | 1.50 | |
| Fuel and Lube | 7.3 | hrs | 4.00 | 29.20 | |
| Repairs | 1 | acre | 31.83 | 31.83 | |
| Irrigation | 8 | hrs | 5.82 | 46.55 | |
| Hired Labor | 0 | hrs | 7.00 | 0.00 | |
| Total Production Cost | 315.23 | | | | |
| **Harvesting and Marketing** | | | | | |
| Fuel and Lube | 6.5 | hrs | 4.00 | 26.00 | |
| Hired Labor: Harvest/Pack | 80 | hrs. | 7.00 | 560.00 | |
| Boxes | 260 | each | 1.50 | 390.00 | |
| **Total Harvest and Marketing Cost** | | | | 1291.23 | |
| Interest | | | | 36.14 | |
| **TOTAL VARIABLE COST** | | | | 1327.37 | |
| **RETURN ABOVE VARIABLE COSTS** | | | | 1272.63 | |
| | | | **FIXED COSTS** | | |
| Depreciation on Machinery and Equipment | | | | 100.00 | |
| Depreciation on Irrigation System | | | | 72.26 | |
| Taxes on Land | | | | 4.00 | |
| Insurance | | | | 25.00 | |
| **TOTAL FIXED COSTS** | | | | 201.26 | |
| **TOTAL EXPENSES** | | | | 1528.63 | |
| **RETURN TO OPERATOR LABOR, LAND, CAPITAL, AND MANAGEMENT** | | | | 1071.37 | |
| Operator and Unpaid Family Labor | 20 | hrs | 7.00 | 140.00 | |

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