

Crop Profile for Pumpkins in Ohio

Prepared: December, 1998

General Production Information



- (Cucurbitaceae, *Cucurbita pepo*, *C. moschata*, and *C. mixta*)
- Acres in Ohio: 4,265 (5)
- Percent of US Acreage/Rank: 5.7%/5th (3)
- Number of Growers: 750 (3)
- Per Acre Value: \$900 - \$2160 (2)
- Value of Production in Ohio: \$3,010,500 - \$7,225,200 (2)

Location of Production

Pockets of concentrated production can be found in the North, Northeast and Southwest regions of the state. The following counties are the top pumpkin producers in Ohio: Sandusky (504A), Wayne (235A), Huron (213A), Portage (199A), Lucas (172A), Mahoning (154A), Lorain (154A), Warren (121A), Fayette (111A), and Stark (110A). (3)

Production Methods

Pumpkins are usually direct seeded into the soil when the soil temperature is greater than 60 F. They should be planted in rows 6-8 feet apart and with a distance of 2-3 feet between plants. Soil pH should be maintained at 6.5. Nitrogen should be applied at a rate of 75-100 lbs. per acre, while phosphorus and potassium should be applied according to soil test. Fifty to seventy percent of the nitrogen fertilizer should be broadcast before plowing and if applicable an additional 30 lbs/A of nitrogen should be side-dressed as the vines begin to run. Proper insect and disease management is essential to realize greater profits from this crop. Bee activity is necessary for adequate fruit set, especially during the critical 2-3 week period. One hive is recommended per acre. Uniform irrigation is important. Pumpkins like a long, warm growing season and are usually harvested in September and October. (1) Yields can range from 15,000 - 18,000 lbs/A. (2) Growers have reported using no pesticides on approximately 13% of the pumpkin acreage in Ohio. Methods used to manage insect pests, diseases and weeds are as follows.

Insect Pests

Cucumber Beetles

Most of the insecticides used on pumpkins are used to control cucumber beetles. Early in the growing season when pumpkin plants are small, heavy feeding by the striped or spotted cucumber beetle can kill a plant in a few days. The beetles like to feed on the thick and fleshy cotyledon leaves. Later in the season the striped cucumber beetle will feed on stems, foliage and fruit, while the spotted cucumber beetle feeds primarily on the leaves. The striped cucumber beetle larvae can feed on the pumpkin roots causing stunted plants and delayed fruit development. Cucumber beetles also carry the bacterium that causes bacterial wilt and squash mosaic virus. Many varieties of pumpkins are not susceptible to this disease. However, bacterial wilt has recently become a problem on pumpkins in Ohio.

Aphids

Direct feeding of aphids on pumpkins is not usually a problem. However, aphids can transmit watermelon mosaic virus (WMV) and other viruses. The disease, which has no treatment after infection, can reduce yields significantly, especially in late-planted pumpkins.

Squash Bugs

Leaves fed upon by squash bugs first develop small specks, which turn yellow and later brown, vines will wilt from the point of attack to the end of the vine, and affected parts become black and crisp. Small plants can be killed by squash bug feeding. Adult squash bugs live on the undersides of leaves and are difficult to kill.

Squash Vine Borer

The squash vine borer larvae tunnel into pumpkin vines causing them to wilt and eventually die. Sawdust-like frass at the base of stems indicates the presence of the borer. Once inside the vine, little can be done to control the borer. Adult moth populations should be monitored to indicate need for control.

Chemical Insect Controls

Carbaryl (Sevin, Adios)

- Target pests: Cucumber beetles, squash bugs
- Percent of acres treated: 31%
- Average rate and frequency of application:
 - Adios - 12oz/A, once on 2% of acres
 - Sevin 80S - 1.5lbs/A, twice
 - Sevin XLR - 1 qt/A, twice
 - Sevin 50WP - 2lbs/A, twice
- PHI: 3 days
- Efficacy rating: Average
- Special uses: IPM

Endosulfan (Thiodan)

- Target pests: cucumber beetle, aphid, squash vine borer and squash bug
- Percent of acres treated: 26%
- Average rate and Frequency of Application:
 - Thiodan 3EC - 0.67qt/A, 3 times
 - Thiodan 50WP - 1.25lbs/A, 4 times
- PHI: 1 day
- Efficacy rating: Good to Very Good.

Carbofuran (Furadan)

- Target pests: cucumber beetles and nematodes
- Percent acres treated: 33%
- Average rate and frequency of application:
 - Furidan 4F - 1pt/A, once
- Efficacy rating: Good to Very Good.
- Special use: IPM

Permethrin (Pounce, Ambush)

- Target pests: cucumber beetle, squash vine borer and squash bug
- Percent acres treated: 17%
- Average rate and frequency of application:
 - Pounce 3.2EC - 5oz/A, 2-3 times

- Ambush 2EC - 5oz/A, twice
- PHI: 0 days
- Efficacy rating: Average to Good.

Esfenvalerate (Asana)

- Target Pests: cucumber beetle, squash bug and squash vine borer
- Percent of acres treated: 15%
- Average rate and frequency of application:
 - Asana XL - 7 oz/A, 3 times on 18% of acres
- PHI: 3 days
- Efficacy rating: Good to Very Good.

Malathion

- Target pests: cucumber beetles, aphids and squash vine borers
- Percent acres treated: 3%
- Average rate and frequency of application:
 - Malathion 5EC - 1.5pts/A, twice
- PHI: 3 days
- Efficacy rating: Average to Good.

Methomyl (Lannate)

- Target pests: cucumber beetles, Flea beetles, and aphids
- Percent acres treated: 2%
- Average rate and frequency of application:
 - Lannate LV - 1.75pts/A, once
- PHI: 3 days
- Efficacy rating: Good.

Cultural Controls

To control cucumber beetles use floating row covers to protect young plants. Row covers should be removed when plants start to flower. Crop remnants should be plowed under after harvest. For aphid

management, encourage populations of natural enemies (lacewings, lady beetles & larvae, syrphid fly larvae and parasitic wasps) that eat aphids. Plant pumpkins early as possible to avoid infection of the young plants with WMV. On small acreage squash bugs can be controlled using boards as traps. The bugs will hide under the boards and can be killed daily. The adults and nymphs can be hand-picked from the plants and eggs should be destroyed in the spring and early summer. Populations of parasites that attack squash bug eggs should be encouraged. To control squash vine borer, slit infected stems, remove and destroy larvae. Stems can also be injected with BTK (*Bacillus thuringiensis* var. *kurstaki*). Watch for and destroy red-orange egg masses in late June or early July at the base of the pumpkin stem.

Diseases

Powdery Mildew

77% of the pumpkin acreage in Ohio is treated for Powdery Mildew. The fungus on the foliage and young stems first appears as a talcum-like layer of growth on the plant surface, especially on the upper sides of leaves. Later the spots turn brown and dry. Affected leaves are distorted and the plant may appear stunted. Powdery Mildew can also affect handle quality. Powdery Mildew does not appear in Ohio before the last week of July or the first week of August. Chemical controls are applied when the disease appears and may be required until harvest if disease development is severe to protect handle quality.

Gummy Stem Blight and Black Rot

Fruit spots (Black Rot) appear as small water soaked areas which grow indefinitely. The fungus also causes cankers to develop on stems (Gummy Stem Blight) and a brown gummy exudate appears on the surface. Infected vines usually wilt after mid-season. 68% of the pumpkin acreage is treated for either of these diseases. Chemical controls are usually applied weekly as needed.

Anthracnose

Approximately 17% of the pumpkins in Ohio are treated for this disease. Anthracnose is usually the first serious fungal disease to appear on pumpkins in Ohio. The fungus causes the pumpkin fruit to develop hollow water soaked spots that eventually grow through the rind. On leaves, the fungus causes lesions on leaf veins. Dysfunction of the veins leads to leaf scorch. Chemical controls may be applied weekly from mid-July until harvest.

Downy Mildew

Leaves with Downy Mildew cup and petioles are stiff and upright. They also develop yellowish-brown

spots on the upper surfaces and downy purple spots on the undersides. The spots eventually spread and the leaves die. Chemical control is applied when disease is present. Less than 5% of the pumpkin acreage is treated for this disease.

Bacterial Wilt

The causal bacteria is spread through cucumber beetle feeding. On infected vines, the leaves wilt and eventually the leaves and vines shrivel and die. A cross-section of infected vines reveals a thick, sticky exudate that can be drawn out to strands to 1 inch or more. In the past, Bacterial Wilt was not a common disease of pumpkins, however, the disease has appear more frequently in certain area of Ohio in recent years and requiring growers to implement control measures. Squash-type pumpkins show the typical wilt symptoms, but true pumpkins have less typical symptoms showing more leaf scorch.

Phythopthora Blight

Symptoms include root rot, stem canker, leaf blight and fruit rot. Affected areas become water-soaked, dark and may be bordered by a white mold growth. The disease is promoted by warm wet weather. Approximately 15% of the pumpkin acreage is treated for this disease.

Fusarium Fruit Rot

Infected fruit develop small, scattered, brown lesions which later become sunken, larger and covered by a white or pink growth of fungus. Infections are usually confined to the rind but can expand into the flesh and seed cavity. This disease can only be controlled by crop rotation.

Sclerotinia Rot

Affected stems and fruit become water soaked and show a cottony white growth of the fungus on quickly growing lesions. Eventually flat, rounded black patches of sclerotia form. This disease can be effectively controlled through crop rotation.

Mosaic Viruses (Watermelon (WMV)and Cucumber(CMV))

Both WMV and CMV are transmitted to pumpkins by aphids. Vines on plants infected with mosaic viruses are stunted, and new leaves are small, spotted and sometimes distorted. CMV sometimes causes new leaves to wilt and dies and old crown leaves to turn yellow and dry up.

Chemical Disease Controls

Chlorothalonil (Bravo, Terranil)

- Target diseases: Gummy Stem Blight, Black Rot, Anthracnose and Fusarium Rot
- Percent acres treated: 90%
- Average rate and frequency of application:
 - Bravo - 2.25 lbs/A, 3 times
 - Bravo 720 - 2pts/A, 3 times
 - Bravo Ultrex - 2 lbs/A, 3 times
- PHI: 0 days
- Efficacy rating: Good

Myclobutanil (Nova)

- Target disease: Powdery Mildew
- Percent acres treated: 37%
- Average rate and frequency of application:
 - Nova 40W - 1pt/A, once
- Efficacy rating: Very Good
- Special use: Myclobutanil use on pumpkins in Ohio for 1997 and 1998 was obtained through a section 18E for emergency use.

Benomyl (Benlate)

- Target diseases: Anthracnose and Powdery Mildew (when mixed with Chlorothalnil)
- Percent acres treated: 11%
- Average rate and frequency of application:
 - Benlate WP - 0.5lb/A, 4 times
- PHI: 1day
- Efficacy rating: Average to Good

Mefenoxam (Ridomil Gold)

- Target disease: Gummy Stem Blight, Black Rot, Downey Mildew, Anthracnose and Phytophthora Blight.
- Percent acres treated: 6%
- Average rate and frequency of application:
 - Ridomil Gold - 0.4 pt/A, once
- Efficacy rating:

Triadimefon (Bayleton)

- Target diseases: Gummy Stem Blight, Black Rot and Powdery Mildew (when tank mixed with Chlorothalnil)
- Percent acres treated: 5%
- Average rate and frequency of application:
 - Bayleton 50 - 4oz/A, twice
- PHI: 1day
- Efficacy rating: Average
- Special uses: After 1998, triadimefon will not be labeled for cucurbits.

Cultural Controls

For the most effective control of disease, chemical controls must be used in conjunction with cultural controls. Manually remove and destroy infected leaves and vines. Crop rotation is very important in pumpkin production, especially for control of Fusarium Fruit Rot and Sclerotinia Rot. Proper site selection and choosing resistant cultivars can also help. Use disease-free seeds and resistant cultivars if available. Reflective mulches have been utilized to repel aphids, the vectors for viral diseases.

Weeds

Broadleaves and Grasses Chemical Controls

Clomazone (Command)

- Target weeds: broadleaf and grasses
- Percent acres treated: 75%
- Average rate and frequency of application:
 - Command 4EC - .75lb a.i./A (1.5pt/A), once
- Efficacy rating: Good, however, weak on pigweed

Ethalflualin (Curbit)

- Target weeds: broadleaf and grasses
- Percent acres treated: 9%
- Average rate and frequency of application:

- Curbit - 1.1lb a.i./A (1.5qt/A), once post- plant but preemergent
- Efficacy rating: Good

Bensulide (Prefar)

- Target weeds: broadleaf and grasses
- Percent acres treated: 5%
- Average rate and frequency of application:
 - Prefar 4EC - 4lbs a.i./A (1gal/A), once preplant
- Efficacy rating: Good.

Sethoxydim (Poast)

- Target weeds: grasses
- Percent acres treated: 3%
- Average rate and frequency of application:
 - Poast - .25lb a.i./A (1.25qt/A), once postemergent
- Efficacy rating Very good

Cultural Controls

Hand hoeing, and mulching with straw or black plastic.

Critical Pest Controls Issues

Important pesticides used for which there are few or no other alternatives or the only alternatives are organophosphates, carbamates or B2 carcinogens include:

- Benomyl (Benlate)
- Chlorothalonil (Bravo)
- Carbaryl (Sevin)
- Carbofuran (Furadan)

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