Crop Profile for Pumpkins in Ohio

Prepared: February, 2004

General Production Information

Production Facts

(Cucurbitaceae, *Cucurbita pepo, C. moschata,* and *C. mixta*)

Acres in Ohio:	4,265
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 the state: Sandusky (504A), Wayne (235A), Huron (213), Portage (199A), Lucas (172), Mahoning (154A), Lorain (152A), Warren (121A), Fayette (111A) and Stark (110A). (3)

Production Methods

Pumpkins are usually direct seeded into the soil when the soil temperature greater than 60EF. 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.

Major Insect, Mite and Nematode Pests

The Crop Profile/PMSP database, including this document, is supported by USDA NIFA.

Insect, Mite, or Nematode Pest	*Frequency of Occurrence*	*Damage Caused By Pest*	*Critical Timing of Control*
Cucumber Beetle ***(Striped and Spotted)***	Annual	Adults feed on cotyledons, stems, leaves and fruit. Larvae feed on roots, causing plant stunting. Known to transmit bacterial wilt.	First generation emerges May-June; second generation emerges July-August.
Aphids	Occasional	No direct plant damage, however, aphids may transmit Watermelon Mosaic Virus (WMV), and other viruses.	Aphid control does not effectively control virus occurrence.
Squash Bug	Annual	Juveniles and adults feed on leaves, resulting in eventual vine death. Squash bug feeding can kill small plants.	Activity should be monitored carefully during seedling stage and early flowering.
Squash Vine Borer	Sporadic/ Annual	Tunnel in vines causing wilting and eventual death.	Mid-June through August.

Insecticide/ Formulation	*% Crop Treated*	*Application Type*	*Application Rate*	*# Of Apps. / Season*	*PHI*	*REI*
Esfenvalerate (Asana)	18%	Foliar	0.02 lbs./A	2.3	3 days	12 hours
Carbaryl (Sevin, Adios)	17%	Bait, Foliar	0.94 lbs./A	2.2	3 days	12 hours
Endosulfan (Thiodan)	13%	Foliar	0.67 lbs./A	1.2	1 day	24 hours
Carbofuran (Furadan)	10%	At Planting	0.76 lbs./A	1.0	14 days	48 hours

Ohio Insecticide Usage Data on Pumpkins: 2000 [8]

Common Insecticide	*Efficacy*	*Common Pest Targeted*	**Available Alternative Insecticides*
Esfenvalerate (Asana)	Good	Squash Bug	Permethrin (Ambush, Pounce), Bifenthrin (Capture), Fenpropathrin (Danitol), Pyrethrins (Pyrenone), Neem (Azatin) (**), Rotenone (**)
Carbaryl (Sevin, Adios)	Good	Cucumber Beetles	Malathion (Cythion), Methomyl (Lannate), Permethrin (Ambush, Pounce), Bifenthrin (Capture), Fenpropathrin (Danitol), Thiamethoxam (Platinum), Rotenone, Imidicloprid (Admire) (**), Pyrethrins (Pyrenone) (**), Cryolite (Kryocide) (**), *Beauveria* (Mycotrol) (**)
Endosulfan (Thiodan)	Good	Cucumber Beetles	Malathion (Cythion), Methomyl (Lannate), Permethrin (Ambush, Pounce), Bifenthrin (Capture), Fenpropathrin (Danitol), Thiamethoxam (Platinum), Rotenone, Imidicloprid (Admire) (**), Pyrethrins (Pyrenone) (**), Cryolite (Kryocide) (**), *Beauveria* (Mycotrol) (**)
Carbofuran (Furadan)	Excellent	Cucumber Beetles	None

Alternative Chemicals [1]

*Alternatives are at least equally effective against common pest targeted, unless otherwise noted

** = Sufficient efficacy data is not available; Product is labeled for this pest and crop

Biological Insect, Mite and Nematode Control Practices[6]

Conservation of Natural Enemies: By avoiding overuse of broad-spectrum insecticides, populations of natural enemies may be conserved. This is important, especially in aphid control. Some natural enemies of other pests can provide moderate control as well.

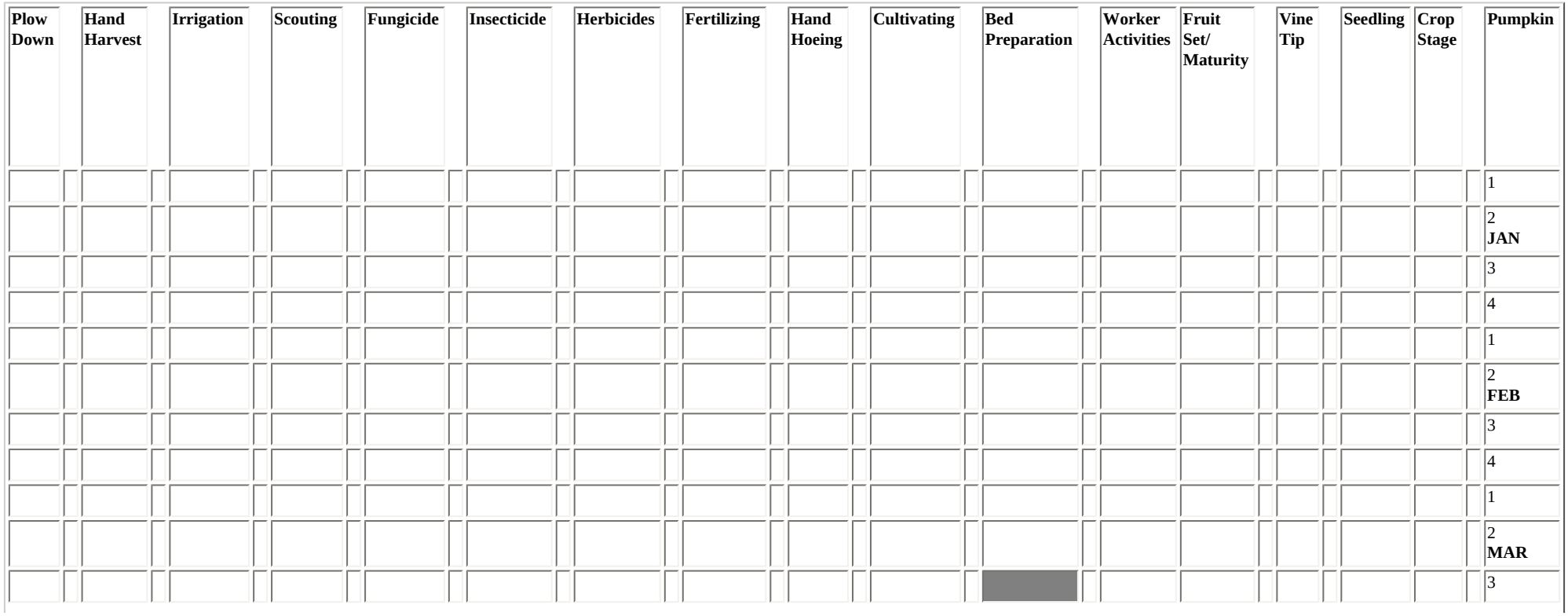
Cultural Insect, Mite and Nematode Control Practices[6]

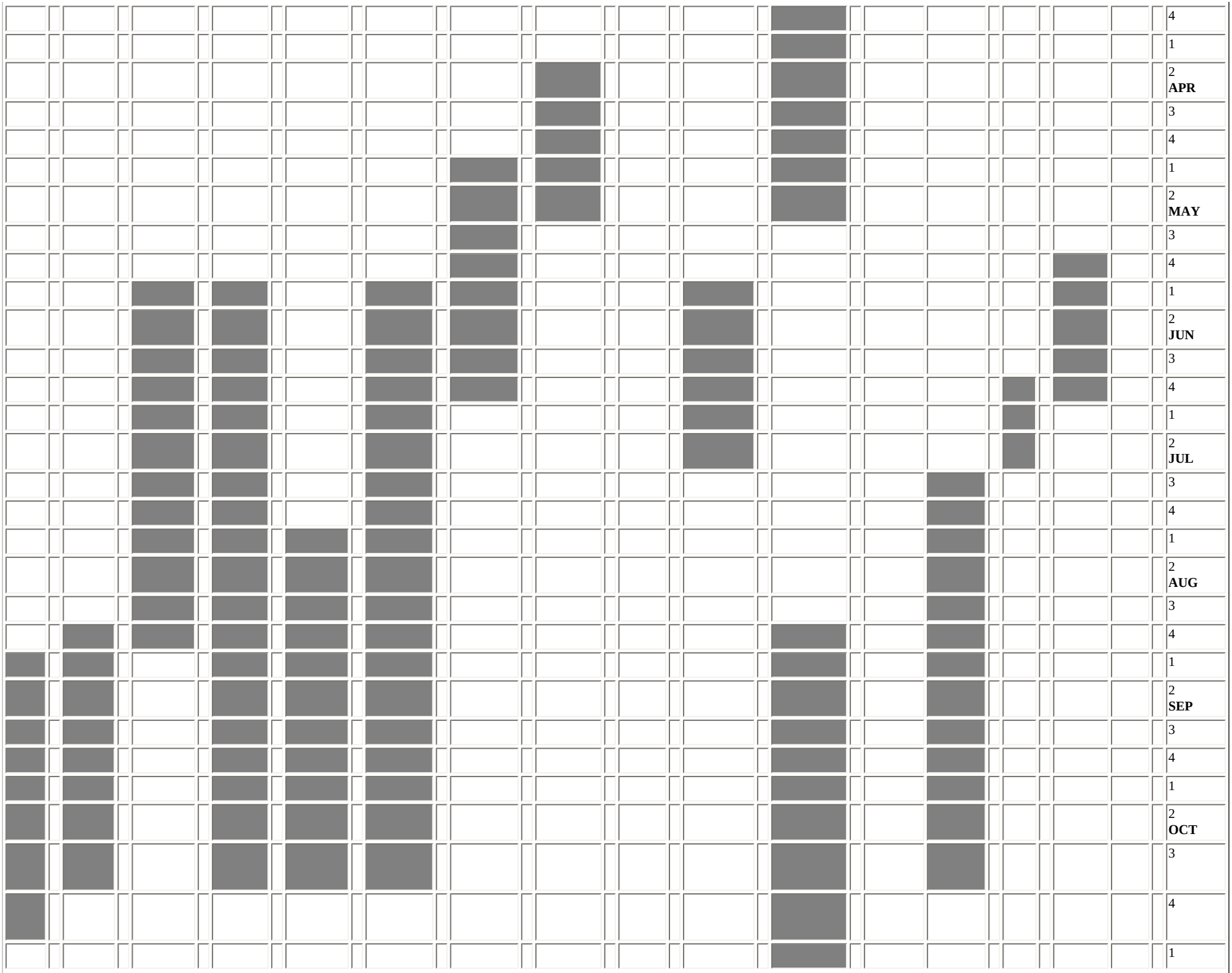
Scouting: Scouting plants for the presence of, and/or damage caused by cucumber beetles, squash bugs, and squash vine borer, can aid in determining a spray schedule.

Silver Plastic Mulch: It has been speculated that the use of silver plastic mulch can confuse insect pests, especially in the young stages of plant development. This tactic is most important in aphid (virus) control, because chemical control of aphids is often less critical.

Crop Production Timeline and Important Worker Activities

Fig. 1. Crop Stages and Worker Activities

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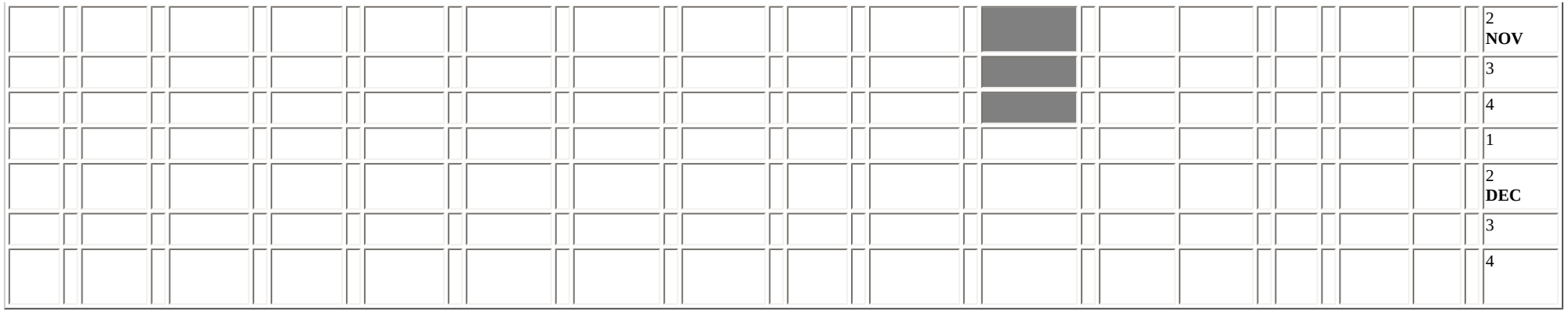

Diseases

Disease	*Frequency of Occurrence*	*Damage Caused By Pest*	*Critical Timing of Control*
Powdery Mildew	Annual. Damage usually severe without control.	Talcum-like layer on upper surface of leaves. Leaves eventually turn brown and dry, which exposes fruit, increasing the risk of sunscald. Affects handle quality.	Last week of July through harvest.
Gummy Stem Blight and Black Rot	Occasional. Damage usually mild without control.	Stem cankers, and water-soaked lesions on fruit. Vines wilt after mid-season. Seed may carry the disease from previous years.	No known effective chemical controls are available.
Anthracnose	Common. More likely to occur with cool wet June weather. Damage usually moderate without control.	Water-soaked lesions on fruit, and lesions on leaf veins.	From first true leaf stage in plant development, through July.

Downy Mildew	Common. Damage usually severe without control.	Cupped leaves and upright petioles. Yellow-brown lesions on upper leaf surface. Purple lesions on lower leaf surface.	Control is not necessary unless disease occurs when fruit is still green. If disease does occur, spray from onset through harvest.
Bacterial Wilt	Common. Damage usually mild to moderate without control.	Transmitted by wounding and feces left by cucumber beetles. Symptoms include interveinal necrosis on leaves, vine wilt, and eventual death.	Control of cucumber beetles is the most effective control of this disease (See *Major Insect, Mite and Nematode Pests*).
Phytophthora Blight	Common. Thrives in flooded and warm conditions. Damage usually mild without control.	Root rot, stem cankers, leaf blight and fruit rot.	Chemicals may be applied mid-season through harvest.
Fusarium Fruit Rot	Common. Thrives in warm, moist conditions. Damage usually moderate to severe without control.	Fruit develop small, scattered, brown lesions. Later, a white or pink fungus develops.	No known chemical controls are available.
Sclerotinia Rot	Common. Damage usually mild without control.	Water-soaked lesions on stems and fruit. White fungus develops on lesions. Black patches of the pathogen appear.	No known chemical controls are available.
Mosaic Viruses	Common. Damage usually severe without control.	Transmitted by aphid feeding. Vines and leaves are stunted. Leaves and fruit may be discolored and malformed.	No known virus control is available. Most research indicates that aphid control is not an effective means for controlling virus.

Ohio Fungicide Usage Data on Pumpkins: 2000 [8]

Fungicide/ Formulation	*% Crop Treated*	*Application Type*	*Application. Rate*	*# Of Apps. / Season*	*PHI*	*REI*
Myclobutanil (Nova)	16%	Foliar	0.07 lbs./A	1.7	0 days	24 hours
Copper Hydroxide (Champ, Kocide)	13%	Foliar	0.62 lbs./A	3.3	0 days	24 hours
Azoxystrobin (Quadris / Austier)	10%	Foliar	0.11 lbs./A	1.5	14 days	12 hours
Chlorothalonil (Bravo/ Terranil)	10%	Foliar	1.58 lbs./A	2.6	7 days	48 hours
Metalaxyl (Ridomil Gold)	7%	Seed Treatment / Foliar	0.11 lbs./A	1.4	5-7 days	48 hours
Mancozeb (Dithane, Manzate)	6%	Foliar	1.41 lbs./A	1.4	5 days	24 hours
Maneb (Maneb, Manex)	4%	Foliar	1.09 lbs./A	2.7	5 days	24 hours
Thiophantate-methyl (Topsin)	3%	Foliar	0.54 lbs./A	1.1	1 day	12 hours

Alternatives to Commonly Used Fungicides [7]

Common Fungicides	*Efficacy*	*Common Pest Targeted*	**Available Alternative Fungicides*

Myclobutanil (Nova)	Excellent	Powdery Mildew	Boscolid+Pyraclostrobin (Pristine)
Copper Hydroxide ***(Champ, Kocide)***	Fair	Bacterial Spot	None
Azoxystrobin (Quadris / Austier)	Excellent	Broad-Spectrum Fungicide	Pyraclostrobin (Cabrio), Boscolid+Pyraclostrobin (Pristine)
Chlorothalonil (Bravo/ Terranil)	Excellent	Gummy Stem Blight	Pyraclostrobin (Cabrio), Boscolid+Pyraclostrobin (Pristine), Azoxystrobin (Quadris / Austier)
Metalaxyl (Ridomil Gold)	Good	Downy Mildew	Chlorothalonil (Bravo/ Terranil), Mancozeb, Maneb, Zoxamide + Mancozeb (Acrobat)
Mancozeb (Dithane, Manzate)	Good	Microdochium Blight	----
Maneb ***(Maneb, Manex)***	Good	Downy Mildew	Zoxamide + Mancozeb (Acrobat), Chlorothalonil (Bravo/Terranil),
Thiophantate-methyl (Topsin)	Good	Powdery Mildew	Sulfur, Azoxystrobin (Quadris/Austier), Pyraclostrobin (Cabrio), Boscolid+Pyraclostrobin (Pristine), Trifloxystrobin (Flint)

*Alternatives are at least equally effective against common pest targeted, unless otherwise noted

Biological Disease Control Practices (6)

Biological Control Products: The following products are available and labeled for use on pumpkins as biological control of certain diseases:

1. Messenger (Harpin protein)-Induces resistance to bacterial spots, wilts, blights, and certain fungi.
2. Serenade (*Bacillus subtillus*)-Broad spectrum protectant and induced resistance activity.

Cultural Disease Control Practices [6]

Scouting: Monitoring fields for disease pressure aids growers in determining when sprays are necessary. Accurate diagnosis, and knowledge of specific disease thresholds is critical in effective scouting.

Worker Activity: Many diseases are spread more readily when plants are wet. Staying out of the field when plants are wet from rain or irrigation can significantly reduce disease spread within a field

Crop Rotation: A 4-5 year rotation of vine and solanaceous crops is important in reducing pathogen inoculum in a field. This is especially important in controlling *Fusarium* Fruit Rot and *Sclerotinia* Rot, which have no known chemical controls available.

Site Selection: A well-drained field can reduce the occurrence of soil-borne diseases, especially *Phytophthora* Blight.

Cultivar Selection: Cultivars with genetic resistance to powdery mildew and *Fusarium* fruit rot are available.

Insect Control: Cucumber beetles are known vectors of bacterial wilt. Controlling the beetle can provide adequate control of the disease. Although aphids vector mosaic viruses, most research indicates that aphid control does not effectively reduce virus infection.

Post-Harvest Disease Control Practices [6]

Eradication of Crop Residues: Crop residues may contain inoculum for the next season. This is critical if a crop rotation is not employed.

Major Weeds

(*Broadleaves and Grasses*)

Weeds reduce crop yield and quality by competing for light nutrients and water. A combination of chemical, cultural and post harvest practices is necessary for adequate control.

Ohio Herbicide Usage Data on Pumpkins: 2000 [8]

Herbicide Formulation	*% Crop Treated*	*Application Type*	*Application Rate*	*Timing*	*# Of Apps. / Season*	*PHI*	*REI*
Clomazone (Command)	24%	Ground, incorporated	0.65 lbs./A	Preplant	1.0	-	12 hours

Glyphosate (Roundup)	15%	Ground	0.75 lbs./A	Preplant	1.0	56 days	12 hours
Bensulide (Prefar)	4%	Ground, incorporated	4.34 lbs./A	Preplant	1.0	-	12 hours
Metolachlor (Dual)	4%	Ground, broadcast	1.75 lbs./A	Preplant, or Preemergence	1.0	60 days	12 hours

Alternatives to Commonly Used Herbicides (1)

Common Herbicides	*Efficacy*	*Common Pest Targeted*	**Available Alternative Herbicides*
Clomazone (Command)	Good	Broadleaves and Grasses	S-Metalachlor (Dual Magnum), DCPA (Dachtal), Sethoxydim (Poast), Clethodim (Select), Paraquat (Gramoxaone Extra)
Glyphosate (Roundup)	Excellent	Broadleaves, Grasses, and Specific Weeds	S-Metalachlor (Dual Magnum), DCPA (Dachtal), Sethoxydim (Poast), Clethodim (Select), Paraquat (Gramoxaone Extra)
Bensulide (Prefar)	Good	Some Broadleaves; Grasses	S-Metalachlor (Dual Magnum), DCPA (Dachtal), Sethoxydim (Poast), Clethodim (Select), Paraquat (Gramoxaone Extra)
Metolachlor (Dual)	Excellent	Broadleaves, Grasses and Specific Weeds	S-Metalachlor (Dual Magnum), DCPA (Dachtal), Sethoxydim (Poast), Clethodim (Select), Paraquat (Gramoxaone Extra)

*Alternatives are at least equally effective against common pest targeted, unless otherwise noted

Cultural Weed Control Practices (5)

Weed Seed Exclusion: Keep machinery clean, as it may carry weed seed. Also purchase seed with low weed seed content, and weed free soil mixtures.
Cultivation: Cultivation before planting, and between rows during the growing season can reduce weed pressure.
Plastic Mulch: Plastic mulch stops weed growth within crop rows.

Post-Harvest Weed Control Practices (5)

Field Weed Maps: Knowing which weeds are a problem in a given field can make management decisions more effective for the following season.
Spot Sprays: Effective with perennial weeds which may persist after harvest.

Cover Crops: Planting a cover crop in the fall can prevent weed seed emergence in the spring. Eradication of the cover crop can pose problems in the spring.

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Compiled by: Elizabeth K. Ike, February 2004