

# Crop Profile for Cucurbits in Illinois

Prepared October, 2000

## General Production Information

<b>Production Facts</b> <sup>(1992)</sup>	
<b>Fresh Market Melons</b>	
Acres Used:	2,020
Value of Production:	\$4,400,000
Number of Operations:	183
<b>Fresh Market Squash</b>	
Acres Used:	500
Value of Production:	\$1,600,000
Number of Operations:	274
<b>Fresh Market Cucumbers</b>	
U.S. Rank/Percent:	10 <sup>th</sup> / 2.4%
Acres Used:	480
Value of Production:	\$12,265,000
Number of Operations:	141
<b>Processed Cucumbers</b>	
Acres Used:	3634

## Cultural Practices

Cucurbits grown in Illinois include cucumbers, cantelopes, watermelons, squash, and pumpkins. These cucurbits are warm weather plants. Their growth, yield and quality is best on warm, sunny days. These cucurbits are subject to attack by a number of insect pests, each of which has a recommended chemical control. Although these pests are capable of causing extensive damage, they can be managed effectively

with scouting and well-timed control procedures.

### **Specifics for cucumbers:**

Cucumbers grow best in sandy soil and warm weather. However, they do need 1-2 inches of water every week, with more needed in hot or dry weather. Plastic mulch and drip irrigation can improve yields and earliness. Good drainage is also important in the production of good fruit. Raised 18-inch wide beds on 48-inch centers are often used to provide a level planting surface and good drainage. The height of the bed depends on how well the soil drains. Planting depth is 1/2 to 1 inches. Rows are usually 38-48 inches apart with 6-8 inches between plants.

Soil temperatures should be at least 60° F to ensure proper growth. The higher the soil temperature, the more rapidly seedlings emerge and the less vulnerable they are to seed corn maggots and damping-off diseases. Seeds should always be planted late enough to avoid frosts. Cold temperatures will slow the growth. Optimum temperature is 65-75° F.

For earlier cucumber production and higher, more concentrated yields, use gynoecious varieties. A gynoecious plant produces only female flowers, thus producing the fruit.

Honeybees are important for pollination, high fruit yields and quality. Populations of pollinating insects may be adversely affected by insecticides applied to flowers or weeds in bloom. Use one hive per acre to get good pollination. Apply insecticides only in the evening hours or wait until blooms have closed before application.

### **Specifics for watermelons:**

All seedless watermelons should be transplanted since high percentage germination of seed requires a specific environment. Since seedless watermelons produce inadequate pollen, a seeded variety must be planted every third or fourth row to ensure good pollination of seedless watermelons. The seeded variety should also be marketable and easily differentiated from the seedless variety so that no mixing of varieties occurs at harvest.

The recommended spacing for watermelons is 5 to 6 feet between rows with 3 to 4 feet between plants in the row. Moist, sandy soils are best suited to sustain a watermelon crop.

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## Insect Pests

### Avg. Crop Loss and % Crop Area Infested for Insects <sup>1</sup>

Common Name	Scientific Name	Avg. % Crop Loss*	Avg. Acres Infested*
<a href="#">Aphids</a>	<i>Aphis gossypii</i>	24.58%	11,022
<a href="#">Cabbage Looper</a>	<i>Trichoplusia ni</i>		
<a href="#">Cucumber Beetles, Striped and Spotted</a>	<i>Diabrotica undecimpuncta and Acalymma vittatum</i>		
<a href="#">Greenhouse Whitefly</a>	<i>Bemisia spp.</i>	10.86%	17,718
<a href="#">Melonworm</a>	<i>Diaphania hyalinata</i>		
<a href="#">Pickleworm</a>	<i>Diaphania Nitidalis</i>		
<a href="#">Seedcorn Maggot</a>	<i>Delia Platura</i>	1.1%	16,108
<a href="#">Squash Bug</a>	<i>Anasa Tristis</i>	0.8%	12,159
<a href="#">Squash Vine Borer</a>	<i>Melittia Cucurbitae</i>	21.7%	795
<a href="#">Thrips</a>	<i>Thrips spp.</i>	5.4%	26,704
<a href="#">Two-spotted Spider Mites</a>	<i>Tetranychus Urticae</i>	2.5%	30,681

\*Based on US Averages

### **Aphids** (*Aphis gossypii*)

Aphids are 1/16 inch long insects that can be seen in many different colors. They colonize on the underside of leaves and have a 5-7 day reproduction cycle.

*Damage:* Aphids feed by sucking the sap from plant leaves and also leaving behind honeydew secretion. Sucking the sap from the plant causes leaves to curl up and die. Furthermore aphids can transfer mosaic

viruses during feeding. The virus causes leaf deformity as well as a light and dark green mottled look.

*Control:* Insecticides are not effective for control, but keep in mind that late planting contributes a heavy infestation.

### **Cabbage Looper (*Trichoplusia ni*)<sup>2</sup>**

The Cabbage Looper is a 1 to 1 and 1/2 inches long green measuring worm with thin white stripes down its back and sides. They overwinter as pupae. In the spring, cabbage looper moths emerge from their cocoons. After mating, eggs are laid on upper leaf surfaces of brassica plants. Larvae hatch several days later and feed for about a month on leaves. After many instars, mature larvae spin a cocoon and pupate. Several generations can occur in one year because the time from hatching to adult takes under a month.

*Damage:* The Loopers cause holes as they feed on the undersides of leaves.

*Control:* For cultural control, hand-pick caterpillars off plants. Plow under crop remnants in spring to bury overwintering pupae before the emergence of adults. For chemical control, use a recommended pesticide.

### **Cucumber Beetles, Spotted and Striped (*Diabrotica undecimpunctata* and *Acalymma vittatum*)**

The striped cucumber beetle overwinters as an adult and appears in the early spring. These beetles are characterized by black stripes down the length of their back and a black abdomen. They lay eggs in the soil near host plants. The striped cucumber beetle should not be confused with the western corn rootworm beetle- this insect does little damage and is differentiated by its yellow abdomen. The spotted cucumber beetle (a.k.a. the southern corn rootworm beetle), is greenish-yellow with 12 black spots on its wing covers. They emerge in mid summer (late June to early July) and feed on cucurbit plants. This feeding can be extremely dangerous for young plants; often leading to stunted growth or death.

*Damage:* Beetles feed on cotyledons, plant stems, foliage, blossoms and true leaves of cucurbits. Striped cucumber beetle larva feed on roots and inside underground stems, which often results in severe damage to underground root systems. These beetles, when feeding, are also able to transmit bacteria, which can potentially cause bacterial wilt. The bacteria clog water conduction tubes within the plant and lead to permanent wilt. Evidence of this infestation will take 2 – 6 weeks to emerge; nothing can be done once a plant has been infected. Thus the only prevention for bacterial wilt is the elimination of cucumber beetles.

**Control:** Scouting field edges is mandatory for control of beetles. They will start in on edges and move into the field 24-36 hours later. They will start to mass quickly- this action calls for weekly sprays until the problem is eliminated. After elimination, scouting should continue in a 'Z' formation across fields. In the 'Z' formation, five stops should be made, counting ten plants at each stop. If beetles reappear, a minimum of one per plant must exist before insecticides can be administered. Most growers apply a systemic insecticide- Furadan- which gives 2-4 weeks of control. But if beetles emerge in late, soil treatment may not be enough; foliar insecticides will have to be used. Foliar varieties with a 5 –7 day residual is most effective. In times of severe infestations, applications may be necessary every five days (high means >20 insects per plant).

### **Greenhouse Whitefly (*Bemisia spp.*)**

Whiteflies are 1/16 inch long insects with four pairs of rounded white wings and a yellow body. They colonize the underside of leaves. Feeding is accomplished by piercing the leaf and sucking the sap out of the leaves. Whiteflies have a 21-36 day life cycle, yielding 8-10 generations per year.

**Damage:** The leaf feeding causes leaves to become speckled yellow or silvery.

**Control:** Natural predators such as *Encarsia formosa* help control whiteflies. If necessary, chemicals such as malathion, thiodan, orthene, talstar, tempo, sumithrin, mavrik or marathon maybe used.

### **Melonworm (*Diaphania hyalinata*)<sup>3</sup>**

Melonworm moths have a brown head and a white-tipped abdomen. The life cycle of the melonworm is similar to that of the pickle worm.

**Damage:** The melonworm is primarily a foliage feeder.

**Control:** See pickleworm control.

### **Pickleworm (*Diaphania Nitidalis*)<sup>3</sup>**

Pickleworms are yellowish-white, have a brown head, and grow up to 3/4 inch long. Females begin to deposit eggs in midsummer on hairy cucurbit surfaces. Within about three days, the eggs hatch and the larvae begin feeding. After a short period the larvae form cocoons inside rolled leaves and pupate. Moths emerge from the cocoons in approximately a week thereafter.

*Damage:* Larvae feed on flowers and leaf buds. When pickleworms are about half grown, they bore into the sides of fruits. This boring causes internal damage and soft excrement to form.

*Control:* Plant early; early spring plantings are seldom damaged. Destroy vines, unused fruits, adjoining weeds and trash as soon as crop is harvested. Spading or plowing in early fall will bury pupae. For chemical control, use a recommended pesticide at first sign of worms in blossoms and buds; worms must be killed before they enter the fruits.

### **Seedcorn Maggot** (*Delia platura*)

Seedcorn maggots are yellowish-white and are about 1/4 inch long at maturity. They are the larval stage of a fly, which is attracted to decaying, organic matter. Maggots can be found in the stems of wilted plants or seeds before plants emerge. The injury to plants from this pest is often mistaken for cold weather damage.

*Damage:* Maggots attack germinating seeds, causing damage early in the season only before the soil warms up. They are attracted to decaying organic matter, which may have left on the planting field from last season. Often, maggots attack the seed before the plant has had a chance to break through the ground, resulting in wilted plants.

*Control:* For cultural control, plant after soil is at least 68° F at a four inch depth for 3-4 days. Eliminate all cover crop remnants and also time for decomposition. Limit manure applications. Use of Furadan 4F at planting for the control of cucumber beetles will contribute to the control of seedcorn maggots. Early planting in cool, wet soil will only increase chances of infestation. Methyl bromide and other fumigants will not help stop seed corn maggots.

### **Squash Bug** (*Anasa tristis*)

Squash bugs are brownish-black in color, flat-backed and about 5/8 inches long at maturity. The females lay eggs on the underside of leaves in rows of about 7-20. Resulting nymphs are 3/16 to 1/2 inches long. Squash bug infestations occur any time in between planting and frost.

*Damage:* Adult and nymphs suck the sap from both leaves and the fruit. Squash bug feeding causes plants to wilt and turn leaves gray or black. Without the sap, leaves may die and the fruit will collapse due to the lack of fluid. No toxins are transmitted via squash bug feeding.

*Control:* Any plant debris surrounding the field edges should be mowed and kept under control. Crop rotation is an effective method of reducing some damage attributed to the squash bug. Scouting is also recommended for squash bugs- look for the number eggs on five plants in ten different locations. If insecticide applications are warranted, they are recommended in the early stage of growth; when the plants are small, adult squash bugs are numerous and there are 1-1.5 egg masses per plant. If this is the time of application, pyrethroids like Asana, Ambush and Pounce have been successful in controlling problems.

### **Squash Vine Borer (*Melittia cucurbitae*)**

*Damage:* The squash vine borer is a sporadic pest, but is also known to cause severe damage sometimes. The first evidence of infestation is the sudden wilting of a usually healthy plant or vine. Also, white grub-like caterpillars create masses of greenish-brown sawdust like frass when they enter the vines. The caterpillars chew through the inside of stems and are of a pencil diameter at maturity.

They then turn in to an adult clear-winged wasp-like moth with metallic olive-brown wings and a red-orange body. Borer eggs are laid on the vines at the start. The young larvae will bore into the vines immediately upon hatching. Scouting is recommended- look for borer frass on five plants in ten different locations. Also be sure to split vines to check for larvae. If borer damage is evident, on cucumber or surrounding fields, insecticides are available for use. Two applications should be made with 5-7 days of each other. If there is no squash vine borer history in the concerned field, infestations will rarely be a problem.

### **Thrips (*Thrips spp.*)**

Male thrips are small, pale yellow and slender; females are larger and vary in color, from light yellow to brown. Their life cycles span over 12 days, beginning with eggs being deposited within leaf or petal tissue. Due to the nature of the deposit, eggs can not be detected easily. There are three stages to adulthood for the thrip; larval, pupal and adult. At maturity, adults are 1 mm long and have 2 pairs of fringed wings crossing their back.

*Damage:* Thrips are beneficial in their predatory nature against spider mites, but also tend to cause damage to plants by rasping and puncturing surface cells. This action results in silvering or deformed

leaves- the deformity often means downward curling leaves. Thrips are also able to transmit tomato spotted wilt virus. The virus causes raised warts encircled by yellow rings on the fruit, and the foliage turns an off-color, bronze shade.

*Control:* Discing weeds before flowering will make fields less attractive to thrips. Blue or yellow sticky traps can be used to detect thrip presence.

### **Two-Spotted Spider Mites (*Tetranychus urticae*)**

Mites are non-insect pests and usually are common in hot and dry weather. They are 1/60<sup>th</sup> of an inch and have eight legs. Spider mites have the ability to spin silk webbing on plants. Infestations can usually be spotted on the edge of the field, if it is caught in the early stages. The use of carbaryl (Sevin) will kill of natural mite enemies and therefore help to speed up mite build up.

*Damage:* Spider mites feed on the undersurface of leaves, sucking out fluid from within the plant and leaving behind a speckled, yellow to bronze or grayish leaf. During times of severe infestation, mites will also turn to fruit for feeding.

*Control:* If insecticides are used on a weekly basis, infestations can start anywhere within the field-not only on the edges. When scouting fields, examine 20-30 plants for mite evidence- concentrate on the borders of fields in most cases. If insecticides are necessary, use Malathion.

### **Insecticide Rates, PHI, REI, and Primary Targets for Cucumber Insects**

<b>Trade Name</b>	<b>Common Name</b>	<b>Rate</b>	<b>Unit</b>	<b>PHI</b>	<b>REI</b>	<b>Crop</b>	<b>Primary Targets</b>
<b>Adios, SLAM</b>	Carbaryl + feeding attractants	.065	Lb/a	3	N/A		N/A
<b>Ambush</b>	Permethrin	.1-.2	Lb	7	12		cucumber beetle, squash bug, squash vine borer
<b>Asana</b>	Esfenvalerate	.03-.05	Lb	3	0		squash bug, squash vine borer

<b>Capture</b>	Bifenthrin	.04 - .1	Lb/a	3	24		Aphids, squash bug, leafhoppers, squash vine borer, pickleworm, mites, cutworm
<b>Furadan</b>	Carbofuran	0-2.4	fl. oz/1000 ft row		48		cucumber beetle
<b>Kelthane</b>	Dicofol	.35-.6	Lb/a	2	12		Mites only
<b>Lindane F</b>	Isotox F	4 oz	/100 lb of seed			Cucumbers, watermelons, cantaloupes, squash and pumpkins	
<b>Lindane 30</b>		4.9 oz	/100 lb of seed			cucumbers, watermelon, cantaloupes, and squash	
<b>Lorsban</b>	Chlorpyrifos	2 oz	/100 lb of seed			cucumbers and pumpkins	
<b>Malathion 8EC</b>	Malathion	1.5	Pt./Acre	1	12		Aphids, spider mites, cucumber beetle
<b>Methoxychlor 2EC</b>	Methoxychlor	.5 – 1.5	Lb/a	7	12		Squash vine borer, fall armyworm, cucumber beetles
<b>Pounce</b>	Permethrin	.1-.2	Lb	7	12		cucumber beetle, squash bug, squash vine borer
<b>Sevin</b>	Carbaryl	.04 - .1	Lb/a	3	12		Squash vine borer, pickleworm

<b>Thiodan</b>	Endosulfan	.5-1.5	Lb/a	2	24		Aphids, Cucumber beetles, squash bug, squash vine borer
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## Diseases

### Avg. Crop Loss and % Crop Area Infested by Diseases (For All Cucurbits)

Common Name	Scientific Name	Avg. % Crop Loss*	% Crop Area Infested*
<a href="#">Alternaria leaf spot or blight</a>	<i>Alternaria cucumerina</i>	3.3%	507,386
<a href="#">Angular leaf spot</a>	<i>Pseudomonas syringae subsp. lachrymans</i>	2.7%	160,227
<a href="#">Anthracnose</a>	<i>Colletotrichum lagenarium</i>	13.9%	276,193
<a href="#">Bacterial wilt</a>	<i>Erwinia tracheiphila</i>	10-20%	
<a href="#">Cucumber mosaic virus (CMV)</a>	None	4.4%	123,750
<a href="#">Downy mildew</a>	<i>Pseudoperonospora cubensis</i>	20.2%	76,119
<a href="#">Fusarium wilt</a>	<i>Fusarium oxysporum f. sp. niveum</i> (watermelon) and <i>Fusarium oxysporum f. sp. melonis</i> (muskmelon)	8.3%	18,534
<a href="#">Powdery mildew</a>	<i>Erysiphe cichoracearum</i>	10-20%	
<a href="#">Scab</a>	<i>Cladosporium cucumerinum</i>		
<a href="#">Squash mosaic virus (SqMV)</a>	None		

<a href="#">Tobacco ringspot virus (TRSV)</a>	None		
<a href="#">Watermelon mosaic virus (WMV)</a>	None	55.4%	108,806

\*Based on US Averages

**Common name(s):** Alternaria leaf spot or blight

**Aggravating factors:**

Humid, wet weather (temps. between 68-90°).

**How disease is spread:**

-Overwinters in diseased crop refuse.

-Conidia is formed and is spread airborne by farm equipment and splashing water.

**Comments:**

-Also attacks squash, cucumber, pumpkin, watermelon, citron, and bur gherkin.

-Muskmelon, cantaloupe, and watermelon varieties are available with resistance to disease.

**Control:**

1. Grow crop under the best possible conditions of soil preparation, texture, fertility, moisture and pH.
2. Rotate with other vegetables, flowers, or small fruits. Only plant cucurbits once in 3 or 4 years.
3. Control weeds.
4. Plant certified, disease-free seed.
5. Follow a protective fungicide program.

6. Spray regularly with a recommended insecticide.

(RPD : no. 918)

**Common name(s):**Angular leaf spot

**Aggravating factors:**

-Extended and frequent rain.

-Humidity at 95% or above.

-Temps. between 75 and 82°.

-High nitrogen levels.

-Sprinkler irrigation.

**How disease is spread:**

-Over seasons in soil, diseased leaves and stems, and fruit.

-Bacteria is disbursed by splashing water, insects, and farm machinery.

**Comments:**

-Also attacks cucumber, zucchini, squash, honeydew, muskmelon, cantaloupe, watermelon, pumpkin, gourds, vegetable-marrows and west Indian gherkin.

**Loss range:**

can exceed 50% in wet seasons (where control is not practiced).

**Control:**

1. Plant certified, disease-free seed.

2. Do not grow cucurbits in the same field more than once in 3 or 4 years.

3. Avoid contact with plants when they are wet.
4. Apply a suggested organic fungicide with a bactericide (fixed copper) spray before symptoms appear.
5. Cleanly plow under or collect and burn crop debris immediately after harvest.
6. Minimize harvest wounds by cutting the stems of the fruit instead of tearing it.
7. Control insects by using a recommended insecticide.
8. 3 to 4 year rotation; Use fixed-copper sprays with Bravo-start early.

\*There are resistant cucumbers to this disease\*

(RPD : no. 919)

**Common name(s):**Anthracnose

**Distribution:** worldwide

**Aggravating factors:**

-Frequent rains.

-Temps. around 75°.

**How disease is spread:**

-Overwinters in weeds or in refuse from a previous vine crop.

-Disease is seedborne and spread by workers, surface drainage water, and cucumber beetles.

**Loss range:**

up to 30% (where control is not practiced).

**Control:**

1. Plant only certified, disease-free seed.
2. Rotate with crops other than cucurbits for 3 years or longer.
3. Plant in well-drained soil.
4. Control all weeds.
5. Collect and burn or cleanly plow down all infected plant debris after harvest.
6. Follow a weekly spray program.
7. Avoid wounding.
8. Grow high-resistant cultivars.
9. Perform weekly sprays of Benlate, Bravo, mancozeb, maneb or Topsin M Quadris.

(RPD : no. 920)

**Common name(s):**Bacterial wilt

**Aggravating factors:**

- High humidity, wet weather.
- Optimum temp. 77-86°.

**How disease is spread:**

- Only overwinters because of striped and spotted cucumber beetle.

**Loss range:**

10-20% (common)

**Control:**

1. Provide season-long control of spotted and striped cucumber beetles and other insects.

2. Grow adapted, partially resistant cucumber varieties.
3. Pull out wilted plants at first sign of disease and destroy them after first spraying with suggested fungicide.

(RPD : no. 905)

**Common name(s):** Cucumber mosaic virus (CMV)

**Distribution:** worldwide

**Aggravating factors:**

-Warm temps., most rapid at 79-89°.

**How disease is spread:**

-Overwinters in reservoir hosts.

-After aphids and cucumber beetles feed on infected plants.

**Control:**

1. A distance of 100 yards between susceptible crops, diseased weeds and susceptible wild plants is recommended.
2. Apply insecticides regularly.
3. Grow resistant varieties of cucumbers.
4. Plant certified, virus-free seed whenever possible.
5. Do not plant cucurbits near fields planted earlier with other vine crops.
6. Where feasible, destroy the first infected plants, but only after first spraying plants thoroughly.
7. Avoid touching healthy plants after handling mosaic-affected plants.

8. The rate of spread of CMV and WMV mosaic viruses may be reduced by the use of:

- a. an aluminum reflective mulch-to repel aphid vectors
- b. 1 or 2 applications of a mineral oil-emulsifier combination
- c. wheat grown in and around cucurbit plants.

(RPD : no. 926)

**Common name(s):** Downy mildew

**Aggravating factors:**

- Warm, moist weather
- (optimum temp. 61-72°).
- High humidity, frequent rains, heavy dews and fogs.
- Spring and summer months.

**How disease is spread:**

- Sporangia are disseminated by splashing rains, insects, equipment, moist air currents, and the handling of infected plants.

**Comments:**

- Sporangia are produced on southern-grown crops and carried progressively northward on moist air currents during spring and summer months.

**Control:**

1. Plant high-quality, high-resistant plant varieties.
2. Apply recommended fungicide.
3. Choose sites with good soil and air drainage and exposure to all-day sun.

4. Try to irrigate on a rising temperature so necessary drying can take place. This will help reduce the amount of time in which conditions are favorable.

(RPD : no. 927)

**Common name(s):**Fusarium wilt

**Aggravating factors:**

-High temps., low humidity

-(optimum temp. 75-83° for watermelon- 70° for muskmelon).

-High light intensity.

-High rate of evaporation.

-Low potassium and calcium levels.

-High nitrogen level.

**How disease is spread:**

-Over seasons in vines.

-Spores are formed and spread soilborne by animals or by machinery.

**Loss range:**

If resistant variety is not used, loss is up to 100%, where soil was thoroughly infested.

**Control:**

1. Grow wilt-resistant varieties.

2. Sow best quality, disease-free seed.

3. Perform soil test.

(RPD : no. 904)

**Common name(s):** Powdery mildew

**Aggravating factors:**

-High day temps. (81°), and cool nights.

-High humidity (46-90%).

-Midsummer.

**How disease is spread:**

-Overwinters in crop refuse.

-Conidia disseminates by insects, farm equipment, and moist air currents.

**Comments:**

-Mostly attacks cucumbers, gourds, cantaloupe, pumpkin, and squash.

**Loss range:**

10-20% (where there is low control).

**Control:**

1. Apply a recommended fungicide.
2. Plant tolerant or resistant varieties.
3. Control weeds.

\*note: seed treatments and crop rotation have no effect on this disease.\*

(RPD : no. 925)

**Common name(s):** Scab

**Aggravating factors:**

- Prolonged, cool and moist weather.
- Frequent fogs, heavy dews, and light rains.

**How disease is spread:**

- Overwinters on seed and crop debris.
- Conidia dissemination occurs by means of moist air currents, insects, tools, farm equipment, and workers brushing up against infected plants.

**Control:**

1. Plant disease-free seed.
2. Grow scab-resistant cucumber varieties.
3. Plant in warm, well-drained soil.
4. Do not plant cucurbits in the same field for more than once in 4 years. Rotate with unrelated crops.
5. Follow a recommended weekly fungicide spray program.
6. Control weeds.
7. Collect and burn or plow down all infected debris after harvest.
8. Control insects by spraying with a recommended insecticide.

(RPD : no. 928)

**Common name(s):** Squash mosaic virus (SqMV)

**Distribution:** worldwide

**Aggravating factors:**

-Planting infected seed.

**How disease is spread:**

-Overwintering beetles.

-Over seasons in infected cucurbit weed hosts.

**Comments:**

-Insect vectors include the 12-spotted, western striped and banded cucumber beetles.

**Control:**

1. A distance of 100 yards between susceptible crops, diseased weeds and susceptible wild plants is recommended.

2. Apply insecticides regularly.

3. Grow resistant varieties of cucumbers.

4. Plant certified, virus-free seed whenever possible.

5. Do not plant cucurbits near fields planted earlier with other vine crops.

6. Where feasible, destroy the first infected plants, but only after first spraying plants thoroughly.

7. Avoid touching healthy plants after handling mosaic-affected plants.

8. The rate of spread of CMV and WMV mosaic viruses may be reduced by the use of:

- a. an aluminum reflective mulch-to repel aphid vectors
- b. 1 or 2 applications of a mineral oil-emulsifier combination
- c. wheat grown in and around cucurbit plants.

(RPD : no. 926)

**Common name(s):** Tobacco ringspot virus (TRSV)

**Distribution:** worldwide

**Aggravating factors:**

-Warm temps. (optimum temp. 82°)

**How disease is spread:**

-Over seasons in crop, weed and wild host plants.

-Soilborne spreading by insects and farm equipment.

**Comments:**

-Seed treatment, crop rotation, and spraying with fungicides are not effective in the control of mosaic diseases.

**Control:**

1. A distance of 100 yards between susceptible crops, diseased weeds and susceptible wild plants is recommended.
2. Apply insecticides regularly.
3. Grow resistant varieties of cucumbers.
4. Plant certified, virus-free seed whenever possible.
5. Do not plant cucurbits near fields planted earlier with other vine crops.
6. Where feasible, destroy the first infected plants, but only after first spraying plants thoroughly.
7. Avoid touching healthy plants after handling mosaic-affected plants.
8. The rate of spread of CMV and WMV mosaic viruses may be reduced by the use of:

- a. an aluminum reflective mulch-to repel aphid vectors
- b. 1 or 2 applications of a mineral oil-emulsifier combination
- c. wheat grown in and around cucurbit plants.

(RPD : no. 926)

**Common name(s):** Watermelon mosaic virus (WMV)

**Distribution:** worldwide

**Aggravating factors:**

-Virus is carried from reservoir hosts to cucurbit plants by aphids.

**How disease is spread:**

-Numerous species of aphids transmit virus to healthy plants.

**Loss range:**

50% or more (when infection occurs early).

**Control:**

1. A distance of 100 yards between susceptible crops, diseased weeds and susceptible wild plants is recommended.
2. Apply insecticides regularly.
3. Grow resistant varieties of cucumbers.
4. Plant certified, virus-free seed whenever possible.
5. Do not plant cucurbits near fields planted earlier with other vine crops.
6. Where feasible, destroy the first infected plants, but only after first spraying plants thoroughly.

7. Avoid touching healthy plants after handling mosaic-affected plants.

8. The rate of spread of CMV and WMV mosaic viruses may be reduced by the use of:

- a. an aluminum reflective mulch-to repel aphid vectors
- b. 1 or 2 applications of a mineral oil-emulsifier combination
- c. wheat grown in and around cucurbit plants.

(RPD : no. 926)

### Fungicide Rate, REI, PHI and Target Diseases

Trade Name	Common Name	Rates		Unit	PHI	REI	Target Diseases
		low	high				
<b>Quadris</b>	Azoxystrobin	11	15.4	fl. oz	1	4	anthracnose, belly rot, downy mildew, gummy stem blight, leaf spots, powdery mildew
<b>Many varieties</b>	Bordeaux mixture	*	*	*	*	*	
<b>Captan 30-DD, Captan 400</b>	Captan	*	*	*	*	*	
<b>Copper Fungicides</b>	Copper Sulfate	n/a	n/a	n/a	n/a	n/a	
<b>Copper-Count N</b>	Copper Ammonium Carbonate	n/a	n/a	n/a	n/a	n/a	
<b>Kocide DF, 4.5 LF, 101, 2000</b>	Copper Hydroxide		1.3	pts	n/a	24	alternaria leaf spot, angular leafspot, anthracnose, downy mildew, powdery mildew, gummy stem blight
<b>Many varieties</b>	Copper Oxychloride	*	*	*	*	*	

<b>Mocap</b>	Ethoprop		2.55	lbs/ banded 1000 row feet	n/a	48	cucumber nematode control
<b>Ridomil Gold EC</b>	Mefenoxan	1	2	pts	n/a	48	pythium damping off and cottony leak
<b>Ridomil Gold Bravo</b>	Mefenoxan	2	3	lbs	n/a	48	downy mildew, anthracnose, cercospora leaf spot, gummy stem blight (black rot), leaf blight, and scab
<b>Ridomil Gold Copper</b>	Mefenoxan		2	lbs	5	48	downy mildew in cucurbits
<b>Ridomil Gold MZ</b>	Mefenoxan		2.5	lbs	5	48	downy mildew in cucumber, melon, and summer squash
<b>Allegiance FL</b>	Metalaxyl						Cucumber seed treatment fro pythium damping off and early season phtophthora control.
<b>Topsin-M70W, M4.5F</b>	Thiophanate methyl	1/4	1/2	lbs	0	12	Cucurbit anthracnose, gummy stem blight, powdery mildew and target spot
<b>Thiram</b>		n/a	n/a	n/a	n/a	n/a	Cucumber and squash seed treatment

\* See label for directions

## Weeds

**Avg. Crop Loss and % Crop Area Infested by Weeds (For All Cucurbits)**

Common Name	Scientific Name	Avg. % Crop Loss*	Avg. Acres Infested*
<a href="#">Barnyardgrass</a>	<i>Echinochloa Crus-galli</i>	6.5%	47,187
<a href="#">Common Lambsquarters</a>	<i>Chenopodium Album</i>	10.7%	25,755
<a href="#">Common Ragweed</a>	<i>Ambrosia Artemisiifolia</i>	4.0%	6,318
<a href="#">Crabgrass</a>	<i>Digitaria spp.</i>	8.1%	36,363
<a href="#">Eastern Black Nightshade</a>	<i>Solanum Ptycanthum</i>	5.4%	3,977
<a href="#">Field Bindweed</a>	<i>Convolvulus Arvensis</i>	2.2%	100,000
<a href="#">Nutsedge spp.</a>	<i>Cyperus spp.</i>	6.9%	48,106
<a href="#">Perennial Sowthistle</a>	<i>Sonchus Arvenis</i>	16.3%	3,681
<a href="#">Pigweed spp.</a>	<i>Amaranthus spp.</i>	9.9%	30,443
<a href="#">Purslane</a>	<i>Portulaca Oleracea</i>	9.2%	41,215
<a href="#">Shepherds Purse</a>	<i>Capsella Bursa-Pastoris</i>	2.1%	100,000
<a href="#">Yellow Nutsedge</a>	<i>Cyperus Esculentus</i>	8.1%	15,340

\*Based on US Averages

## Barnyardgrass

This summer annual germinates from 0 to 5 inches deep in the soil. The seeds remain viable for several years, and plants may emerge throughout the summer. Barnyardgrass is most troublesome in low, moist, warm areas.

## Common Lambsquarters

Common lambsquarters produce numerous small seeds which germinate after an overwintering process. Optimal temperature for germination is 70F, but can germinate between 40 to 94, which suggests early germination capabilities. Survival is favored by rains which dilute or leach herbicides from the soil surface.

## Common Ragweed

Common ragweed is a summer annual that is favored by moist soils and can be a serious problem in individual fields. Control of common ragweed with tillage or row cultivation is effective in controlling

small seedlings.

## **Crabgrass**

A warm season grass most often troublesome in the southern and southeastern part of the state. The plants generates stolons and may result in a severe infestation from a single plant. May be most severe during the late part of the growing season after herbicides have degraded or and holes remain in the canopy. Tillage and row cultivation also help control.

## **Eastern Black Nightshade**

This summer annual can produce thousands of berries; each berry contains up to 50 seeds. While nightshade is generally not considered a serious pest in Illinois, severe infestations in individual fields do occur. Tillage and row cultivation are effective for early, newly emerged seedlings. The weed is particularly damaging to soybeans because the sticky juice of the berries can plug harvesting equipment and result in dockage at the elevator.

## **Field Bindweed<sup>1</sup>**

Field bindweed is a perennial weed and a member of the morningglory family. It has arrowhead-shaped leaves and white or pink flowers. The bindweed grows along the ground until it encounters an object to climb or entangle, such as a plant or fence. It reproduces by seeds and horizontal roots, which in-turn makes it difficult to kill. The most effective control is with herbicides, but it takes several years of applications to see results.

## **Nutsedge spp.<sup>2</sup>**

Nutsedges are perennial weeds that superficially resemble grasses. Leaves are V-shaped in cross section and arranged in sets of three at the base. They grow mainly from tubers or "nutlets" formed on rhizomes. These tubers are the key to their survival. If you can limit the production of the tubers, then the nutsedge will eventually be controlled. To limit tuber production, remove small nutsedge plants before they have five to six leaves.

## **Perennial Sowthistle**

The perennial sowthistle reproduces by seeds and horizontal roots. When in full bloom, they stand 2-7 feet tall. The sowthistle is distinguished by its dandelion-shaped leaves and yellow flowers. When these flowers mature, they become fluffy white seed heads. The plant seems to prefer moist, low areas.

## **Pigweed spp.**

Pigweeds are prolific seed producers, and one female can produce over 100,000 seeds in one growing season. The seeds of this plant may remain viable for years. Pigweeds are a problem in no-till systems because undisturbed soils favor germination of the minuscule seeds, and the debris keeps the field moist and allows for extended germination. Other favorable germination locations are where excess nitrogen is available, and where no soil applied herbicides have been used. Localized populations of some biotypes of pigweed have shown triazine or acetolactate synthase (ALS)-inhibitor resistance.

**Purslane<sup>2</sup>**

This annual weed favors dry conditions but can also thrive in moist situations. As Purslane grows, it produces a high number of small seeds which may remain viable in the soil for several years. Herbicide control is effective, but seeds may mature in the time it takes a herbicide to kill the plant.

**Shepherds Purse**

Shepherd's purse is a winter annual which reproduces by seed. It is a common weed throughout Illinois fields in scattered populations. The stems are single or branching at the base, and stand 12 to 18 inches tall. The flowers are small with white petals. The pods are flat and triangle-shaped. Each pod produces about 20 seeds.

**Yellow Nutsedge**

Yellow nutsedge causes the most severe perennial weed infestations and is quite serious across Illinois. It reproduces from tubers as the seed does not survive overwintering, and tubers can adapt to almost any soil type and conditions. Tubers germinate at up to 12 inches of soil and remains viable for up to three years in soil. Severe infestations can occur in various parts of the state.

**Herbicide Rates, REI, PHI and Primary Targets**

Trade Name	Common Name	Rate/Acre		Unit	PHI	REI	Treatment	Crop	Target Weeds
		low	high		days	hrs		Treated	
<b>Alanap 2L</b>	Naptalam	6	8	qts	N/A	48	Preemergence	Cucumber, melon	N/A
<b>Command 3ME</b>	Clomazone	1.5	2	pts	N/A	12	Preemergence	Processing pumpkins only	All grasses controlled in 2+pints are used

<b>Curbit 3EC</b>	Ethalfluralin	3	4.5	pts	N/A	24	Preemergence	Cucumber, melon, Pumpkin, squash	Various species of grasses, Broadleaf weeds
<b>Gramoxone Extra</b>	Paraquat	2	3	pts	0	12	Stale seedbed	Cucumber, melon, Pumpkin, squash	Various species of broadleaves, grasses, perennials
<b>Prefar 4EC</b>	Bensulide	5	6	qts	N/A	12	Preemergence	Cucumber, melon, Pumpkin, squash	Various species of annual grasses
<b>Poast 1.5EC</b>	Sethoxydim	1	1.5	pts	N/A	12	Postemergence	Cucumber, melon, Pumpkin, squash	Various species of annual grasses, perennial grasses
<b>Roundup Ultra</b>	Glyphosate	1.5	3	qts	N/A	4	Stale seedbed	Pumpkin, squash	Various species of annual grasses and broadleaves.
<b>Treflan HFP</b>	Trifluralin	1	2	pts	30	12	Preemergence	Cucumber, melon	Various species of grass weeds

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