Crop Profile for Cucumbers (Processing) in Ohio

General Production Information

Cucumber = Cucurbitaceae *(Cucumis sativus)*

- Acres in Ohio: 3177(2)
- Percent of US Acreage/Rank: 2.4%/10th (2)
- Number of Growers: 268 (2)
- Per Acre Value: $4088 (5)
- Value of Production in Ohio: $12,265,000 (5)

LOCATION OF PRODUCTION (2)

- Sandusky Co. - 1334 acres
- Seneca Co. - 610
- Wood Co. - 405
- Ottawa Co. - 224
- Putnam Co. - 168

PRODUCTION METHODS

Cucumbers are coarse, prostrate annual vining plants that have a deep root system. They prefer light textured soils that are well drained, high in organic matter and have a pH between 6-6.8. Cucumbers need a soil temperature of greater than 60EF for good germination. A complete fertilization program includes a broadcast or band application, followed by one or more side-dressings. Seeds are very susceptible to rot in cold soils followed by bright sun. Cucumber seeds are drilled at 2-3 inches apart in

rows 3-4 feet apart. Herbicide use is the preferred method of weed management, especially in the high density planting of processing cucumbers. Pollinators, usually honeybees, are required. Some growers have found it helpful to establish 1-3 bee colonies per acre of cucumbers to ensure pollination. Poor pollination can result in misshapen fruit or poor fruit set. The cucumber growing season is relatively short, lasting 55-60 days. Processing cucumbers are often picked in one destructive harvest. An average yield is 11.4 ton or 460 bushels per acre.

Insect Pests

Cucumber Beetles (Striped and Spotted)
Cucumber beetles are the most important pests of cucumbers in the Midwest. The striped cucumber beetle has 3 black stripes along the length of its body while the spotted cucumber beetle has 12 black spots on its back. The beetles overwinter as adults in weeds and protected areas. The beetles become active in the spring as temperatures begin to rise. The females deposit eggs in the soil at the base of the plant. The eggs hatch later in the summer and constitute the second generation of beetles. The larvae feed on the root and stem of the young cucumber plants and can sometimes do extensive damage if feeding occurs before vining. However, the most significant damage from cucumber beetle feeding is the transmission of the bacterium that causes wilt. Upon infection, the bacteria travel quickly in the vascular system of the plant and cause blockages to develop which lead to the wilt symptoms. A cucumber beetle feeding on an infected plant can pick up the bacteria and spread it to other plants. Once a plant is infected with the bacteria, nothing can be done to save the plant. Controlling cucumber beetles is the most important way to prevent bacterial wilt.

MINOR PESTS

Aphids
Aphids live in colonies on the underside of leaves. They feed on the sap from the leaves which can weaken a plant and reduce fruit production. Early signs of aphid feeding are twisted leaves with puckering or cupping in the affected area. Aphids also excrete sticky honeydew onto the leaf surface and fruit. The honeydew can reduce the marketability of the fruit and can serve as the medium for development of sooty fungus. Aphids can also transmit mosaic virus to cucumbers, however, many virus-resistant varieties are available. Aphid populations are usually kept in check by populations of beneficial insects. Chemical use which affects beneficial insects can result in an increase in aphid populations.

Potato Leaf hopper
Feeding by this insect is usually accompanied by yellowing, browning or blighting of the foliage known as hopper burn. Leafhoppers can also inject their saliva in to the phloem during their feeding disturbing

the plant physiologically and producing disease-like manifestations.

Flea Beetles
Adult flea beetles chew small holes in to leaves. Heavy feeding on leaves can cause them to dry out and die. Seedlings, because of their small leaf areas are considered more vulnerable.

Thrips
Damage to the plant is caused by the nymphs and adults sucking the plant sap. The feeding causes small white spots to appear on the foliage and when severe, the entire plant can wilt and die.

Spider Mites
Spider mites can be a problem if the weather is hot and dry for an extended period of time. They feed on the undersides of leaves by sucking the sap from the plant. A severe infestation can result in the defoliation of the vines.

Nematodes
Nematodes feed on the roots of a developing plant causing stunted growth, galls or lesions, depending upon the type of worm present.

CHEMICAL CONTROLS

Carbofuran (Furadan)

- Target Pests: cucumber beetles and nematodes
- Percent acres treated: 74%
- Average rate and frequency of application:
    - Furidan 4E B 40oz/A, once at planting
- Efficacy rating: Good but difficult to work with
- Special use: IPM

Endosulfan (Thiodan)

- Target Pests: cucumber beetles, flea beetle, and aphids
- Percent acres treated: 71%
- Average rate and frequency of application:
    - Thiodan 3EC B 1qt/A, once (timed not to interfere with the activity of bees)
- PHI: 1 or 4 days depending upon application rate
- Efficacy rating: Good
- Special use: IPM, when cucumber beetles and aphids are present.

Carbaryl (Sevin)

- Target Pests: cucumber beetles, flea beetles, and leafhopper
- Percent acres treated: 42%
- Average rate and frequency of application:
    - Sevin XLR B 1 qt/A, twice (timed not to interfere with the activity of bees)
- PHI: 3 days
- Efficacy rating: Very good.
- Special use: IPM

Permethrin (Ambush)

- Target Pests: cucumber beetles
- Percent acres treated: 16%
- Average rate and frequency of application:
    - Ambush 2EC B 8oz/A, once
- PHI: 0 days
- Efficacy rating: Good

Malathion

- Target Pests: cucumber beetles, aphids, thrips and mites
- Percent acres treated: 16%
- Average rate and frequency of application:
    - Malathion 5EC B 1.5pt/A, once after vining
- PHI: 1 day
- Efficacy rating: Poor

Diseases

Anthracnose
The causal fungus overwinters in seed and in residues from diseased plants. On the cucumber leaf an infection first appears as a yellowish or water-soaked area that quickly enlarges, turns brown, and shatters to form a ragged hole. An infection on fruit develops as a depressed dark-bordered canker with creamy pink-colored ooze in the center. Humid conditions, frequent rain and splashing promote disease development.

Belly Rot (Rhizoctonia)
Belly rot is caused by the common soil fungus, *Rhizoctonia solani*. The rot develops where the fruit touch the ground. On mature fruit, the site of infection becomes a large, water soaked area of decay. A dense mold growth often develops on the rotting area. Belly rot is transmitted rapidly at high temperature and humidity.

Angular Leaf Spot
Angular leaf spot is caused by a bacterium that overwinters in seeds and infected crop residues. The bacteria can infect leaves, stems and fruit, but the most conspicuous infections occur in the foliage. On leaves, the disease first appears as small water soaked spots. The spots grow larger and become angular and irregular in shape. Eventually, the site of infection turns tan or gray and drops out, leaving a ragged hole. Fruit infections appear as small sunken water-soaked spots usually followed by fruit rot. The bacteria is spread in the field by splashing rain and passing workers.

Powdery Mildew
The causal fungus can be introduced through infected greenhouse-grown plants or by wind from areas with relatively warm winters where the fungus can overwinter. A white talcum-like growth appears on the foliage after infection. The areas of powdery growth can expand and grow together, covering most of the surface of the leaf. Affected leaves can wither and eventually become dry and brittle. The loss of foliage often results in secondary fruit effects including sunburning, premature ripening, and poor flavor and texture. Periods of high temperature favor disease development.

Gummy Stem Blight
Gummy stem blight first appears as light brown or gray spots on leaves, petioles and stems. Spots on the stems begin at the nodes and elongate into stem streaks. A gummy exudate usually appears near the streak. The leaves on infected vines turn yellow and die. In severe cases, entire plants can be killed. The causal fungus overwinters in seeds and in plant residue from infected crops.

Downy Mildew
Like Powdery Mildew, the causal fungus overwinters in areas with mild winters and is carried by wind to other areas. Periods of moist weather favor disease development. Upon infection, irregular yellow to brown spots appear on the underside of leaves usually at the center of the plant. A purplish mildew develops on the underside of the spot. As the spots grow in size the leaf dies. The disease progresses rapidly from the crown of the plant to the new growth until the entire plant is killed.

Bacterial Wilt
See disease description under cucumber beetles.

Cucumber Mosaic Virus
The new leaves on cucumbers infected with the CMV may wilt and die, whereas old crown growth may turn yellow and dry up as the entire plant slowly declines. Infected young fruits show symptoms ranging from a mild mottle to extensive warty malformations.

CHEMICAL CONTROLS

Chlorothalonil (Bravo)

- Target diseases: Anthracnose, Belly Rot, Gummy Stem Blight
- Percent acres treated: 89%
- Average rate and frequency of application:
    - Bravo Ultrex B 7.5lb/A, once (for Belly Rot) 2lbs/A, once (for Anthracnose)
    - Bravo 720 B 5 pts/A, once (for Belly Rot) 2pts/A, 3 times (for Anthracnose and Gummy Stem Blight)
    - Bravo B 7lbs/A, once (for Belly Rot)
- PHI: 0 days
- Efficacy rating: Good to Very Good

Thiophanate-methyl (Topsin)

- Target diseases: Anthracnose and Powdery Mildew
- Percent acres treated: 36%
- Average rate and frequency of application:
    - Topsin M B 0.4lb/A, 3 times
- PHI: 0 days
- Efficacy rating: Good to Very Good
- Special uses: resistance management

Benomyl (Benlate)

- Target diseases: Anthracnose, Powdery Mildew and Gummy Stem Blight
- Percent acres treated: 20%
- Average rate and frequency of application:
    - 0.5lb/A, 4 times
- PHI: 1 day
- Efficacy rating: Average to Good

Copper Hydroxide (Champ)

- Target disease: Angular Leaf Spot
- Percent acres treated: 11%
- Average rate and frequency of application:
    - Champ B 1.5oz/A, 3 times

    - Champ 2 B 3pts/A, once
- PHI: 0 days
- Efficacy rating: Good

CULTURAL PRACTICES

Crop rotation on a 3-4 year basis, plan resistant varieties, destroy infected vines, keep area free of perennial weeds (especially ragweed and ground cherry), limit movement in fields (especially when the field is wet), keep crop separated from other cucurbits to limit spread of disease spores.

Weeds

Broadleaf and Grasses

CHEMICAL CONTROLS

Clomazone (Command)

- Target weeds: Broadleaf and grasses
- Percent acres treated: 90%
- Average rate and frequency of application:
    - Command 4EC B 0.325lb a.i./A (0.65pt/A), once pre-plant
- Efficacy rating: Good

Naptalam (Alanap)

- Target weeds: annual
- Percent acres treated: 74%
- Average rate and frequency of application:
    - Alanap L B 1.9lb a.i./A (3.8qts/A), once preemergent to seeded crop
- Efficacy rating: Average to Poor

Bensulide (Prefar)

- Target weeds: annual grasses
- Percent acres treated: 16%
- Average rate and frequency of application:
    - Prefar 4E B 4lb a.i./A (4qts/A), once preplant

- Efficacy rating: Good

Sethoxydim (Poast)

- Target weeds: annual and some perennial grasses
- Percent acres treated: 16%
- Average rate and frequency of application:
  - Poast B 0.3 lb a.i./A (1.5 pts/A), once postemergent
- PHI: 14 days
- Efficacy rating: Good to Very Good (depending upon the weather)

CULTURAL CONTROLS

Cultivations until vining, mulch and hoeing.

CRITICAL PEST CONTROL ISSUES

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

- Chlorothalonil (Bravo)
- Thiophanate-methyl (Topsin)
- Carbofuran (Furidan)
- Benomyl (Benlate)

Contacts

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