

# Troubleshooting Vegetable Production Problems in the Southeast



A pictorial guide to the common cultural, insect and disease issues with management tips.

## How to Use This Guide

Locate the photo that best exemplifies the damage observed on vegetables. Manage or solve the problem by using one or more of the management tips provided for the particular problem. Note that some insect pests are too small to see without a hand lens or microscope, although the type of damage they cause can provide evidence of the culprit.

## Useful Terms

**Brassica** – Vegetables such as cabbage, cauliflower, broccoli and Brussels sprouts.

**Beneficials or natural enemies** – Insects, spiders or mites that are predators or parasitoids feeding on insect pests.

**Crop rotation** – The practice of growing different crops in succession on the same land.

**Cruciferous weeds** – Members of the mustard family, such as shepherd's purse and hairy bittercress.

**Cucurbit** – The gourd family containing squash, pumpkin, watermelon, cucumbers and many others.

**Defoliation** – Loss of leaves.

**Farmscaping** – Using the whole-farm, ecological approach (hedgerows, insectary plants, cover crops and water reservoirs) for pest management.

**Foliar insecticide** – Insecticide sprayed directly on the plant's leaf.

**Fungicide** – A chemical that inhibits the growth of fungi.

**Legumes** – Beans, lentils, peas, soybeans, etc.

**Nymph** – An immature form of an insect, like a stink bug or squash bug.

**Parasitoid** – An organism or insect that lives in or on the body of its host and eventually kills the host.

**Resistant varieties** – Plant varieties that are less attractive to, tolerant or have negative effects on pests.

**Terminal bud** – Bud at the tip of a stem.

**Trap crop** – A crop planted to attract insect pests from another crop, especially one in which the pests fail to survive or reproduce when treated.

# Common Insect Pests of Vegetables



F. Hale, University of Tennessee

F. Hale, University of Tennessee

## Diamondback moth

(*Plutella xylostella*)

Small to medium holes, primarily in leaves and buds.

**Affects cruciferous vegetables.**

**Management:** Remove cruciferous weeds, conserve natural enemies, use insecticides as needed.



F. Hale, University of Tennessee

F. Hale, University of Tennessee

## Imported cabbageworm

(*Pieris rapae*)

Plants reduced to stems and leaf veins.

**Affects cruciferous vegetables.**

**Management:** Remove cruciferous weeds, conserve natural enemies, use insecticides as needed.



F. Hale, University of Tennessee

Clemson University, Bugwood.org

## Cross-striped cabbageworm

(*Evergestis rimosalis*)

Small holes in leaves and buds. Large holes in leaves can reduce the plant to stems and leaf veins.

**Affects cruciferous vegetables.**

**Management:** Conserve natural enemies, use insecticides as needed.



A. N. Sparks, Jr., University of Georgia, Bugwood.org

## Pickleworm

(*Diaphania nitidalis*)

Burrows in blossoms, fruit and vines, destroying blooms and fruit.

**Affects cucurbits.**

**Management:** Plant early, use screens or row covers, use insecticides from early bloom through harvest.



F. Hale, University of Tennessee

## Corn earworm

(*Helicoverpa zea*)

Burrows into corn kernels and fruits.

**Affects most vegetables.**

**Management:** Apply mineral oil, set baits, use insecticides every two-six days.

# Common Insect Pests of Vegetables



A. Wyndham, University of Tennessee

## Squash vine borer

(*Melittia cucurbitae*)

Wilted leaves and damaged vines.

**Affects squashes and some pumpkins.**

**Management:** Provide a chemical or physical barrier during egg-laying. Plant early, remove dying vines, kill larvae when feasible.



S.K. Brannan, University of Georgia

## Hornworms (*Manduca* spp.)

Defoliation of entire plant. Damage to blossoms and fruits.

**Affects tomato, eggplant, potato.**

**Management:** Remove weedy hosts. Monitor for larvae; they may be difficult to find. Frass is the first sign of infestation.



R. Ottens, University of Georgia, Bugwood.org

## Spotted cucumber beetles

(*Diabrotica undecimpunctata*)

Small holes in leaves, flowers and fruit; can transmit bacterial wilt disease.

**Affects cucurbits and others.**

**Management:** Use row covers, farmscaping, mulches, resistant varieties and/or insecticides.



F. Hale, University of Tennessee

## Flea beetles

(various species)

Small holes in leaves, especially on young plants.

**Affects a broad range of fruits and vegetables.**

**Management:** Use insecticides to protect small seedlings.



S.K. Brannan, University of Georgia

## Colorado potato beetle

(*Leptinotarsa decemlineata*)

Defoliation of plant.

**Affects potato, tomato, eggplant.**

**Management:** Rotate crops, conserve natural enemies, use resistant varieties, use foliar insecticides.

# Common Insect Pests of Vegetables



S.K. Brannan, University of Georgia

## Mexican and squash beetles

(*Epilachna varivestis* and *Epilachna borealis*)

Lace-like, skeletonized leaves.  
Damaged fruit.

**Affects legumes, cucurbits.**

**Management:** Use insecticides, trap crops or parasitoids.



F. Hale, University of Tennessee

## Aphids and whiteflies

Honeydew or sooty mold on leaves.  
Leaves wilt and die.

**Affects many vegetables.**

**Management:** Early detection important; use insecticides as necessary, conserve beneficials.



J.T. Read, Mississippi State University, Bugwood.org

## Thrips

(*Frankliniella fusca*)

Stunted growth, dropped flowers, silvery scarring; plant may be diseased.

**Affects many vegetables.**

**Management:** Use insecticides and provide sanitation.



S.K. Brannan, University of Georgia

## Squash and leaf-footed bugs

(*Anasa tristis* and *Leptoglossus* spp.)

Leaves wilt, yellow or blacken, and die.  
Dropped fruit.

**Affects cucurbits and others.**

**Management:** Plant later. Use clean cultivation and insecticides that target nymphs.



F. Hale, University of Tennessee

## Stink and kudzu bugs

(various species)

Deformed fruit and blossoms; damage on stems and leaves.

**Affects various vegetables.**

**Management:** Apply foliar insecticides. Remove adults and egg masses by hand.

# Common Cultural Problems of Vegetables



R. Westerfield, University of Georgia

## Animal browsing

Plants are completely removed or branches and leaves appear cut off.

**Affects all vegetables.**

**Management:** Exclude animals with fencing. Repellents may work but are temporary.



R. Westerfield, University of Georgia

## Potassium deficiency

Chlorosis or yellowing on margins of leaves.

**Affects all vegetables.**

**Management:** Soil test, adjust pH and properly irrigate.



R. Westerfield, University of Georgia

## Sunscald

Fruit appears to be brown, wrinkled and sunken.

**Affects tomatoes, peppers, eggplants, cucumbers and other vegetables.**

**Management:** Lightly shade affected plants from afternoon sun until canopy is better developed.



R. Westerfield, University of Georgia

## Blossom-end rot

Round, black, water-soaked spot develops on the bottom end of the fruit.

**Affects tomatoes, peppers and certain cucurbits.**

**Management:** Maintain calcium levels. Provide sufficient and consistent irrigation.



R. Westerfield, University of Georgia

## Cat-facing

Malformed fruit with greenish bands around it.

**Primarily affects tomatoes.**

**Management:** Avoid planting when soil temperatures aren't warm enough. Provide consistent irrigation and well-drained soil.

# Common Cultural Problems of Vegetables



R. Westerfield, University of Georgia

## Blotchy ripening

Yellow blotches on the outside of the tomato skin. Tissue inside may contain heavy amounts of white core material.

**Primarily affects tomatoes.**

**Management:** Maintain nutrition, proper irrigation and avoid planting in cool soils.



South Dakota State University - Plant Science Dept.

## Nitrogen deficiency

Yellowing in the lower, more mature leaves first with plants growing slowly and stunted.

**Affects all vegetables.**

**Management:** Soil test and supply adequate nitrogen.



R. Westerfield, University of Georgia

## Cold damage

Leaves appear burned and may defoliate.

**Affects all vegetables.**

**Management:** Protect tender crops with cardboard boxes; mulch or use row covers when temperatures drop severely.



R. Westerfield, University of Georgia

## Phosphorus deficiency

Leaves display purple or bright green hue.

**Affects all vegetables.**

**Management:** Soil test for phosphorus and pH levels, especially in cool temperatures.



R. Westerfield, University of Georgia

## Drought stress

Uppermost leaves appear brown at tips. Plants droop or wilt.

**Affects all vegetables.**

**Management:** Provide sufficient irrigation at root zone.

# Common Cultural Problems of Vegetables



R. Westerfield, University of Georgia

## Overwatering

Plant leaves appear yellow and plant health declines.

**Affects all vegetables.**

**Management:** Avoid overwatering; grow plants in well-drained soils.



R. Westerfield, University of Georgia

## Herbicide damage

Leaves of affected plants are normally twisted, discolored or distorted.

**Affects all vegetables.**

**Management:** Use extreme care when applying herbicides near vegetable gardens.



R. Westerfield, University of Georgia

## Leaf roll

Leaves curl up and appear to be drought-stressed.

**Primarily affects tomatoes, but other crops can be affected.**

**Management:** Avoid early planting and cool temperatures.



R. Westerfield, University of Georgia

## Fruit cracking

Circular or radial cracks appear on the stem end of ripening fruit.

**Primarily affects tomatoes.**

**Management:** Maintain even soil moisture.



R. Westerfield, University of Georgia

## Poor pollination

Misshapen fruit or total lack of fruit set.

**Affects all vegetables.**

**Management:** Do not apply insecticides early in morning. Plant colorful flowers near the garden to attract more pollinating insects.

## Common Diseases of Vegetables



G. Holmes, CSU, Bugwood.org

### Early blight (*Alternaria solani*)

Brown lesions on leaves, stems and fruit. Increases during warm, wet weather.

**Affects tomatoes and potatoes.**

**Management:** Rotate crops, use mulch, stake or trellis plants, apply fungicides, remove infected plant material.



E. Little, University of Georgia

### Late blight (*Phytophthora infestans*)

Blighting of leaves, stems and fruit. Plants may die during cool, wet weather.

**Affects tomatoes and potatoes.**

**Management:** Remove infected material, use clean transplants, use resistant varieties, apply fungicides.



E. Little, University of Georgia

### Fusarium wilt

(*Fusarium oxysporum* f. sp. *lycopersici*)

Plants yellow, wilt and die.

**Primarily affects tomatoes.**

**Management:** Have long crop rotations, increase organic matter, use resistant varieties.



E. Little, University of Georgia

### Cucurbit powdery mildew

(*Podosphaera xanthii*)

White fungal growth on leaves. Leaves turn yellow and brown.

**Affects most cucurbits.**

**Management:** Plant early in open, sunny areas. Use resistant varieties, apply fungicides.



E. Little, University of Georgia

### Cucurbit downy mildew

(*Pseudoperonospora cubensis*)

Yellow to brown spots on leaves; leaves die.

**Affects squash, melons, cucumbers.**

**Management:** Plant early, plant in open, sunny areas. Avoid overhead irrigation, apply fungicides.

## Common Diseases of Vegetables



E. Little, University of Georgia

### Leaf spots on cucurbits

(*Alternaria*, *Alternaria cucumerina*; Anthracnose, *Colletotrichum orbiculare*)

Brown spots on leaves. Leaves may die.

**Affects melons and cucumbers.**

**Management:** Rotate crops, plant in open, sunny areas. Grow on trellis, apply fungicides.



E. Little, University of Georgia

### Yellow vine disease

(*Serratia marcescens* [bacterium])

Plants yellow, wilt and collapse. (Spread by squash bugs.)

**Affects squash and melons.**

**Management:** Plant early, manage squash bugs.



E. Little, University of Georgia

### Cucurbit viruses

Mottled, distorted and stunted leaves and plants. Common in late summer.

**Affects squash, melons, cucumbers.**

**Management:** Use resistant varieties, plant early, remove infected plants quickly.



G. Holmes, CSU, Bugwood.org

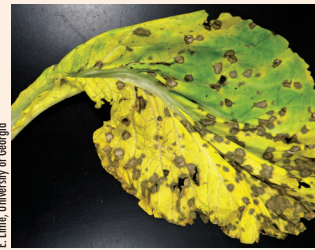
### Pepper anthracnose

(*Colletotrichum* spp.)

Sunken lesions on fruit.

**Affects peppers.**

**Management:** Use disease-free seed and transplants, rotate crops, remove infected fruit, plant in open, sunny areas. Avoid overhead irrigation.



E. Little, University of Georgia

### White leaf spot

(*Pseudocercospora capsellae*)

Spots on leaves. Leaves may die.

**Affects turnips and mustards.**

**Management:** Rotate crops, plant in open, well-drained areas. Avoid overhead irrigation, apply fungicides.

# Common Diseases of Vegetables



E. Little, University of Georgia

## Black rot

(*Xanthomonas campestris* pv. *campestris* [bacterium])

V-shaped lesions on leaf edges.  
Plants may die.

**Affects brassica crops.**

**Management:** Purchase clean seeds and transplants, rotate crops, avoid overhead irrigation, apply copper.



E. Little, University of Georgia

## White mold

(*Sclerotinia* spp.)

Rot of stems, fruits and flowers. White fungal growth often present.

**Affects many vegetables.**

**Management:** Destroy infected plants, rotate crops, avoid wet soils, increase microbial activity in soil.



E. Little, University of Georgia

## Southern blight

(*Sclerotium rolfsii*)

Plants wilt and die. Brown lesions form at soil line.

**Affects many vegetables.**

**Management:** Destroy dead plants, rotate crops, manage soil moisture, increase soil microbial diversity.



G. Holmes, CPSU, Bugwood.org

## Damping off

(*Rhizoctonia solani*, *Pythium* spp.)

Death of seeds and seedlings.

**Affects many vegetables.**

**Management:** Avoid cold, wet soils. Use sterile soil, improve soil microbial diversity, use treated seed.



E. Little, University of Georgia

## Root-knot nematodes

(*Meloidogyne incognita*)

Stunting, poor growth, galls on roots.

**Affects most vegetables.**

**Management:** Rotate to non-host cover crops, increase soil microbial diversity, use resistant varieties.

## Management Tips

- Check plants frequently and early in the season to detect pests and problems while they are still at a manageable level. Look for signs of discoloration or irregular growth.
- A magnifying hand lens can be a helpful tool.
- Avoid unnecessary pesticide applications to conserve pollinators and other beneficials.
- Use selective pesticides when possible to protect non-target species.
- Get a soil test every two years to avoid nutritional and pH issues.
- Use drip irrigation and keep water off stems and leaves.
- Choose an open, sunny site for garden.
- Improve soil with organic matter to help keep plants healthy.
- Avoid growing the same crop in the same spot (rotate crops).
- Be cautious about mulch. Grass clippings may contain herbicides.
- Remove and destroy diseased plants or plant parts, especially at the end of the season.

For additional information or further assistance, contact your local county Extension office or access our publications: [extension.uga.edu/publications](http://extension.uga.edu/publications).

This publication was developed collaboratively by university specialists in Georgia, Alabama and Tennessee.

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