

Module 16: Vegetables - Solanaceous



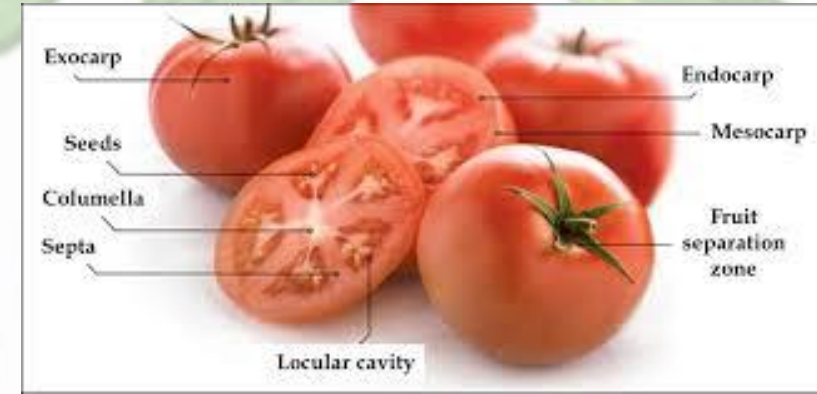
LSU AgCenter Home Gardening Certificate Course

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Solanaceae Crops

Solanaceae - Characteristics:

- Alternating leaf arrangement
- Vegetative parts often contain alkaloids
- Flower:
 - Solitary or Clustered
 - Flower parts in 5's
 - Petals and Sepals fused
- Fruit is a berry or capsule
- Berry - a simple fleshy fruit with many seeds, derived from a single ovary of an individual flower.

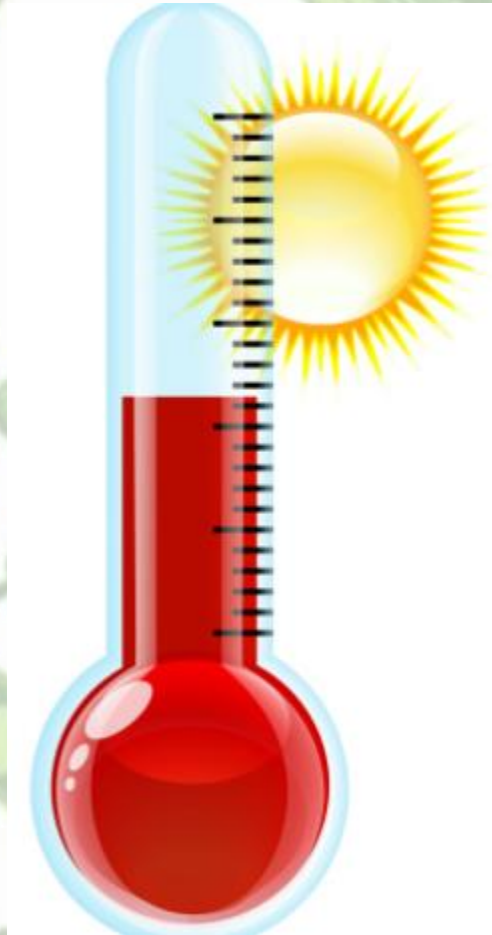


Common Solanaceous Vegetables



Growing

- Warm Season Crops (Spring/Summer)
- Easily damaged by mild frosts
- Seeds will germinate as low as 60°F; optimum usually 65-85°F
- Transplant: Tomato, Eggplant, Pepper
- Vegetative: Potato



Growing

- Warm well-drained soil, rich in organic matter
- Ideal pH 5.8-6.7 (tomato, eggplant, pepper) 4.8-5.4 (potato)
- Sunlight – 6-8 hours minimum direct
- Soil test for fertilization recommendations
- Generally:
 - Tomatoes – At planting, first fruit set, every 3-4 wks.
 - Peppers & Eggplant – At planting, first fruit set
 - Potato – At planting, when plants are 6-10" tall

Plant Spacing & Staking

Somewhat Variety Dependent, but in general:

Crop	Spacing	Staking
Eggplant	18-36"	Yes or No – Mostly yes
Pepper	12-18"	Yes or No – Some varieties definitely
Tomato	18-24"	Yes
Potato	9-12"	No

Days to Harvest

Varieties Dependent

Crop	Days to Harvest
Eggplant*	80-85
Pepper*	60-80
Tomato*	60-75
Potato	90-120

* - Days after transplanting

Best Harvested

Crop	Harvest When
Eggplant	Young fruit, should still be glossy
Pepper	Green or Ripe – ripe associated with color change
Tomato	Fruit is colored and slightly soft
Potato	“New Potatoes” 2-3 wks after flowering stops Mature Potatoes – 2-3 wks after foliage dies

Common Insect Pests - Aphids

Aphids:

- **Melon aphids** (*Aphis gossypii*) - yellow to dark green, and about 1.0 to 1.5 mm long.
- **Green peach aphids** (*Myzus persicae*) - light to dark green or pink, with red eyes.



Damage:

- Curled/Misshapen Leaves, Stunted plants.
- Chlorotic blotches
- Transmit viruses

Control:

- Insecticidal Soaps, Horticultural Oil, Neem Oil, Malathion
- Parasitic wasps, ladybird beetles, syrphid fly, lacewing



Common Insect Pests – Whiteflies

Greenhouse Whitefly (*Trialeurodes vaporariorum*) - Adult – 0.12” long, white and often keeps its wings flat on its back.

Sweetpotato Whitefly (*Bemisia tabaci*) – Adult - small, about 0.4” long, holds its solid white wings roof-like over a pale yellow body.

Damage:

- Vector viruses
- Defoliation and leaf stippling

Control: Neem, Horticultural oil, Insecticidal soap, Pyrethrin



Greenhouse Whitefly



Sweetpotato Whitefly

Lepidopteran Caterpillars

Beet Armyworm (*Spodoptera exigua*)

Green or black larva, up to 1 ¼" long; three lightly colored stripes running length of body; black spot on each side of body on second segment behind head;

Damage: Chewing damage to buds and leaves.

Control: *Bt* var *azaiwi* strain, Spinosad, carbaryl, chlopyrifos



Lepidopteran Caterpillars

Fall Armyworm (*Spodoptera frugiperda*) – Green, brown, or black caterpillar with black stripe down each side and yellowish-gray stripe down back; body up to 1 ½" long; head capsule with pale, but distinct inverted Y;

Damage: eats leaves and gouges fruit

Control: Bt, spinosad, carbaryl, bifenthrin, Confirm



Lepidopteran Caterpillars

Tobacco/ Tomato hornworm

(*Manduca sexta/quinquemaculata*) –

Greenish caterpillar up to 4" long with red/blue anal horn; body with fine white pubescence and 7 diagonal stripes on each side;

Damage: strips leaves from plants; infrequently feeds on fruit, leaving large, open superficial scars

Control: Hand-picking, Bt, carbaryl



Lepidopteran Caterpillars

Tomato Fruitworm (*Helicoverpa zea*) alias corn earworm, cotton bollworm - larvae are 1.5-2" long. May be green, brown, pink, yellow, or black. They have tan heads and alternating light and dark stripes run lengthwise on the bodies.

Damage: visible hole at the base of the fruit stem. When the fruit is cut, tunneling is evident and the cavity may contain frass and decay as well as the worm.

Control: Parasitic wasps, Diatomaceous earth, Bt, carbaryl, pyrethrins



Hemipteran Insects

Shield-Shape

Brown stink bug (*Euschistus servus*) - grayish-yellow with dark punctures on their back. The fourth and fifth antennal segments are darker in color.

Green stink bug (*Acrosternum hilare*) - bright green with a narrow orange-yellow line bordering the major body regions.

Brown marmorated stink bug (*Halyomorpha halys*) – Brown, 5/8" long. White bands on antennae in adult and immature forms.

Southern green stink bug (*Nezara viridula*) - dull green. Eyes are dark red or black. Small black dots along sides of the abdomen

Damage: misshapened, discolored fruit. Transmit microorganisms that cause fruit rot.

Control: Hand removal, Natural predators. Nymphs – insecticidal soaps, neem, pyrethrins, imidacloprid. Adults – imidacloprid, kaolin clay



Southern Green



Brown marmorated



Brown



Green

Hemipteran Insects

Leaffooted Bug (*Leptoglossus* spp.) (7 South Eastern U.S. species) - Leaffooted bugs get their name from the flattened tibia of the hind leg, which gives this segment a leaf-like appearance.

Damage: Mainly on fruit: Early damage - severe deformities and abscission. Later damage - small dark spots at the feeding site, hard tissue beneath fruit skin.

Control: Hand removal, kaolin clay, Neem, permethrin, cyfluthrin



L. zonatus



L. phyllopus



L. brevirostris



L. oppositus



L. gonagra



L. clypealis



Nymphs



L. occidentalis

Thysanopteran Insects

Multiple Thrips - typically 1-2 mm in length. Females are usually brown or black and the males are yellow.

Fringed wings.

Tobacco thrips (*Frankliniella fusca*)

Western flower thrips (*Frankliniella occidentalis*)

Damage: distorted young growth, flower drop, fruit scarring, VIRUS TRANSMISSION (e.g. TSWV)

Control: Natural predators, weed control, carbaryl,



Tobacco thrips



Western Flower Thrips



Common Insect Pests – Flea Beetles

Tobacco (*Epitrix hirtipennis*) - 1.4- 2.2 mm long, reddish, yellow brown, with a brown patch across the back

Southern tobacco (*Epitrix fasciata*) - slightly smaller and wider than the tobacco flea beetle

Pale striped (*Systema blanda*) - 3.0-4.3 mm long, a pair of pale yellow stripes down the back

Eggplant (*Epitrix fuscula*) - oval, black, 2 mm long

Damage:

Adults chew small holes in leaves, giving them a sievelike appearance.

Larvae feed on underground plant parts.

Control:

neem oil, Kaolin clay, carbaryl, permethrin, bifenthrin, imidacloprid



Pale Striped



Tobacco



Eggplant



Southern Tobacco



Common Insect Pests – Colorado Potato Beetle

Colorado potato beetle (*Leptinotarsa decemlineata*) - Adults - light tan to dark brown, oval. Five black lines on each side with light tan lines in between. The head is orange and brown with a triangular black spot. Larvae – plump reddish and black with two rows of black spots on each side of the abdomen.

Damage: Plant defoliation

Control: *Beauveria bassiana*, Neem, Spinosad, Azadirachtin



Mites

Twospotted spider mite

(Tetranychus urticae) - Adults are 0.4 to 0.5 mm long, Actively feeding females are clear to greenish with dark spots on the body.

Damage: Feed on leaf underside causing stippling, wilt, desiccation, abscission, distortion. Webbing

Control: Predatory mites, Neem, abamectin



Solanaceous Vegetable Diseases

Tomato – American Phytopathological Society lists:

Bacterial – 13

Phytoplasma - 3

Fungal – 33

Viral – 20

Viroid - 6

Nematode – 4

We will only highlight some common ones.

Common Diseases

Early blight (*Alternaria solani*, *Alternaria alternata*)- Tomato and Potato.

Symptoms: Affects stems, leaves and fruit. Symptoms usually start at the bottom of the plant. Typical symptoms are irregular-shaped brown spots with dark, concentric rings frequently surrounded by a yellow halo. Spots (cankers) on the stem are elongated and can girdle the stem causing the stem to collapse.

Control: Resistant varieties.
Improving. Mancozeb. Chlorothalonil.



Common Diseases

Late blight (*Phytophthora infestans*)

Tomato and Potato.

Symptoms: appear on all aboveground plant parts and tubers. Irregular, water-soaked, dark necrotic lesions. Rapidly enlarges to entire leaf.

Control: Remove and destroy any infected plants. Resistant varieties. Chlorothalonil. Mancozeb. copper or a combination of mancozeb plus copper.



Common Diseases

Southern blight (*Sclerotium rolfsii*) a soil-borne fungus. Tomato, potato, pepper, eggplant.

Symptoms: Attacks the crown of the plant at the soil line causing stem girdling, plant wilting. White fungal growth at the base of the plant and the nearby soil. In later stages, the fungus develops mustard seed-like structures (sclerotia) on the stem near the soil line.

Control: No fungicides registered use. When symptoms are first observed, remove and discard the affected plants along with the associated topsoil. Soil solarization.



Common Diseases

Cercospora leaf spot/frogeye leaf spot

(*Cercospora melongenae*, *C. capsici*) Eggplant, pepper.

Symptoms: Initial symptoms are small circular or oval chlorotic spots on leaves which develop light to dark brown centers;. Spots usually appear on the lower leaves first and move up the canopy. May develop concentric zones; severely infested leaves may dry out and curl then drop from the plant.

Control: mancozeb, chlorothalonil. If left unmanaged, the plants will drop their leaves prematurely, exposing the fruit to direct sunlight, resulting in sunscald.



Common Diseases

Bacterial spot (*Xanthomonas* spp.) is caused by a seed-borne bacterium. Tomato, pepper.

Symptoms: attacks the leaves, stems and fruit. Tomato - small irregular shaped, water-soaked spots. Older spots are crusty and have a yellow halo.

Pepper - Symptoms first appear as small circular water-soaked spots with a yellow halo. Leaf turns yellow and drops off prematurely.

Control: Relies on prevention. Resistant varieties. Certified disease-free seed and transplants. Avoid overhead watering. Copper-based fungicides can be used prophylactically.



Common Diseases

Southern bacterial wilt (*Ralstonia solanacearum*) - a soil-borne bacterium. Tomato, pepper, eggplant, potato.

Symptoms: Mature plants begin to wilt at the top of the plant when temperatures rise. Within two to three days the entire plant wilts and dies. The inner stem tissue will have a brownish color. The bacterium can survive in the soil for long periods of time even in the absence of a host plant.

Control: Remove and discard diseased plants, including the root system and any soil surrounding the root system. Soil sterilization. Grafted plants on resistant rootstock. No registered pesticides or resistant varieties.



Common Diseases

Phomopsis fruit rot and blight (*Phomopsis vexans*) – Eggplant

Symptoms: affects all above ground parts of the plant. Stems - have brown, elongated lesions. The leaves attached to the stem wilt and die. Fruit - multiple, tan colored, sunken lesions develop eventually covering most of the fruit surface. Persists in seed and overwinters in residue. Spores spread by splashing water.

Control: Resistant varieties. Mancozeb. Copper. Remove and Discard diseased fruit and dead plants.



Common Diseases

Anthracnose fruit rot

(*Colletotrichum* spp.) – Pepper, tomato, eggplant, potato.

Symptoms: Medium to large sunken lesions on fruit or tubers. Spots may be covered with masses of salmon-colored spores. The fungus can survive on seed, in the soil or on plant debris.

Control: Mulch - Protect plants from soil splashing. Avoid the use of overhead watering. Diseased fruit should be bagged and discarded. Remove plant debris.

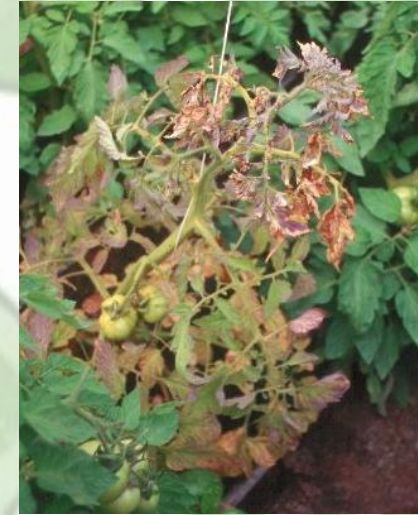


Common Diseases

Tomato spotted wilt virus (TSWV) –
Tomato, pepper, eggplant, potato –
Vectored by thrips.

Symptoms: TSWV symptoms include stunting, bronze spots on the leaves and twisted or cupped leaves. Dark spots and necrotic ringspots, often with chlorotic halos.

Control: Resistant varieties (none for eggplant). Weed control. Vector control. Remove diseased plants.



Common Diseases

Tomato yellow leaf curl virus (TYLCV)

– Tomato, pepper, eggplant, potato.

TYLCV vectored by whiteflies.

Symptoms: Yellowing and distortion of leaves. Affected plants appear stunted with abnormally small leaves.

Control: Resistant varieties. Remove diseased plants. Control vectors. Remove weeds.



This Can Come
From YOUR
Garden!





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