

Module 17:

Vegetables - Legumes



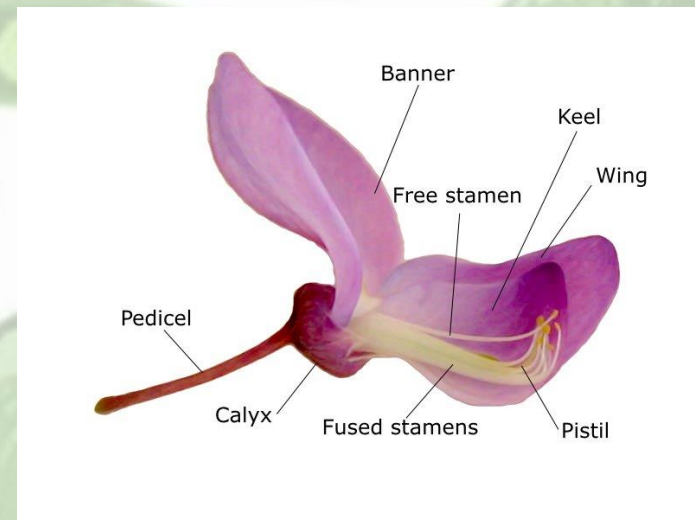
LSU AgCenter Home Gardening Certificate Course

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Legumes

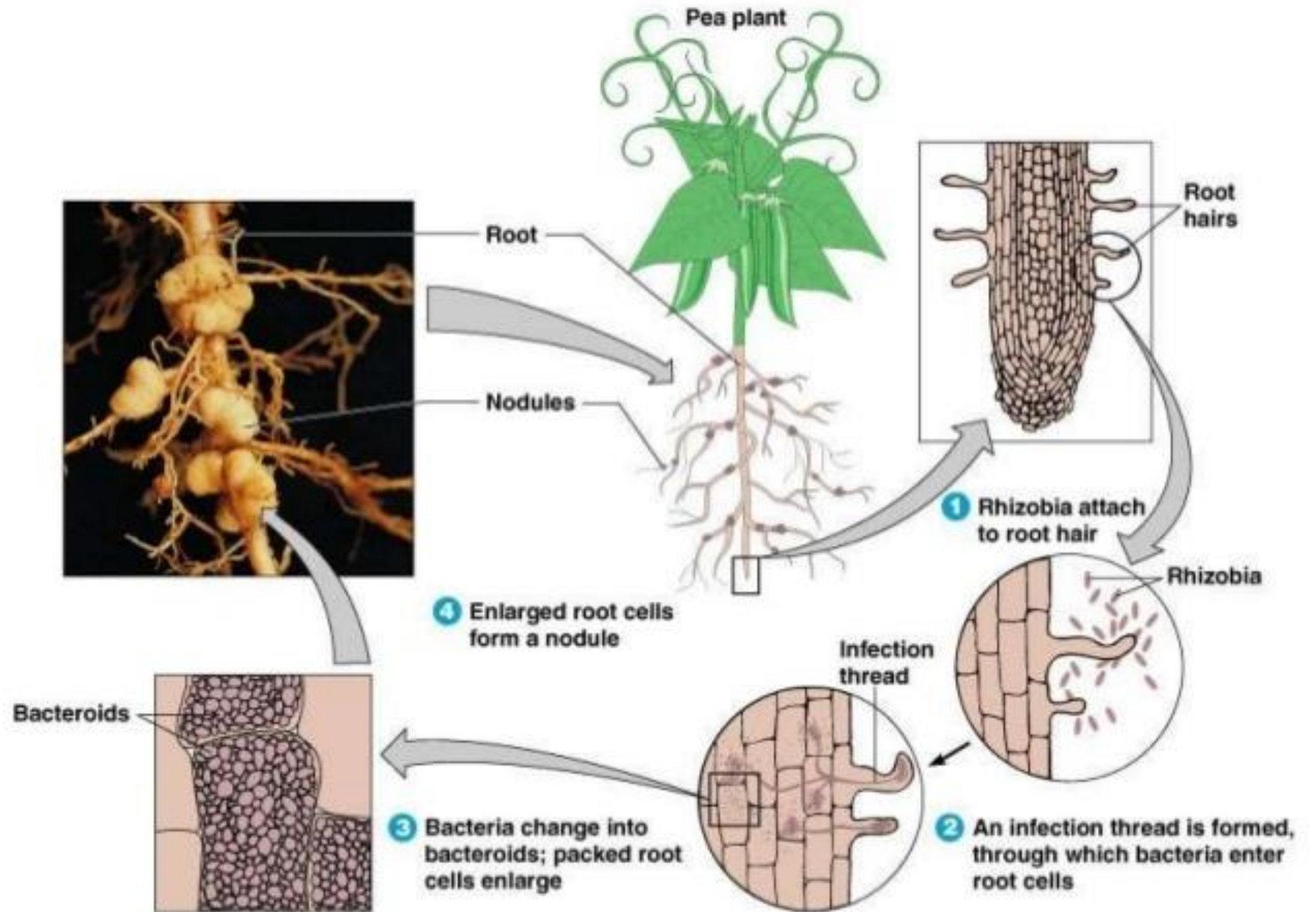
Fabaceae (formerly Leguminosae) Characteristics:

- Alternating, compound leaf arrangement
- Stipules – outgrowth on each side of leafstalk base
- Flower of legume **vegetables (papilionaceous)**:
 - Five petals (Standard, Wing (2), Keel (2))
 - Nine fused stamens and one single stamen
- Fruit is a legume (pod) - simple dry fruit that usually dehisces (opens along a seam) on two sides.
- Most plants in the Fabaceae family form symbiotic associations with bacteria which live in nodules on their roots and fix nitrogen.



Root Nodule Formation

The genus and species of rhizobia are specific to the legume which it infects.



Common Legume Vegetables



Soybean



Lima Bean



Cowpea



Snap Bean



Sugar Snap Pea



Fava Bean



Peanut



Jicama



Lentils

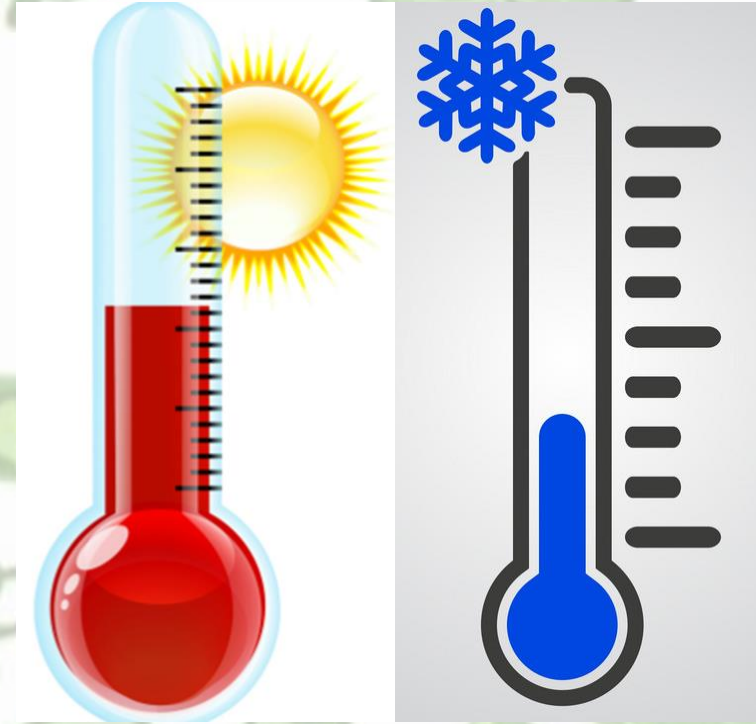


Chickpea

It is estimated that there are well over 400 different types or varieties of edible beans grown throughout the world.

Growing

- Cool Season Crops (Fall/Winter/Early Spring) Sugar peas, snow peas, fava beans
- Optimum germination 68-75°F
- Can survive mild frosts
- Warm Season Crops (Spring/Summer) Peanuts and all other beans
- Optimum germination 75-86°F
- Direct seed all legumes



Growing Peanuts

- Peanuts aren't usually considered for a vegetable garden. WHY NOT!
- Well-drained sandy soil, rich in organic matter
- Ideal pH 6.0 – 7.0
- Sunlight – 8 hours minimum direct
- Soil test for fertilization recommendations
- Generally, 1 ½ c. 8-8-8/100 ft.² at planting, sidedress with 1 c. gypsum (calcium sulfate) at flowering. Peanuts need Ca for pod development.

Growing Other Legumes

- Well-drained loam rich in organic matter
- Ideal soil pH 5.8-6.8
- Minimum 8 hours full sun per day
- Soil test for fertilization recommendations
- Generally, 1 lb. 8-24-24/100ft² at planting
- Some have pole and bush varieties – always stake pole varieties.
- Rhizobium inoculum is available and can increase plant health and yields

Plant Spacing, Days to Harvest, Season

Somewhat Variety Dependent, but in general:

Crop	Spacing	Days to Harvest	Season
Snap Beans	3-12"	48-66	Warm
Lima, etc.	4-12"	60-90	Warm
Soybeans	4-6"	75-85	Warm
Sugar Snap Peas/Snow	2-3"	60-70	Cool
Cowpeas/Fieldpeas	4-6"	70-80	Warm
Peanuts	4-8"	110-120	Warm
Fava	4-6"	75-80	Cool

Best Harvested

Crop	Harvest
Beans, Snap	Pods should be smooth, tender and green
Beans, Lima, etc.	Fresh - when pods are plump and seeds are bulging. Dry - when pods are dry and open easily.
Soybean	Fresh - just as pods begin to lose their color. Dry - when pods are dry and plant has lost 90% of leaves
Sugar peas/Snow peas	Snow peas – when pods are flat with little to no seed bulge Sugar snap – when pods are still green, plump and seed is just swelling Fresh peas – when pods are fully formed and pod wall begins changing color and thins
Cowpeas/Fieldpeas	Fresh – when pods are fully formed and seeds are bulging Dry – when pods are dry and easily split
Fava	Fresh – when pods are green and seeds are plump Dry – after pod has fully dried
Peanuts	Generally, when older leaves begin to yellow

Common Pests

You've seen these before:

- Aphids
- Armyworm
- Corn Earworm
- Stink bugs
- Thrips
- Two-Spotted
- Spider Mite
- Whiteflies



Black Bean Aphid



Mite Damage on Bean



Corn Earworm aka
Soybean Pod Worm



Green Stink Bug



Fall Armyworm on Bean



WFT damage on bean



Caterpillar Damage
to pods



Spider Mite
Webbing



Bean Leaf w/ Whiteflies

Common Pests

Mexican Bean Beetle (*Epilachna varivestis*) – Adults – oval (1/4" long) orange-brown with 8 black dots on each wing cover. Larva – greenish yellow with stiff branched spines.

Damage: Feed on leaves, flowers and pods. Leaves have a lace-like appearance. Pods will have chunks missing.

Control: Lots of natural predators, *Beauveria bassiana*, azadirachtin, carbaryl, bifenthrin, acephate



Common Pests

Bean Leaf Beetle (*Cerotoma trifurcate*) – Adult – polymorphic ranging from yellow to orange to red with black markings and a black triangle behind the head. Larva- cylindrical, white with brown head.

Damage: Larvae feed on roots. Adults feed on leaves and pods. Vectors Bean Pod Mottle Virus (BPMV)

Control: Insecticidal soaps, Neem, Spinosad, pyrethrin, bifenthrin



Common Pests

Cowpea curculio (*Chalcodermus aeneus*) – Adult – Black with bronze tint, ca. ¼" long, elongated mouthparts. Larva – Pale yellow

Damage: Adults and larvae feed on seeds inside pod, also on leaves.

Control: Parasitic flies and wasps, Entomopathogenic fungi, Neem, pyrethrin, bifenthrin, carbaryl



Common Pests

Lesser cornstalk borer (*Elasmopalpus lignosellus*) – Adult moths – ca. $\frac{3}{4}$ " long. At rest, the female moth is often charcoal-colored with wings held straight back along the body, while the male moth is tan-colored with charcoal wing strips. Larva - mature larvae are bluish green with distinct yellowish white stripes.

Damage: Larvae feed on roots and tunnel in stems causing wilting and girdling.

Control: Spinosad, Bt azaiwa, bifenthrin, cyfluthrin, diazinon, acephate



Common Pests

Tarnished Plant Bug (*Lygus lineolaris*) – Adult - small, flattened bug, about 1/4" in long, bronze in color with yellow and black markings. Nymphs - small, green and resemble immature aphids, black dots.

Damage: Transmit diseases. Terminal growth yellow or distorted. Flowers sometimes fail to develop on one side or the whole bud aborts.

Control: Remove weeds. Parasitic beneficials, carbaryl, bifenthrin



Common Pests

Banded cucumber beetle (*Diabrotica balteata*) –

Adult – 5-6 mm in length, greenish yellow in color with a red head. Usually, three transverse green bands across the back, a thin green stripe running down the center of the back. Larva - initially white, may also take on a pale yellow color.

Damage: Larvae feed only on the roots. Adults feed on all plant parts, may cause defoliation.

Known vector of bean viruses (cowpea mosaic virus, cowpea severe mosaic virus, cowpea chlorotic mottle virus, bean rugose mosaic virus, bean mild mosaic virus, quail pea mosaic virus,).

Control: parasitic nematodes, Neem, pyrethrins, bifenthrin, carbaryl, acephate



Common Diseases

Bacterial Brown Spot (*Pseudomonas syringae* pv *syringae*) – Bacterium overwinters on host weeds and plant debris.

Symptoms: Small, circular necrotic spots on leaves often with narrow halo. Lesions may fall out leaving a shot hole appearance. Infects all above ground parts.

Control: Remove weeds and plant debris, Avoid overhead watering. Resistant varieties. Copper.



Common Diseases

Common blight (*Xanthomonas axonopodis* pv *phaseoli*) – Bacterium is seed transmissible.

Symptoms: Water soaked spots developing into light brown irregular lesions with chlorotic halo. Infects all above ground parts.

Control: Certified disease-free seed. Sanitation. Crop rotation. Copper. Avoid overhead watering.



Common Diseases

Halo blight (*Pseudomonas syringae* pv *phaseolicola*) – Bacterium is seed transmissible. Can survive a year in plant debris.

Symptoms: Small, angular water-soaked lesions on leaf underside developing into reddish-brown necrotic lesions with halo. Water-soaked pod lesions may ooze bacteria.

Control: Certified disease-free seed, sanitation, copper. Avoid overhead watering.



Common Diseases

Anthracnose (*Colletotrichum lindemuthianum*)

Symptoms: Black, sunken lesions about ½ inch in diameter develop on stems, pods and seedling leaves (cotyledons) but are most prominent on pods. Lesions may develop salmon-colored ooze, and the veins on lower leaf surfaces turn black. May be seed-borne, survives for 2 years in soil on crop debris.

Control: Certified seed. Sanitation. Copper. Chlorothalonil.



Common Diseases

Bean rust (*Uromyces appendiculaters*) – fungus survives in the soil, on plant debris and even on poles used the previous year.

Symptoms: mainly a disease of leaves that causes rust-colored spots to form on the leaf surface. Severely infected leaves turn yellow, wilt, and fall off.

Stems and pods may also be infected.

Control: Remove plant debris, Chlorothalonil, Sulfur, Avoid overhead watering.



Common Diseases

Alternaria leaf spot (*Alternaria alternata*)

Symptoms: Small irregular brown lesions on leaves which expand and turn gray-brown or dark brown with concentric zones; older areas of lesions may dry out and drop from leaves causing shot hole; lesions coalesce to form large necrotic patches.

Control: Maintain plant nutrient health; sulfur, copper, chlorothalonil.



Common Diseases

White mold (*Sclerotinia sclerotiorum*) – infects nearly 400 plant species. Fungus can survive in soil for in excess of 5 years; disease can be spread by wind, contaminated irrigation water and by infected seeds. Sclerotia.

Symptoms: circular, dark green, water-soaked lesions on pods, leaves and branches which enlarge and become slimy; cottony white growth may be visible on lesions; death of branches and/or entire plant.

Control: Disease-free seed. Avoid excess nitrogen.



Common Diseases

Fusarium root rot (*Fusarium solani*) – Fungus can survive in soil for several years.

Symptoms: Young plants stunted with chlorotic leaves; older plants with chlorotic leaves and some leaf drop; severely decayed roots which are hollow and dry.

Control: Crop rotation. Avoid water stress.



Common Diseases

Damping-off (*Rhizoctonia solani*, *Pythium* sp., *Fusarium solani*) – common on bean seedlings. Infects older plants too.

Symptoms: damping off of seedlings; or stunting, yellowing and death of older plants. Elongated sunken reddish-brown lesions on roots and stems at or below the soil line. Lesions girdle the stem, causing the death of the plant.

Control: Seed fungicide pre-treatment, Sanitation.



Common Diseases

Bean common mosaic virus (BCMV) & Bean common mosaic necrosis virus (BCMNV)

- causes light and dark green mosaic patterns of infected leaves; systemic necrosis. Cupping and distortion. Aphid transmitted.

Bean yellow mosaic virus (BYMV) - bright yellow to green mosaic or mottle appearance of infected leaves. Cupping and distortion. Aphid transmitted.

Beet Curly Top Virus (BCTV) - stunting. On young plants, leaves pucker and curl down. General yellowing and death. Older plants become yellowed, dwarfed, and bunchy, and pods are stunted. Leafhopper transmitted.

Control: Resistant varieties. Remove weeds.

Vector control won't work – quickly transmitted.



BYMV



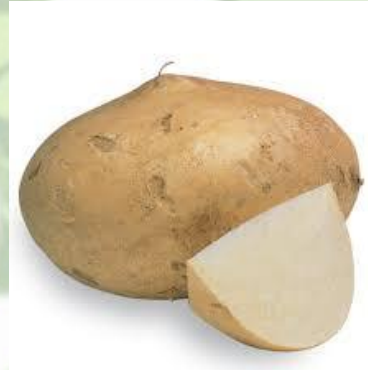
BCMV or BCMNV



BCTV



This Can Come From YOUR Garden!



Dixie Lee peas



Brown Crowder peas



Black Eye peas



Zipper peas



Whiteacre peas



Pink Eye peas





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