

Other Insects and Pests



FIGURE 1



FIGURE 2



FIGURE 3



FIGURE 4

Other Insects and Pests

AUTHORS: H.F. Schwartz and F.B. Peairs (Colorado State University)

PHOTOGRAPHS: Courtesy of F.B. Peairs (CSU), K.K.Mauna (Asiatic Agr. Ind.), and M. Sheppard et al. (SE Asia, Bugwood.org). [09/2011]

COMMON HOSTS: Legumes such as *Phaseolus vulgaris* are affected by various insects and other pests that are widespread in tropical to semi-tropical growing regions around the world. **NOTE:** Additional insect information is available on Legume ipmPIPE Diagnostic Pocket Series Cards “Legume Insect Pests” and “Legume Insect Vectors of Viruses”.

FIGURE 1 • Bean fly, *Ophiomyia phaseoli* is a shiny, metallic black fly 2 mm in length, with a wing span of 5 mm. Eggs are laid on the upper or lower surface of leaves. Maggots tunnel through leaf tissue (silvery mines), to the petiole, branch and/or upper part of the stem, and then down to the root. Affected plants may exhibit wilting, stunting, cracked or swollen stems, and death. It is important in tropical Africa and Asia.

FIGURE 2 • Bruchids (Weevils), *Acanthoscelides obtectus*, *Zabrotes subfasciatus* (left) are important dry bean pests in the Americas. Several *Callosobruchus* species infest stored tropical legumes worldwide. *A. obtectus* scatters eggs among stored seeds or infests bean pods in the field, while *Z. subfasciatus* attaches eggs to seeds. *C. maculatus* (right) attaches its eggs on cowpea seed either in the pod or in storage. Newly hatched larvae (1–2 mm) of all three species penetrate the seed coat and feed internally.

FIGURE 3 • Pod borers, *Apion godmani* (upper), *Epinotia aporema*, *Heliothis* spp., and *Maruca testulalis* (lower) lay eggs on or near pods, after which larvae penetrate pod walls and feed on pod tissue and seeds. *A. godmani* is a weevil, while the others are caterpillars.

FIGURE 4 • Bean slug, *Sarasinuola plebeia*, can consume entire leaves or even seedlings and also feed on pods. Slime trails often are present on affected plants. Adults live 12-18 months and reach 5-7 cm in length. Most damage occurs along the borders of fields, especially in weedy fields near streams. An estimated economic injury level is 0.25 slugs/m². It is an intermediate host for *Angiostrongylus costaricensis*, and *A. cantonensis* which are human pathogenic nematodes.

FACTORS FAVORING:

- Presence of previously infested crop debris
- Lack of crop rotation
- Poor sanitation of previous legume and weed debris
- Contaminated seed
- Susceptible varieties
- Moderate to high moisture conditions favor slugs

ADDITIONAL DIAGNOSTICS AVAILABLE AT:

<http://legume.ipmpipe.org>

<http://wiki.bugwood.org/PIPE:Legume>

<http://www.apsnet.org/> —Dry Bean Production & Pest Management

Whitefly-Transmitted Viruses



FIGURE 1

FIGURE 2



FIGURE 3



FIGURE 4



Whitefly-Transmitted Viruses

AUTHORS: H.F. Schwartz (Colorado State University), M.A.C. Langham (South Dakota State University), and J.K. Brown (University of Arizona)

PHOTOGRAPHS: Courtesy of F.J. Morales (CIAT—APS Bean Compendium), S.K. Mohan (Univ. of Idaho), J.K. Brown and H.F. Schwartz [09/2011]

COMMON HOSTS: Legumes such as *Phaseolus vulgaris* may be susceptible to one or more of these *Begomoviruses* transmitted in a persistent manner by whitefly biotypes (*Bemisia tabaci*: sweet potato sibling species group). These viral diseases occur in tropical to semi-tropical legume regions around the world including Latin America and Africa.

FIGURE 1 • *Bean calico mosaic virus* (BCaMV); a member of the Squash leaf curl virus clade. Symptoms resemble those of BGMV and BGMVY but differ by developing bright green and yellow mottling, and white sectoring in certain cultivars. Flowers may abort or produce empty and deformed pods. BCaMV occurs in western Mexico.

FIGURE 2 • *Bean dwarf mosaic virus* (BDMV). Symptoms include irregular yellow and green mottling, internode shortening, leaf malformation, flower abortion, and pod distortion. Chlorotic lesions on leaves may develop into yellow patches. BDMV is native to Colombia.

FIGURE 3 • *Bean golden mosaic virus* (BGMV). Symptoms include a mild to intense yellowing, systemic mosaic, flower abortion, and distorted pods with few seeds. BGMV is native to Puerto Rico, Dominican Republic, Central America, and the Caribbean.

FIGURE 4 • *Bean golden yellow mosaic virus* (BGMVY). Symptoms include dwarfing, mosaic, and chlorosis, and flower abortion. BGMVY is native to Brazil.

FACTORS FAVORING:

- Whitefly vector presence, especially in intensive and continuous mixed cropping systems (e.g., cotton, soybean, tobacco, tomato, potato, eggplant) and infected weeds (e.g., malvaceous, solanaceous, papilionaceous and other species) that favor whitefly vector reproduction
- Intensive insecticide use may promote insecticide-resistant populations of the whitefly vector and pest
- Susceptible varieties
- Infection at V1–V4 results in enhanced symptom severity, reduced pod set, poor seed fill, and yield loss

ADDITIONAL DIAGNOSTICS AVAILABLE AT:

<http://legume.ipmpipe.org>

<http://wiki.bugwood.org/PIPE:Legume>

<http://www.apsnet.org/> —Compendium of Bean Diseases, 2nd Ed.

Tropical Diseases



FIGURE 1



FIGURE 2



FIGURE 3



FIGURE 4



FIGURE 5

Tropical Diseases

AUTHORS: H.F. Schwartz (Colorado State University) and S.K. Mohan (University of Idaho)

PHOTOGRAPHS: Courtesy of G.E. Galvez (CIAT—APS Bean Compendium), S.K. Mohan and H.F. Schwartz [09/2011]

COMMON HOSTS: Legumes such as *Phaseolus vulgaris* are susceptible to various diseases that are widespread in tropical to semi-tropical production regions around the world.

FIGURE 1 • Entyloma Leaf Smut, *Entyloma* spp. Leaf lesions appear water-soaked and then gray-brown on the upper surface and gray-blue on the lower surface. Lesions contain mycelium and teliospores, and may coalesce and become delimited by leaf veinlets.

FIGURE 2 • Machismo, Phytoplasma organisms transmitted by leafhoppers such as *Scaphytopius fuliginosus*. Symptoms of this disease group may include witches' broom, virescence (flower petals turn light to dark green), phyllody (unopened, distorted floral structures), elongation of stems, and distorted pods with few seeds; and seeds may germinate in healthy appearing pods prior to harvest.

FIGURE 3 • Southern Blight, *Sclerotium rolfsii*. Infection appears as a slight yellowing on lower leaves, water soaking and darkening of hypocotyls above the soil line, and destruction of the cortex; followed by wilting, leaf drop and death. Small (1-2 mm diam), spherical, brown sclerotia form on coarse mycelium at the plant base. The pathogen has a very wide host range.

FIGURE 4 • Web Blight, *Rhizoctonia solani* (*Thanatephorus cucumeris*). Small necrotic lesions (2-10 mm in diam) with brown centers and olive green margins form on leaves. Lesions become water-soaked, enlarge and coalesce rapidly to take on a scalded appearance and become covered by whitish to brown mycelium with small sclerotia.

FIGURE 5 • Yeast Spot, *Nematospora* & *Eremothecium* spp. Symptoms appear after insects such as stink bugs (*Megalotomus* spp.) and lygus bugs (*Lygus* spp.) transmit the yeast organism to pods and developing seeds. Spores germinate and infect the seeds, producing irregular, slightly sunken rose, tan or brown lesions about 1 mm in diam.

FACTORS FAVORING:

- Presence of previously infested crop debris
- Lack of crop rotation
- Poor sanitation of previous legume debris
- Contaminated seed
- Susceptible varieties
- Moderate to high moisture conditions
- Infection at V2–R2 results in plant death, and/or reduced pod set, poor seed fill, and yield loss

ADDITIONAL DIAGNOSTICS AVAILABLE AT:

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<http://www.apsnet.org/> —Compendium of Bean Diseases, 2nd Ed.

Fungal Leaf Spots

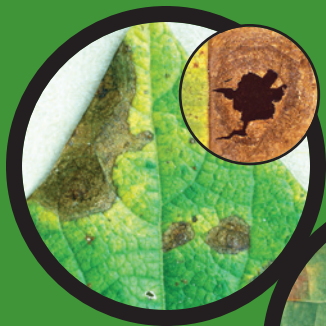


FIGURE 1

FIGURE 2



FIGURE 3



FIGURE 4



FIGURE 5



FIGURE 6



Fungal Leaf Spots

AUTHORS: H.F. Schwartz (Colorado State University) and S.K. Mohan (University of Idaho)

PHOTOGRAPHS: Courtesy of H.F. Schwartz & S.K. Mohan [09/2011]

COMMON HOSTS: Legumes such as *Phaseolus vulgaris* are affected by various fungal diseases that are widespread in tropical to semi-tropical growing regions around the world.

FIGURE 1 • Alternaria Leaf and Pod Spot, *Alternaria* spp. Lesions appear as small circular to irregular spots and flecks with a pale brown center and a dark margin on leaves and pods. Lesions may enlarge (5-15 mm in diam.) as concentric rings.

FIGURE 2 • Cercospora Leaf Spot and Blotch, *Cercospora* spp. Brown or rust-colored lesions (2-10 mm in diam.) may vary in shape (circular to angular) with a gray center and slightly reddish border. Tissue in the lesions dries and falls out. Lesions can occur on other plant parts.

FIGURE 3 • Floury Leaf Spot, *Mycovellosiella phaseoli*. Light green to slightly chlorotic lesions (10-15 mm in diam.) form on the upper leaf surface with white floury mats of fungal growth on the lower surface of leaves (rarely on the upper surface).

FIGURE 4 • Gray Leaf Spot, *Cercospora vanderysti*. Light green to slightly chlorotic lesions (2-5 mm in diam.) are usually delimited by veins and veinlets on the upper leaf surface with grayish white fungal growth on the lower surface of leaves.

FIGURE 5 • Powdery Mildew, *Erysiphe polygoni*. Slightly darkened spots (10 mm in diam) become covered by growth of white, superficial, powdery mycelium on leaves. Infection can occur on stems and pods as well.

FIGURE 6 • White Leaf Spot, *Pseudocercospora albida*. Lesions appear as white, angular spots (2-5 mm in diam.) restricted by veins. Spots become slightly gray with age and may appear pale green to yellow (chlorotic) on the upper leaf surface.

FACTORS FAVORING:

- Presence of previously infested crop debris
- Lack of crop rotation
- Poor sanitation of previous legume debris
- Contaminated seed
- Susceptible varieties
- Moderate to high moisture conditions
- Infection at V4–R2 results in enhanced symptom severity, reduced pod set, poor seed fill, and yield loss

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