

# TOMATO

Certainly! Here's detailed information for each of the diseases and pest issues listed for tomatoes:

## Bacterial Spot

- **What is the disease?** Caused by several species of *Xanthomonas*, it creates small, water-soaked spots on leaves, stems, and fruits, eventually turning into scab-like lesions.
- **How it occurs:** Spread through water (rain or irrigation) and contaminated tools/equipment. It thrives in warm, moist conditions.
- **Prevention:** Use resistant varieties, apply copper-based sprays early, and practice crop rotation. Avoid working in fields when plants are wet to prevent spread.
- **Cure:** Once established, control is difficult. Copper sprays and improved cultural practices can mitigate but not eliminate the disease.

## Early Blight

- **What is the disease?** Caused by the fungus *Alternaria solani*, it manifests as dark, concentric rings on older leaves and stems, leading to leaf drop.
- **How it occurs:** The fungus overwinters in the soil and plant debris, infecting through splashing rain or irrigation.
- **Prevention:** Rotate crops, till under infected debris, and practice good weed management. Use fungicide sprays when conditions favor disease development.
- **Cure:** Apply fungicides based on mancozeb or chlorothalonil, especially after periods of rain or heavy dew.

## Late Blight

- **What is the disease?** A serious disease caused by *Phytophthora infestans*, leading to rapid wilting, brown lesions on leaves, stems, and fruit.
- **How it occurs:** It spreads through spores in moist, cool weather and can devastate crops quickly.
- **Prevention:** Grow resistant varieties, improve air circulation with proper spacing, and avoid overhead irrigation. Use fungicides preventatively in high-risk areas.
- **Cure:** Apply specific fungicides promptly at the sign of outbreak. Infected plants should be removed and destroyed.

## Leaf Mold

- **What is the disease?** Caused by *Fulvia fulva* (formerly *Cladosporium fulvum*), resulting in pale green to yellow spots on upper leaf surfaces and a velvety, olive-green to brown mold on undersides.
- **How it occurs:** Favored by high humidity and temperatures between 71-79°F (22-26°C). It's more common in greenhouse tomatoes.
- **Prevention:** Ensure good air circulation, reduce humidity in greenhouses, and use resistant varieties.
- **Cure:** Apply fungicides that target leaf mold specifically. Improved ventilation and reduced leaf wetness can also reduce disease pressure.

### Septoria Leaf Spot

- **What is the disease?** Caused by *Septoria lycopersici*, this disease features small, circular spots with greyish centers and dark margins on leaves.
- **How it occurs:** The fungus survives in plant debris and soil, spreading through splashing water.
- **Prevention:** Practice crop rotation, till under plant debris, and avoid overhead watering. Use mulch to prevent soil from splashing onto lower leaves.
- **Cure:** Use fungicides containing chlorothalonil or copper when first symptoms appear and as part of a regular spray program.

### Spider Mites (Two-spotted Spider Mite)

- **What is the pest?** The two-spotted spider mite, *Tetranychus urticae*, is a tiny spider-like pest causing yellow stippling on leaves by sucking plant juices.
- **How it occurs:** Hot, dry conditions are favorable for rapid population growth.
- **Prevention:** Use reflective mulches to deter mites. Maintaining high humidity can discourage mite outbreaks.
- **Cure:** Introduce natural predators like ladybugs or use miticides as necessary. Ensure to alternate miticides to prevent resistance development.

### Target Spot

- **What is the disease?** Caused by the fungus *Corynespora cassiicola*, it includes symptoms of dark, target-like spots on leaves, leading to significant defoliation.
- **How it occurs:** The fungus thrives in warm, wet conditions and is spread by splashing water.
- **Prevention:** Use disease-free seeds, avoid overhead watering, and ensure good air flow around plants.
- **Cure:** Apply suitable fungicides and remove severely affected foliage. Crop rotation can help break the disease cycle.

### Yellow Leaf Curl Virus (TYLCV)

- **What is the disease?** A viral disease transmitted by the whitefly, *Bemisia tabaci*, causing leaves to yellow, curl upwards, and stunted plant growth.
- **How it occurs:** Whiteflies carry the virus from infected plants to healthy ones. Warm climates favor whitefly populations.
- **Prevention:** Use insect-proof netting for young plants, control whiteflies with insecticides or natural predators, and remove weeds that can host whiteflies.
- **Cure:** There's no cure for infected plants. Management focuses on prevention, controlling whiteflies, and removing infected plants to prevent spread.

### Mosaic Virus

- **What is the disease?** Tomato Mosaic Virus (ToMV) and Tobacco Mosaic Virus (TMV) can cause mottling, distortion of leaves, and stunted growth.
- **How it occurs:** Spread through mechanical transmission (tools, hands) and sometimes by seed. It's highly contagious.
- **Prevention:** Use virus-free seeds, sterilize tools, and avoid handling plants when wet.
- **Cure:** No cure exists. Infected plants should be removed and destroyed to prevent spread. Practice strict sanitation to control the virus.

### Healthy

- Of course, this indicates plants that are not exhibiting any of the symptoms of the diseases or pest issues above, displaying vigorous growth, green leaves, and healthy fruit production.

For management of any tomato disease or pest issue, adopting an integrated pest management (IPM) strategy is crucial, combining cultural, biological, and chemical controls for effective management.

# CORN

### Blight in Corn

There are several types of blight that can affect corn, including Northern Corn Leaf Blight and Southern Corn Leaf Blight. For general understanding, I'll focus on Northern Corn Leaf Blight (NCLB).

#### What is the disease?

- Northern Corn Leaf Blight is caused by the fungus *Exserohilum turcicum*. It is characterized by long, slender, gray to tan lesions on the leaves, which can reduce photosynthesis and weaken the plant.

#### How it occurs:

- The fungus thrives in cool, wet conditions. Spores are spread by wind and rain, infecting leaves and perpetuating the disease cycle.

**Prevention:**

- Plant resistant corn varieties.
- Practice crop rotation with non-host crops to reduce the fungal load in the soil.
- Keep fields clean of plant debris which may harbor the fungus.

**Cure:**

- Fungicide applications can be effective, particularly when applied shortly after the first signs of disease appear and before it spreads significantly.

**Common Rust**

**What is the disease?**

- Common Rust is caused by the fungus *Puccinia sorghi*. It produces powdery, reddish-brown pustules on both surfaces of the corn leaves.

**How it occurs:**

- The fungus is airborne and can travel long distances. It prefers cooler temperatures and moist environments.

**Prevention:**

- Plant rust-resistant corn varieties.
- Monitor fields regularly for early detection.

**Cure:**

- Apply fungicides as soon as rust pustules are observed, especially during cool, wet growing seasons to protect uninfected plants.

**Gray Leaf Spot**

**What is the disease?**

- Gray Leaf Spot is caused by the fungus *Cercospora zeae-maydis*. It leads to rectangular, grayish lesions on the leaves, which can coalesce and destroy large portions of leaf tissue.

**How it occurs:**

- The fungus overwinters in corn residue on the soil surface. Spores are spread by wind and rain splash.

**Prevention:**

- Practice crop rotation with non-hosts to decrease available inoculum.

- Bury crop residue to reduce spore survival.
- Plant resistant varieties when available.

#### **Cure:**

- Fungicides should be applied preventatively or at the earliest sign of disease spread. Application timing and the choice of fungicide can significantly influence the effectiveness of disease management.

#### **Healthy Corn Plants**

##### **Characteristics of healthy plants:**

- A healthy corn plant has a strong, upright growth habit.
- Leaves are vibrant green without spots or lesions.
- The plant develops fully, reaches maturity appropriately, and yields healthy ears of corn.

##### **Maintaining Plant Health:**

- Follow good agricultural practices, including proper spacing to ensure good air circulation.
- Maintain soil health through regular application of appropriate fertilizers and organic matter.
- Ensure adequate but not excessive irrigation to avoid water stress or overly wet conditions which can promote disease.
- Regularly monitor plant health to catch and address potential issues early.

For effective disease management in corn, integrating cultural, genetic, and chemical control measures as part of an overall crop management strategy is crucial. This approach helps reduce the reliance on chemical controls and promotes sustainable agriculture practices.

# **TEA**

#### **Anthracnose**

- **What is the disease?** Caused by various species of the genus *Colletotrichum*, this fungal disease leads to dark, sunken lesions on leaves, stems, and fruits.
- **How it occurs:** Spores spread via water, infected tools, and wind. High humidity and warm temperatures encourage development.
- **Prevention:** Space plants to improve air circulation. Prune infected parts promptly. Use disease-free planting material and ensure field sanitation.

- **Cure:** Apply fungicides containing copper or systemic fungicides as per guidance. Integrated disease management practices are recommended for long-term control.

#### **Algal Leaf Spot (*Cephaleuros*)**

- **What is the disease?** Caused by green algae *Cephaleuros virescens*, it manifests as raised, fuzzy, green to orange spots on the upper surface of leaves.
- **How it occurs:** The algae thrive in warm, humid, and shaded conditions, often attacking weak plants.
- **Prevention:** Increase sunlight and air flow by properly spacing and pruning trees. Control plant vigor through balanced fertilization.
- **Cure:** Copper-based fungicides can help control severe outbreaks. Improving plant vigor through appropriate cultural practices is also effective.

#### **Bird Eye Spot**

- **What is the disease?** Caused by the fungus *Cercospora angolensis*, characterized by small, round spots with a tan or grey center and a reddish-brown edge, resembling a bird's eye.
- **How it occurs:** Fungal spores spread through water splash and infect leaves under wet conditions.
- **Prevention:** Improve air circulation and reduce leaf wetness to decrease infection chances. Practice good sanitation.
- **Cure:** Apply fungicides as necessary, especially during wet conditions that favor the spread of this disease.

#### **Brown Blight**

- **What is the disease?** Caused by the fungus *Blumeria graminis*, this disease presents as brown or reddish spots or patches on the tea leaves.
- **How it occurs:** The fungus thrives and spreads rapidly in cool, humid environments.
- **Prevention:** Ensure good air circulation around plants. Avoid excessive nitrogen fertilization which can increase susceptibility.
- **Cure:** Apply sulfur-based or other appropriate fungicides following expert recommendations. Regular monitoring and immediate action upon first signs are crucial.

#### **Grey Blight**

- **What is the disease?** Caused by the fungus *Pestalotiopsis theae*, it causes small, circular, grey spots with a dark margin on leaves.
- **How it occurs:** The fungus favors warm, wet conditions, especially in crowded plantings with poor air flow.

- **Prevention:** Space plants adequately to improve air circulation. Practice regular pruning and remove infected leaves to reduce fungal spread.
- **Cure:** Fungicides effective against a broad range of fungi can be used following the labels and expert advice. Enhanced field hygiene and cultural control are foundational.

### Red Leaf Spot

- **What is the disease?** This fungal disease, often caused by *Exobasidium vexans*, results in bright red spots on the leaves, causing a reduction in photosynthesis and overall vigor.
- **How it occurs:** Spread through spores via air and rain, it proliferates in humid, cooler weather.
- **Prevention:** Regularly inspect plants and remove the initial infections promptly. Avoid overhead watering to reduce leaf wetness.
- **Cure:** Use protective fungicides as a preventive measure in areas with a history of the disease. Improving plant resilience through proper nutrition and management is also beneficial.

### White Spot

- **What is the disease?** Caused by the fungus *Corticium salmonicolor*, it produces white to pinkish patches on the surface of leaves.
- **How it occurs:** The fungus can spread through direct contact and by tools or equipment. High humidity and temperatures promote its growth.
- **Prevention:** Keep pruning tools sterilized. Maintain lower humidity levels around plants through adequate-spacing and proper irrigation techniques.
- **Cure:** Infected branches should be pruned and destroyed. Apply fungicides that are effective against a broad spectrum of fungi as a protective measure.

### Maintaining Healthy Tea Plants

- **Characteristics of healthy plants:** Strong, robust growth, with vibrant green, unblemished leaves.
- **Maintaining Plant Health:** Implement an integrated pest management approach. Ensure adequate spacing, proper nutrition, and appropriate water management. Regular monitoring and timely action against early signs of disease or infestation contribute significantly to maintaining healthy tea gardens.

Effective disease management in tea plants combines preventative measures, such as cultural practices to improve plant health and resilience, with the judicious use of fungicides when necessary. Always consider environmental factors and seek to adopt sustainable practices in managing tea plant health.

# APPLE

## Apple Black Rot

**What is the disease?** Apple black rot is caused by the fungus *Botryosphaeria obtusa*. It affects fruits, leaves, and bark, causing fruit rot, leaf spots, and cankers on the tree. The most recognizable symptom on fruits is the formation of black, sunken lesions.

**How it occurs:** The fungus persists in dead wood and mummified fruits, releasing spores during wet conditions that infect susceptible tissues. High humidity and warm weather favor its spread.

### Prevention:

- Prune and destroy dead and diseased branches to reduce the source of infection.
- Remove mummified fruits from the tree and the ground.
- Ensure proper air circulation within the canopy by pruning.
- Use resistant apple varieties where available.

### Cure:

- Apply fungicides that target black rot starting from pre-bloom until the end of the growing season, following the specific label recommendations. Fungicides containing captan and strobilurins are generally effective.
- Maintain good orchard sanitation to minimize the fungal load.

## Apple Cedar Rust

**What is the disease?** Caused by the fungi *Gymnosporangium juniperi-virginianae* (Eastern cedar-apple rust) and other *Gymnosporangium* species, this disease needs juniper (cedar) and apple (or crabapple) hosts to complete its life cycle. On apples, it causes bright orange to yellow spots on leaves and can deform fruits.

**How it occurs:** The fungus overwinters on junipers as galls. In spring, these galls produce spore horns that release spores, which are carried by the wind to infect apple leaves, blossoms, and young fruits.

### Prevention:

- Remove nearby juniper trees if feasible, or plant apple trees away from juniper hosts to minimize infection risk.
- Choose resistant apple varieties.
- Apply protective fungicides during the growing season if removal of juniper trees is not an option.

### Cure:



- Fungicide applications timed to coincide with spore release from the juniper host can reduce new infections but must be applied preventatively.
- Infected leaves and fruits should be removed and destroyed to reduce the source of inoculum.

### **Apple Scab**

**What is the disease?** Apple scab, caused by the fungus *Venturia inaequalis*, is one of the most common and destructive diseases affecting apples. It results in dark, olive-green to black spots on leaves and fruits. Severe infections can cause fruit deformation and significant leaf drop.

**How it occurs:** The fungus overwinters in fallen leaves and apple debris. During wet, spring conditions, spores are released and carried by wind or splashing water to infect new growth.

#### **Prevention:**

- Practice good sanitation by removing and destroying fallen leaves and other debris from under trees.
- Apply nitrogen fertilizers judiciously to avoid excessive soft growth which is more susceptible to infections.
- Prune to improve air circulation within the tree canopy.
- Plant resistant varieties if they are available for your area.

#### **Cure:**

- Fungicide applications may be necessary, especially in regions where apple scab is prevalent. They should be started at green tip through petal fall at intervals dictated by weather conditions (more frequent applications may be needed in wet conditions).
- Proper timing and selection of fungicides are crucial for control.

Management of these diseases in apple orchards involves a combination of cultural and chemical methods aimed at reducing the inoculum levels and protecting new growth from infection. Always follow local guidelines and regulations when applying fungicides to ensure safe and effective use.

# COTTON

Given the context, it appears the focus here is on common diseases affecting cotton plants and overall plant health. While "fresh cotton leaf" and "fresh cotton plant" imply healthy conditions, "diseased cotton leaf" and "diseased cotton plant" suggest a need for information on common diseases. Below are details on two prevalent cotton diseases, as specific diseases were not named under "diseased cotton leaf" and "diseased cotton plant":

## Cotton Leaf Curl Virus (CLCuV)

**What is the disease?** Cotton leaf curl virus is a devastating disease caused by a complex of virus species in the genus Begomovirus, which is transmitted by whitefly (*Bemisia tabaci*). It leads to a curling of leaves, stunted plant growth, and can dramatically reduce yields.

**How it occurs:** The disease is primarily spread by the whitefly, which acquires the virus from infected plants and transmits it to healthy ones during feeding. The high population of whiteflies and the presence of infected plants nearby increase the risk of spread.

### Prevention:

- Control whitefly populations through integrated pest management (IPM) strategies, including the use of reflective mulches to deter whiteflies, planting whitefly-resistant cotton varieties, and utilizing biological controls like natural predators.
- Remove and destroy infected plants to reduce virus sources.
- Avoid planting cotton back-to-back in the same field to reduce the buildup of pests and diseases.

### Cure:

- There's no cure for plants already infected with CLCuV. Management focuses on preventing the spread of the disease and controlling whitefly populations.

## Cotton Bacterial Blight

**What is the disease?** Also known as angular leaf spot or cotton black arm, bacterial blight is caused by *Xanthomonas citri subsp. malvacearum*. The disease manifests as water-soaked lesions on leaves, black arm on stems and branches, and boll rot, severely affecting cotton yield and quality.

**How it occurs:** The bacteria can survive in cotton seeds and plant debris, spreading through water splash, rain, and mechanical means. Warm, wet weather fosters the development and spread of the disease.

### Prevention:

- Plant certified, disease-free seeds.
- Use resistant cotton varieties if available.

- Rotate crops with non-host crops to reduce the bacterial load in the soil.
- Practice good field sanitation by removing and destroying infected plant residues.

#### **Cure:**

- Infected fields should be treated with appropriate bactericides, following recommended guidelines. However, prevention and use of resistant varieties remain the most effective management strategies.
- Implementing wide row spacing to improve air circulation and reduce leaf wetness can help minimize the conditions conducive to bacterial propagation.

### **Healthy Cotton Plants**

#### **Characteristics:**

- Fresh cotton leaves are typically broad, healthy green, and free of spots or deformities.
- A healthy cotton plant displays vigorous growth, has a strong stem, and produces numerous, well-formed bolls.

#### **Maintaining Plant Health:**

- Regular monitoring for pests and diseases and implementing IPM practices.
- Ensuring balanced fertility to promote healthy plant growth without encouraging conditions favorable to pests and diseases.
- Providing adequate irrigation, avoiding water stress, and optimizing plant density and row spacing to improve air flow and reduce disease pressure.

Maintaining the health of cotton plants involves proactive management practices to prevent diseases and manage pests effectively, as well as implementing cultural practices that promote vigorous plant growth and resilience to challenges.

# **POTATO**

### **Early Blight**

**What is the disease?** Early blight is a common potato disease caused by the fungus *Alternaria solani*. It is characterized by small, dark spots on older leaves, which can expand into larger rings, giving a target-like appearance. The disease can also affect the stems and tubers, leading to reduced yield and quality.

**How it occurs:** The fungus overwinters in soil and plant debris, becoming active in warm, humid conditions. It spreads through rain splash, irrigation, and contaminated equipment.

#### **Prevention:**

- Rotate crops with non-hosts for at least three years to reduce soil inoculum levels.
- Practice good field sanitation by removing and destroying infected plant debris.
- Use certified, disease-free seed potatoes.
- Manage irrigation to avoid prolonged leaf wetness and reduce humidity in the canopy.
- Apply a preventive fungicide regimen, particularly during conditions that favor the disease.

#### **Cure:**

- Once symptoms are observed, apply recommended fungicides to protect uninfected foliage. Products containing chlorothalonil or mancozeb are commonly used. Be sure to rotate fungicide groups to prevent resistance development.

#### **Late Blight**

**What is the disease?** Late blight is a potentially devastating disease of potatoes caused by the oomycete *Phytophthora infestans*. It can destroy leaves, stems, and tubers quickly under favorable conditions. The disease is most infamous for causing the Irish Potato Famine. Symptoms include rapid blight of foliage, dark lesions on stems, and dark, firm rot of tubers.

**How it occurs:** The pathogen thrives in cool, wet weather conditions and spreads through wind-driven rain, equipment, and infected plant material. Spores can travel long distances through the air and infect fields far from the initial source.

#### **Prevention:**

- Implement crop rotation and avoid planting potatoes in fields adjacent to last year's potato or tomato crops.
- Destroy volunteer potatoes and solanaceous weeds that can harbor the pathogen.
- Use resistant potato varieties whenever possible.
- Employ targeted irrigation practices to minimize leaf wetness and humidity.
- Apply a protective fungicide before the disease appears, especially when conditions are favorable for disease development.

#### **Cure:**

- Once detected, apply a specific fungicide for late blight management. Products containing metalaxyl or mefenoxam can be effective, but resistance is a concern, so these should be used in rotation with other modes of action.
- Infected plants should be removed and destroyed to prevent further spread.

#### **Healthy Potato Plants**

##### **Characteristics:**

- Healthy potato plants are vibrant green with sturdy stems and well-formed leaves.

- The plants produce a robust yield of tubers that are firm, unblemished, and free of rot.

#### **Maintaining Plant Health:**

- Select high-quality, certified disease-free seed potatoes.
- Provide adequate spacing between plants to ensure good air circulation.
- Manage irrigation to avoid excessive soil moisture and prevent standing water in fields.
- Monitor crops regularly for early signs of disease and pest activity.
- Implement a balanced fertilization program to support healthy growth without overstimulating foliage, which can be more susceptible to diseases.

Ensuring the health of potato crops involves proactive disease prevention strategies, regular monitoring, and timely intervention when diseases are detected. This integrated approach helps maintain productive and healthy potato fields.

# **CITRUS**

#### **Black Spot**

**What is the disease?** Citrus Black Spot is a fungal disease caused by *Guignardia citricarpa*. It primarily affects the fruit skin creating dark, sunken spots or lesions, often leading to premature fruit drop. It doesn't usually affect the fruit's internal quality but severely impacts its marketability.

**How it occurs:** The fungus thrives in warm, wet conditions. Spores are spread by rain splash and infect citrus fruit through the skin. The disease cycle is closely linked with leaf litter and other plant debris that harbors the fungus.

#### **Prevention:**

- Keep groves clean by removing fallen leaves and fruit which can harbor the fungus.
- Practice good water management to minimize extended periods of leaf and fruit wetness.
- Apply copper sprays or other recommended fungicides during periods of rapid fruit growth and before rain events, as a protective measure.

#### **Cure:**

- Once the disease is present, the use of fungicides becomes the primary control method. Application timing and frequency should follow local extension service recommendations to be effective.

- Severely affected orchards may require more aggressive management, including the removal of highly susceptible varieties.

### **Canker**

**What is the disease?** Citrus canker is a bacterial disease caused by *Xanthomonas citri subspecies citri*. It causes raised lesions or cankers on leaves, stems, and fruit, which is accompanied by yellow halos. Severe infections can lead to leaf drop, blemished fruit, and premature fruit drop.

**How it occurs:** The bacterium spreads primarily through water movement, be it rain splash or overhead irrigation, and can be disseminated by wind-blown rain, contaminated equipment, and people moving through groves.

#### **Prevention:**

- Avoid the overhead irrigation that can spread the bacterium.
- Implement windbreaks to reduce the spread of the bacteria by wind-driven rain.
- Disinfect tools and equipment and institute a stringent sanitation protocol to prevent spread from infected groves.
- Apply copper-based bactericides as a protective barrier on susceptible tissues during wet and warm conditions when the disease spreads most effectively.

#### **Cure:**

- Infected trees should be treated with bactericides to manage the spread; however, complete eradication of the disease from a grove once established is very difficult.
- Severely infected trees or sections of a grove may need to be destroyed to contain the spread of the disease.

### **Greening (Huanglongbing - HLB)**

**What is the disease?** Citrus Greening, also known as Huanglongbing (HLB), is a bacterial disease caused by *Candidatus Liberibacter* spp. It's one of the most serious citrus diseases, causing misshapen, bitter fruits, yellow mottling of leaves, reduced yield, tree decline, and eventually death.

**How it occurs:** The disease is primarily spread by the Asian citrus psyllid, a small insect that feeds on citrus trees. The psyllid acquires the bacterium while feeding on infected trees and transmits it to healthy trees during subsequent feedings.

#### **Prevention:**

- Control the Asian citrus psyllid through the use of insecticides and biological control agents.
- Remove and destroy infected trees to reduce the spread of the disease.
- Use disease-free planting material for new plantings or replanting.

#### **Cure:**

- There's currently no cure for HLB. Integrated management strategies focusing on psyllid control, use of disease-free nursery stock, and removal of infected trees are the best methods for managing the disease.

### **Melanose**

**What is the disease?** Melanose is a fungal disease caused by *Diaporthe citri*. It affects the fruit, leaves, and young twigs, causing raised, rust-colored spots. While primarily a cosmetic issue affecting fruit marketability, severe infections can cause leaf drop and twig dieback.

**How it occurs:** The fungus lives in dead wood and is disseminated by water splash. Warm, wet springs and summers favor disease development.

#### **Prevention:**

- Prune dead wood from trees to reduce the source of inoculum.
- Avoid injury to trees, as wounds can provide entry points for the fungus.
- Apply copper-based fungicides as a protective measure during periods of new growth and before rain events.

#### **Cure:**

- Effective control relies on protective fungicide applications and cultural practices aimed at reducing the source of the fungus.
- Ensure proper sanitation by removing and destroying debris from around trees that may harbor the fungus.

# **MANGO**

### **Anthracnose**

**What is the disease?** Anthracnose in mango is caused by the fungus *Colletotrichum gloeosporioides*. It is one of the most common and serious diseases in mango, affecting flowers, leaves, and fruit. It manifests as black, sunken lesions on the fruit, leading to significant post-harvest losses.

**How it occurs:** The fungus thrives in moist, warm conditions and can spread rapidly. It overwinters in infected plant debris and is spread by rain splash and contaminated equipment.

#### **Prevention:**

- Prune trees to improve air circulation.
- Remove and destroy fallen leaves and fruits, which can harbor the fungus.

- Apply protective fungicides during the flowering period and pre-harvest, following local guidelines for application and timing.

**Cure:**

- Use registered fungicides as a post-harvest treatment for fruits. Pre-harvest, apply fungicides that are effective against anthracnose following recommended guidelines.

**Bacterial Canker**

**What is the disease?** Bacterial canker in mango is caused by *Xanthomonas axonopodis* pv. *mangiferae*indicae. It leads to cankers on stems, branches, and fruit, and can cause leaf spotting and gummosis.

**How it occurs:** The bacteria enter the plant through wounds or natural openings and are spread by rain, insects, and contaminated tools.

**Prevention:**

- Avoid mechanical injuries to trees.
- Practice good sanitation by removing and burning infected plant parts.
- Use copper-containing bactericides as a preventive measure, especially after pruning.

**Cure:**

- There is no cure for trees once they are heavily infected; however, the progression can be slowed with the application of copper-based bactericides. Severely diseased limbs should be pruned and burned.

**Cutting Weevil**

**What is the pest?** The mango cutting weevil (*Sternonchetus mangiferae*) attacks the stems of young shoots and can bore into the fruit, causing direct damage and making the fruit vulnerable to secondary infections.

**How it occurs:** Weevils lay their eggs in the bark of mango trees. The larvae then bore into the plant tissues, which can kill young shoots or cause fruit to drop prematurely.

**Prevention:**

- Regularly monitor trees, especially during the flowering and fruiting seasons.
- Maintain good orchard sanitation by removing and destroying infested plant parts.

**Cure:**

- Use insecticides recommended for weevil control in mangoes. Pesticide application timing and methods should follow expert recommendations for effective management.

**Die Back**



**What is the disease?** Die back is a condition in mango trees where branches start drying back from the tips owing to fungal infections, primarily caused by *Lasiodiplodia theobromae*, among others.

**How it occurs:** The fungus enters the tree through wounds and spreads during moist, humid conditions, causing the tissue to die back.

**Prevention:**

- Avoid injuries to the trees.
- Prune infected branches well below the last visible signs of the disease and burn them.
- Paint the wounds with fungicide to prevent infection.

**Cure:**

- Similarly, to prevention, infected parts of the tree should be removed. Apply fungicides to protect healthy tissues and promote recovery.

**Gall Midge**

**What is the pest?** The mango gall midge (*Procontarinia matteiana*) causes the formation of galls on leaves and sometimes on flowers, affecting the photosynthetic capability of the plant and the overall yield.

**How it occurs:** Midge larvae feed on the plant tissues, leading to gall formation. The pest is more prevalent in wet conditions.

**Prevention:**

- Prune and destroy affected plant parts to reduce the population of midges.
- Encourage natural predators by maintaining a biodiversity-friendly environment around the orchard.

**Cure:**

- Application of appropriate insecticides can help control the midge population. It's crucial to follow local guidelines for the timing and use of these products.

**Powdery Mildew**

**What is the disease?** Powdery mildew, caused by the fungus *Oidium mangiferae*, affects leaves, flowers, and young fruits of mango trees, covering them in a white, powdery fungal growth.

**How it occurs:** The fungus prefers high humidity and moderate temperatures. Spores are airborne and can infect other trees over long distances.

**Prevention:**

- Ensure good air circulation through regular pruning.
- Apply sulfur or other recommended fungicides at the first sign of the disease.

**Cure:**

- Fungicide applications should be made at the correct time and rate to effectively control the disease while minimizing impact on beneficial organisms.

**Sooty Mould**

**What is the disease?** Sooty mould is a fungus that grows on honeydew secreted by insects such as aphids, scale insects, and mealybugs. It forms a black coating on leaves, significantly reducing photosynthesis.

**How it occurs:** The condition is secondary to insect infestations that produce honeydew, on which the sooty mould fungus thrives.

**Prevention:**

- Control the primary insect infestation to prevent sooty mould development.
- Apply insecticides to manage populations of aphids, scales, and mealybugs.

**Cure:**

- Once the causative insect infestation is controlled, sooty mould can be washed off the leaves with a strong jet of water or treated with neem oil or similar products to help remove the fungus.

Managing health in mango orchards requires an integrated approach, addressing both the direct issue (be it fungal, bacterial, or pest-related) and the underlying causes, such as environmental conditions that favor the development of these problems. Regular monitoring and timely interventions are key to maintaining a healthy orchard.

# RICE

**Bacterial Leaf Blight**

**What is the disease?** Bacterial leaf blight is caused by the bacterium *Xanthomonas oryzae pv. oryzae*. It is characterized by wilting of seedlings and yellowing and drying of leaves, starting from the tips and margins, progressing inward. In severe cases, it can cause significant yield loss.

**How it occurs:** The bacteria spread primarily through infected seeds, water splash, and contaminated tools. It enters the plant through wounds or natural openings and is favored by high humidity and temperatures between 25°C to 30°C (77°F to 86°F).

**Prevention:**

- Use certified disease-free seeds.
- Manage field water diligently to avoid excessive moisture.
- Practice crop rotation with non-host crops to break the disease cycle.
- Ensure balanced fertilization, avoiding excessive nitrogen application.

#### **Cure:**

- Once the disease is established, the focus shifts to management as no direct cure is available. Apply copper-based bactericides or antibiotics such as streptomycin sulfate following local extension recommendations, though their effectiveness can vary.
- Removing and destroying infected plant debris can help reduce the spread.

#### **Brown Spot**

**What is the disease?** Brown spot is caused by the fungus *Helminthosporium oryzae* (also known as *Cochliobolus miyabeanus*). Symptoms include circular or oval brown spots on leaves, grains, and glumes, which can merge and cover large areas. This disease can lead to reduced seed quality and grain yield.

**How it occurs:** The fungus persists in infected plant residues and soil. It spreads through air, seeds, and water splash. The disease is more severe under conditions of nutrient deficiency, particularly silicon and potassium, and in fields with poor drainage.

#### **Prevention:**

- Use disease-free seeds and treat seeds before planting.
- Maintain balanced soil fertility to promote healthy plant growth.
- Practice crop rotation and remove infected plant debris to reduce inoculum sources.

#### **Cure:**

- Fungicidal sprays can help control the disease, especially when applied at the first sign of infection. Products containing propiconazole or azoxystrobin have been effective.
- Enhancing plant vigor through appropriate fertilization, especially with potassium and silicon, can also reduce disease severity.

#### **Leaf Smut**

**What is the disease?** Leaf smut of rice is caused by the fungus *Entyloma oryzae*. It produces long, narrow, black or dark-brown lesions on the leaves, which can reduce photosynthetic area and, thus, affect plant growth and yield.

**How it occurs:** The fungus survives in infected crop residues and soil. It infects new plants through water splash or direct contact. The disease thrives in warm, humid environments.

#### **Prevention:**

- Plant smut-resistant rice varieties, where available.

- Rotate crops to reduce the buildup of fungal spores in the soil.
- Remove and destroy infected plant material at the end of the growing season.

**Cure:**

- Applying protective fungicides as a foliar spray can help manage leaf smut, though resistant cultivars and cultural practices are the primary methods of control.
- Ensuring plants are not stressed, especially through proper nutrition, can help reduce the impact of the disease.

In all cases, an integrated management approach combining cultural, biological, and chemical methods tailored to local conditions and crop varieties will provide the most effective disease control and maintain crop health.