Anthracnose

It is a common fungal disease that affects mango trees, causing dark lesions on leaves, flowers, and fruit.

Homemade Anthracnose Control Solution:

Ingredients:

1. Neem oil - 30 ml
2. Baking soda - 15 grams
3. Potassium bicarbonate - 15 grams
4. Copper fungicide - 20 ml (ensure it's labeled for use on mango trees)
5. Water - 1 liter

Instructions:

1. Neem Oil:

- Neem oil has antifungal properties and helps control anthracnose.
- Measure 30 ml of neem oil and add it to a container.

2. Baking Soda:

- Baking soda acts as a fungicide and helps control the spread of anthracnose.
- Measure 15 grams of baking soda and add it to the container.

3. Potassium Bicarbonate:

- Potassium bicarbonate is an effective fungicide and also helps regulate pH.
- Measure 15 grams of potassium bicarbonate and add it to the container.

4. Copper Fungicide:

- Copper fungicides are widely used for controlling fungal diseases in plants.
- Measure 20 ml of copper fungicide and add it to the container.

5. Water:

- Use clean, lukewarm water for better mixing and application.
- Add 1 liter of water to the container.

6. Mixing:

- Thoroughly mix all the ingredients until they are well combined.

7. Application:

- Apply the solution using a spray bottle or a garden sprayer.
- Ensure complete coverage of leaves, flowers, and fruit, focusing on affected areas.

8. Frequency:

- Apply the solution every 10-14 days, especially during the growing season and in humid conditions.

9. Preventive Measures:

- Prune and remove infected plant parts regularly.
- Provide adequate spacing between trees for proper air circulation.
- Avoid overhead watering to reduce moisture on leaves.
- Ensure proper drainage around the tree.

10. Note:

- Always test the solution on a small portion of the plant first to check for any adverse reactions.
- Apply the solution in the early morning or late evening to avoid sunburn on the leaves.

PEST MANAGEMENT DECISION GUIDE: GREEN AND YELLOW LIST

plantwise

Anthracnose fungal disease in mango

Colletotrichum gloeosporioides

Brow spots along leaf edges due to anthracnose (photo: Scot Nelson)

Sap oozing from infected area of a semi-ripe mango (Photo: Thaumaturgist

Disease on ripe fruits (photo: Scot Nelson)

Prevention	Monitoring	Direct Control	Direct Control	Restrictions
• Plant tolerant varieties like Kent • Plant trees with sufficient spacing of at least 2.5m x 2.5m for dwarf mango and 5m x 5m for high-stem trees to allow air circulation • Prune the mango trees 3 times per year, of which 1 to be done before flowering, so that full cover sprays can be achieved • The prunings should be destroyed by burying away from the mango trees or burning • Control weeds at all times. • Rotten and fallen fruits should be buried in a pit to prevent the spread of the disease by wind. • Harvest mangoes carefully to prevent injuries and do not allow them to touch the ground, so that they do not get the disease. • Keep trees healthy by applying 5 to 10 kg animal manure, or 5 to 15 cm layer compost around trunk, 2 to 3 times a year, to better tolerate the disease • When harvesting start from uninfected to infected trees to avoid spreading the disease.	• Mark 10 trees per block of about 1 lima, or 10 trees out of 50 trees, and observe them weekly from flowering to harvest. • Look for small, black sunken spots at leaf margins, flowers, and fruits. Spots later become large necrotic areas. Note that black large and small spots near or along the central vein of leaves, is not anthracnose. • During susceptible stage of flowering and during rainy season, monitor twice a week. • Consider action when 3 out of 10 trees have leaves showing signs of the disease. • If the fruits show the disease, action is too late.	• Infected leaves, flowers or fruits cannot be cured. • Rake and dispose of fallen leaves and twigs. • Spray 70% Neem Oil to prevent further anthracnose spread every 7 to 14 days for 1 to 2 months. • Post-harvest hot water treatment reduces anthracnose on stored mango: Dip newly harvested fruits in a tank of 50-55°C water for 5-10 mins. Put water on the fire and keep your finger dipped for a 1 minute without getting burnt; then the temperature has been achieved. Then cool the fruits by putting them into cold water for 2 hours or place them in a well-ventilated area.	• Most fungicides are contact chemicals with protective action but have little to no curative effect: • When using a pesticide or botanical, always wear protective clothing and follow the instructions on the product label, such as dosage, timing of application, pre-harvest interval, max number of sprays, restricted re-entry interval. Do not empty into drains and water sources.	
			• Azadirachtin – based products or other neem extracts (Azatin, Turplex, and others). Apply at blossoming or between fruit set to maturity. It is usually used as an insecticide but also has fungicidal action.	• Not WHO classified but unlikely to present acute hazard in normal use. Pre-harvest interval p.h.i. 3 days; restricted re-entry interval r.e.i. 1 day after spray; max 2 sprays in min 7 day intervals.
			• Carbendazim - based products (SAAF, SAFE, and others). Usually applied at 20 to 50gms in 20ltr container but double check labels. Apply 1 week after start of flowering followed by a spray when half of the field has flowered. Repeat the spray after a weak if necessary. Benzimidazoles group of fungicides.	• WHO toxicity class U (Unlikely to present acute hazard in normal use); P.h.i. 17 days at simple rate and 28 days at double rate; r.e.i. 1 day after spray; max 3 sprays at minimum 14 day intervals. Do not treat on waterlogged soils. Toxic to predatory mites. Non-toxic to bees but toxic to fish and earthworms.

Bacterial canker

It is a disease caused by bacteria that affects mango trees, leading to cankers on branches and trunks.

Ingredients:

1. Copper sulfate - 20 grams

2. Hydrated lime - 50 grams

3. Neem oil - 30 ml

4. Garlic extract - 20 ml

5. Water - 1 liter

Instructions:

1. Copper Sulfate:

- Copper sulfate has antimicrobial properties and helps control bacterial infections.
- Measure 20 grams of copper sulfate and add it to a container.

2. Hydrated Lime:

- Hydrated lime acts as a protectant and helps to balance the pH of the solution.
- Measure 50 grams of hydrated lime and add it to the container.

3. Neem Oil:

- Neem oil has antibacterial and antifungal properties, offering additional protection.
- Measure 30 ml of neem oil and add it to the container.

4. Garlic Extract:

- Garlic has natural antibacterial properties and can be effective against bacterial canker.
- Prepare a garlic extract by crushing garlic cloves and soaking them in water for a day. Filter the liquid.
- Measure 20 ml of garlic extract and add it to the container.

5. Water:

- Use clean, lukewarm water for better mixing and application.
- Add 1 liter of water to the container.

6. Mixing:

- Thoroughly mix all the ingredients until they are well combined.

7. Application:

- Apply the solution using a spray bottle or a garden sprayer.
- Focus on the affected areas, covering cankers on branches and trunks.

8. Frequency:

- Apply the solution every 14 days or as recommended by your local agricultural extension service.

9. Preventive Measures:

- Prune and remove infected branches, ensuring proper sanitation.
- Avoid over-fertilizing, as excessive nitrogen can contribute to the development of bacterial canker.
- Maintain good air circulation by spacing trees appropriately.

10. Note:

- Always test the solution on a small portion of the plant first to check for any adverse reactions.
- Apply the solution in the early morning or late evening to avoid sunburn on the leaves.

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cutting weevils

Neem Oil Spray:

Ingredients:

- Neem oil (100% pure)

- liquid soap (organic, non-detergent)

Instructions:

- Mix 5 mL (1 teaspoon) of neem oil with 1-2 drops of liquid soap in 1 liter of water.
- Shake well to ensure proper emulsification.

Application:

- Spray the mixture onto the affected parts of the mango tree, focusing on the areas with cutting weevils.
- Repeat every 7-10 days until the infestation is under control.

Garlic and Pepper Spray:

Ingredients:

- Garlic cloves

- Hot peppers

- Water

Instructions:

- Crush a handful of garlic cloves and hot peppers.
- Boil the crushed garlic and peppers in water for 15-20 minutes.
- Strain the solution to remove solid particles.

Application:

- Spray the solution on the mango tree, concentrating on the affected areas.
- Apply every 7-10 days until the cutting weevil infestation subsides.

Tobacco Infusion:

Ingredients:

- Tobacco leaves or tobacco dust

- Water

Instructions:

- Soak tobacco leaves or dust in water for 24-48 hours.
- Strain the solution to remove solid particles.

Application:

- Spray the tobacco-infused water on the mango tree, paying attention to the cutting weevil-infested parts.
- Repeat the process every 7-10 days.

Cultural Practices:

1. Pruning:

- Regularly prune affected branches to remove cutting weevil larvae and eggs.
- Dispose of pruned material away from the tree to prevent reinfestation.

2. Clean Surroundings:

- Keep the area around the mango tree clean from fallen leaves and debris, as cutting weevils can hide in these materials.

3. Natural Predators:

- Encourage natural predators of cutting weevils, such as birds and beneficial insects, by creating a biodiverse environment.

Remember to test any solution on a small, inconspicuous part of the tree before applying it broadly to ensure it won't cause harm.

Dieback

It in mango trees can be caused by various factors, including fungal infections, bacterial diseases, or environmental stress. While homemade remedies may help mitigate some issues, it's important to note that serious cases may require professional intervention or the use of commercial pesticides. Here are some general guidelines for homemade remedies to address dieback in mango trees:

Neem Oil Spray:

Neem oil has natural antifungal and antibacterial properties.

Ingredients:

- Neem oil: 10 ml
- Liquid soap: 5 ml (to help emulsify the oil)
- Water: 1 liter

Instructions:

1. Mix neem oil and liquid soap in a container.

2. Add water gradually while stirring to create an emulsion.

3. Pour the solution into a spray bottle.

4. Spray the affected mango tree, focusing on the diseased areas.

Baking Soda Solution:

Baking soda can help control fungal diseases.

Ingredients:

- Baking soda: 15 g
- Water: 1 liter

Instructions:

1. Dissolve baking soda in water.

2. Mix well and transfer to a spray bottle.

3. Spray the solution on the affected parts of the mango tree.

Garlic and Chili Pepper Spray:

Garlic and chili peppers have natural antifungal and insect-repelling properties.

Ingredients:

- Garlic cloves: 5
- Chili peppers: 2
- Liquid soap: 5 ml (to help emulsify the mixture)
- Water: 1 liter

Instructions:

1. Crush the garlic cloves and finely chop the chili peppers.

2. Add crushed garlic, chopped chili peppers, and liquid soap to a blender.

3. Blend until you get a smooth paste.

4. Dilute the paste with water, stirring well to create an emulsion.

5. Strain the mixture to remove solid particles.

6. Transfer the liquid to a spray bottle.

7. Apply the solution to the affected parts of the mango tree.

Note:

- Garlic and chili pepper spray may help deter pests and provide some protection against fungal infections.
- Like other homemade remedies, it's advisable to test a small portion of the tree before widespread application.
- Apply the spray during cooler parts of the day to prevent leaf burn.
- Monitor the tree's response and reapply the solution if necessary.

Copper Sulfate Solution:

Copper sulfate is a fungicide and bactericide.

Ingredients:

- Copper sulfate: 5 g
- Water: 1 liter

Instructions:

1. Dissolve copper sulfate in water.

2. Mix thoroughly and transfer to a spray bottle.

3. Apply the solution to the affected areas.

Cultural Practices:

- Pruning: Remove and dispose of dead or infected branches to prevent the spread of disease.
- Watering: Ensure proper watering to avoid water stress. Use a drip irrigation system to keep the soil consistently moist but not waterlogged.
- Mulching: Apply organic mulch around the base of the tree to retain moisture and regulate soil temperature.

Note:

- Always test any homemade remedy on a small portion of the tree before widespread application.
- Apply treatments during cooler parts of the day to prevent leaf burn.
- If the condition persists or worsens, consult with a local agricultural extension office or a professional arborist for further guidance.

Remember, prevention is key to maintaining a healthy mango tree. Regular monitoring and early intervention can significantly reduce the impact of diseases.

The **mango gall midge** or blister midge damage flowers and infested mango buds, shoots, young fruits bear and many small blister galls. Leaf gall midge is serious pest of mango; heavily infested mango trees may reduce few inflorescences resulting in reduced yield of mango fruits. Gall leaves remaining on trees are known to provide reservoirs of anthracnose inoculums. Newly emerged larvae (young ones) feed on leaves and produce small raised wart-like galls underside of leaves. The adult emerges from leaves by making holes after about a fortnight in summer season. The photosynthetic activity is reduced; affected leaves get deformed and drop prematurely, and ultimately lowered fruit yield.

Background

Galls caused by gall flies on mango leaf.

light traps, yellow sticky bands etc. The leaves are rendered useless by continuous draining of the sap by larvae feeding inside the gall.

Management

- The surviving stages of midges in fallen leaves should be collected and destroyed.
- Hoeing should be done under the tree canopy of mango tree followed by irrigation to kill the pupating midges in soil.
- After fruit harvesting pruning should be done properly and damaged branches are burned away from orchard.

- Plastic sheet is used to break life cycle of midge under the plant canopy to cover soil. It prevents emergence of adult from soil and also prevent dropping larvae to go into soil for pupation that results population decreases.

- Use of foliar application of 2 % Neem extract on affected mango trees.

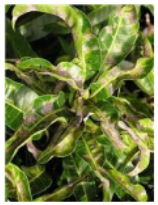
- Soil treatments have also been used to kill carry over population of larvae in soil under mango trees, apply through drenching chlorpyrifos (e.g. Lorsben 500ml/100L water) OR apply fipronil (e.g. Regent/Refree 8 kg/acre) under the canopy of trees.

PEST MANAGEMENT DECISION GUIDE: GREEN LIST

Powdery mildew on Mango

Oidium mangiferae

Powdery mildew on inflorescence (Scot Nelson)



Powdery mildew on leaves (Scot Nelson)

Powdery mildew (*Oidium* sp.) (Florida Department of Agriculture and Consumer Services, Bugwood.org)

Prevention

- Plant-resistant or tolerant varieties.
- Plant at wider spacing from 8 x 8 m to 12 x 12m. If you plant at smaller distances, keep thinning until the standard spacing is reached.
- Practice good orchard sanitation:
- Prune tree branches to allow air circulation.
- Pickup and destroy fallen leaves and flowers.
- Remove tall weeds from orchards.
- Fertilize the orchard properly (increased rates of N-P-K application decreases the incidence of powdery mildew). Avoid late-season applications of nitrogen fertilizer.
- As the fungi is carried by the wind, intercropping with other fruit trees or forestry species reduces the spread of the disease.
- In nurseries, avoid overhead watering to help reduce the relative humidity.
- Keep all equipment clean and dry to prevent spread of the fungus.

Monitoring

- Before blossoming, observe 10 marked trees/ha in the orchard for symptoms each week:
- Young tissues (flowers, leaves and young fruits) show small patches of white powdery mycelium which can later merge to cover large areas.
- Young infected leaves may become distorted, develop grey necrotic lesions on the upper side of the leaves and tend to curl downwards.
- If severe, the leaves may become brown, dry and fall.
- Inflorescences: fail to open and may drop from panicles, can become completely covered by the mildew and blacken or become brown and dry.
- Fruits: severe blossom infection can result in complete loss of fruit. The epidermis of the infected newly set fruit cracks and forms corky tissue. Entire fruit may become yellow and misshapen, covered in mildew and fall prematurely.
- Carefully monitor the flowers as they are susceptible to infection once they have begun to open on the panicles, 3-5 weeks after bud break.
- Monitor more frequently during favourable conditions, when temperatures are mild (23°C) and air is moist (as little as 20%).
- If 2-3 trees are infested (5-10 % of leaves or flower bunches) out of 10 trees, then consider action.

Direct Control

- Remove severely infected panicles and all infected plant parts, and burn or bury to at least 60 cm deep. Do not compost infected plant debris.
- Spray infected shoots with a solution of: 6 spoons of baking powder, 3 spoons of white oil and white bar soap foam and mix with 15 litres of water.

Note: Pesticides may be available to control this pest. Please check with the Ministry of Agriculture in your country to find out which pesticides are registered in your country and the local restrictions for their use.

Sooty mold

It is a type of fungus that grows on the honeydew secreted by sap-sucking insects like aphids, scales, or whiteflies. In mango orchards in India, sooty mold can be a common issue.

1. Insect Control:

- Identify and control the sap-sucking insects responsible for honeydew production. This may involve using insecticides or introducing natural predators that feed on these pests.
- Choose an insecticide suitable for the target pests (aphids, scales, or whiteflies). Follow the manufacturer's instructions for dilution. Common insecticides include imidacloprid, neem oil, or horticultural oil.
- Mix the insecticide according to the recommended concentration. For example, if the label recommends 5 ml of insecticide per liter of water, mix accordingly.

2. Horticultural Oils and Soaps:

- Horticultural oils and insecticidal soaps can be used to control the pests causing honeydew secretion. These products are less harmful to beneficial insects and can help manage the population of aphids, scales, or whiteflies.
- Use horticultural oil or insecticidal soap for control of sap-sucking insects.
- Dilute the product according to the instructions on the label. Common concentrations may be around 5 to 10 ml per liter of water.

3. Neem Oil:

- Neem oil is a natural product that can be effective in controlling both pests and sooty mold. It acts as a repellent, disrupts the feeding patterns of insects, and has antifungal properties.
- Neem oil is effective against pests and has antifungal properties.
- Mix neem oil at a rate of around 10 to 20 ml per liter of water, or as recommended on the product label.

4. Pruning:

- Prune heavily infested branches to remove both the pest and the sooty mold. Dispose of the pruned material properly to prevent the spread of pests.

5. Ant Control:

- Ants are attracted to honeydew and may protect the pests producing it. Controlling ant populations can help reduce the spread of sap-sucking insects.
- ant-specific insecticides can be used.

6. Cultural Practices:

- Promote good cultural practices, such as proper spacing between trees, regular pruning, and adequate nutrition, to maintain plant health and reduce the likelihood of pest infestations.

7. Fungicide Application:

- Once the pest problem is under control, you can consider applying a fungicide to eliminate the sooty mold. Fungicides containing copper or sulfur are commonly used for this purpose.
- Choose a fungicide containing copper or sulfur for treating sooty mold.
- Follow the product label for the recommended dilution. Typical rates might be 10 to 20 ml per liter of water.

8. Watering Practices:

- Adjust irrigation practices to minimize excess moisture on the leaves, as sooty mold tends to thrive in humid conditions. Watering early in the day allows foliage to dry before nightfall.

9. Monitor and Repeat:

- Regularly monitor your mango trees for signs of pests and sooty mold. If the problem persists, be prepared to repeat treatments as necessary.

Sooty mould: *Capnodium mangiferae*

Symptoms

- The fungi produce mycelium which is superficial and dark. They row on sugary secretions of the plant hoppers. Black encrustation is formed which affect the photosynthetic activity.
- The fungus grows on the leaf surface on the sugary substances secreted by jassids, aphids and scale insects.

Healthy leaf

Infected leaf

Sooty mould on mature fruit

Management

- Management should be done for insects and sooty moulds simultaneously.
- Controlling of insect by spraying systemic insecticides like methyl dematon
- After that spray starch solution (1kg Starch/Maida in 5 litres of water. Boiled and dilute to 20 liters)
- Starch dries and forms flake which are removed along with the fungus.