Coconut

Common Pests and Diseases

Diseases

Category : Fungal

Bud rot and nutfall Phytophthora spp.

Fusarium solani

Fusarium moniliforme

Graphium spp.

Coconut tree infected with bud rot pathogen Phytophthora palmivora

Symptoms

Chlorosis of youngest open leaves; leaves rapidly turning necrotic; necrotic spots on leaf bases; unopened spear leaves can be pulled away from the plant easily; removal of unopened spear leaves reveals soft, pink-red tissue with foul smell; leaf necrosis spreading through central crown leaves; woody parts of plant may have water-soaked, pink lesions with dark borders; infected inflorescences abort nuts.

Cause

Oomycete

Comments

Palms between 14 and 40 years old most susceptible; disease occurs in all coconut growing regions; diseases emergence favored by high rainfall.

Management

Control of the disease is reliant on good sanitation practices and the use of appropriate systemic fungicides; remove all infected debris and dead trees from plantation and destroy; irrigate trees early in the day to allow surfaces to dry off during the day.

Ganoderma butt rot Ganoderma spp.

Fruiting bodies

Close-up of Ganoderma root and butt rot fruiting bodies

Ganoderma root and butt rot (Ganoderma australe) fruiting bodies

Symptoms

Older fronds turning yellow and gradually wilting and drooping; fronds collapsing and dying; internal tissue of lower stem discolored; overall reduction in vigor.

Cause

Fungi

Comments

Fungi may enter through wounds on trunk or pruning wounds.
Management
Spacing trees widely limits the chance of infection through root grafts; avoid damaging tree trunks with tools and machinery; remove any dead or severely damaged trees from plantation immediately, including any that have been killed by natural processes; if a site is known to be infected with the disease, the ground should be fallowed for at least 1 year prior to a new plantation being established.

Gray leaf blight Pestalotiopsis palmarum

Symptom

Pestalotiopsis leaf spot (Pestalotiopsis palm arum) sign
Symptoms
Small, yellow-brown spots on leaflets which develop gray centers and dark green borders; lesions coalesce to form large necrotic patches; tips of leaflets turning gray; canopy has blighted appearance.
Cause
Fungus
Comments
Fungi will colonize young, wounded or weakened tissues; disease emergence favored by high rainfall and high humidity.
Management
Disease usually only merits control in coconut nurseries as infection of mature coconut palms are rare; appropriate broad spectrum protective fungicides should be applied.

Lethal bole rot Marasmiellus cocophilus

Symptoms
Oldest leaves of palm turning yellow and wilting; reddish-brown rot in bole tissue; destruction of root system
Cause
Fungus
Comments
Some grasses such as Bermuda grass have been reported as alternative hosts fro the fungi
Management
Any infected trees must be uprooted and burned; area can only be replanted once soil is treated for the disease

Stem bleeding disease Chalara paradoxa (syn. Thielaviopsis paradoxa, Ceratocystis paradoxa)

The canopy of the coconut in the center is wilted and necrotic due to a trunk infection by Thielaviopsis paradoxa.

Only one side of this trunk has significant rot due to Thielaviopsis paradoxa. The fungus rots the trunk tissue from the outside to the inside.

The three coconuts on the left have died from Thielaviopsis trunk rot. The palm in the foreground exhibits trunk collapse.

The trunk of this coconut was just beginning to exhibit "stem bleeding", but the large rusty-brown area at the top was already soft.

Trunk collapse due to stem bleeding disease

Stem bleeding on a coconut trunk. The top of the blackened area was very soft and could be easily pushed in with the fingers.
Symptoms
Soft, yellow rot on trunk; affected areas are dark and turn black as they mature; a reddish-brown liquid may ooze from rotting regions and spill down trunk.
Cause
Fungus
Comments
Fungi enter the trunk through wounds.
Management
Avoid wounding palms with machinery and tools to reduce disease incidence; disease can be controlled with applications of the fungicide benomyl where registered; infected trees should be removed and destroyed as soon as possible.
Category : Viral

Cadang-cadang Coconut cadang-cadang viroid (CCCVd)

Area with cadang-cadang disease showing trees in the early, medium and late stages of the disease.
Symptoms
Newly formed nuts more rounded than in previous years; nuts exhibit scarring on the surface; chlorotic spots on leaves; stunted inflorescences with tip necrosis; leaves begin to decline in size and number; death of palm.
Cause

Viroid
Comments
No vector has been identified.
Management
There is currently no known method of controlling the disease.

Coconut foliar decay Coconut foliar decay virus (CFDV)

Symptoms
Some varieties which have the disease may show no symptoms, others exhibit partial yellowing of leaves which begins to spread to leaf tip; necrosis of petioles causing leaves to die and hang from palm canopy
Cause
Virus
Comments
Transmitted by leaf hoppers
Category : Other

Lethal yellowing (Palm lethal yellowing) Candidatus Phytoplasma palmae (PLY)

Infected trees

Damage due to lethal yellowing

Lethal yellowing infected coconut trees

Infected coconut trees

Lethal yellowing infected palm

Symptoms of lethal yellowing on coconut palm

Lethal yellowing damaged tree

Cocos nucifera spear leaf is dying just as the last leaves are discoloring due to lethal yellow phtyoplasma

Symptoms of lethal yellowing on coconut palm

Symptoms
Premature dropping of fruit; fruit with brown-black water-soaked appearance; necrosis of inflorescences; flower stalks turn black; lower, older leaves turning yellow; entire crown turning yellow; yellow leaves turn brown, dry out and hang from canopy.
Cause
Phytoplasma
Comments
May be transmitted by leaf hoppers.
Management
The most effective method of managing the disease is to plant resistant coconut varieties such as Malayan dwarf or Maypan; antibiotic treatment is effective but not usually practical for large scale plantings.

Pests

Category : Insects

Coconut bug Pseudotheraptus wayi

Symptoms
Damged and/or aborted flowersd; sunken necrotic lesions and scars on nuts; young nuts may exude gum (gummosis) and die; many nuts fall from tree; adult insect is a brown-red with well-developed wings; nymphs are brown-red or green in color with long antennae and feed at the calyx of the nut
Cause
Insect
Comments
The coconut bug is one of the most damaging pests of coconut in Africa; just two bugs per palm can cause severe damage
Management
Natural enemies of the coconut bug include weaver ants, conserve bushes and trees around plantation which are habitats for weaver ants or intercrop with mango, guava or citrus which are attractive to weaver ants; connect canopy with ropes or sticks to allow weaver ants to move between trees

Coconut leafroller Omiodes blackburni (earlier Hedylepta blackburni)

Coconut leafroller (Hedylepta blackburni) damage to coconut plant

Damage due to coconut leafrollers

Coconut leafroller larvae

Coconut leafroller (Hedylepta blackburni) adult

Coconut leafroller (Hedylepta blackburni) larvae damage to coconut leaves.

Coconut leafroller pupae and frass

Coconut leafroller feeding on leaves

Coconut leafroller pupa, larva and frass.

Coconut leafroller rolls leaf near midrib of frond
Symptoms
The larvae feeds on under surface of leaves. Usually they found protected by silken web. Initially they feed on the lower epidermis leaving the upper epidermis intact. The larvae often fold two sides of leaflets by a silken thread and feed inside. The later stage larvae feeds on both upper and lower epidermis of leaves. Severe infestation leads to skeletonization of fronds.
Cause
Insect
Comments
The insect is quite common in high wind areas.
Management
Encourage natural enemies in the orchard.

Coconut rhinoceros beetle Oryctes rhinoceros

Damaged coconut frond

coconut rhinoceros beetle (Oryctes rhinoceros) adult

Lure and trap for Coconut Rhinoceros Beetle

coconut rhinoceros beetle injury to young coconut tree

coconut rhinoceros beetle (Oryctes rhinoceros) pupae

Damage due to coconut rhinoceros beetle

Rhinoceros beetle damage

Coconut rhinoceros beetle larvae

coconut rhinoceros beetle (Oryctes rhinoceros) injured trees

Damage due to rhinoceros beetle

Coconut Rhinoceros Beetle (CRB)

The Asiatic rhinoceros beetle or coconut rhinoceros beetle (Oryctes rhinoceros) damage to coconut
Symptoms
V-shaped cuts in palm fronds or holes in leaf midribs caused by beetles boring into crown to feed; adult insect is a large black beetle with a curved spine on its head; larvae are creamy white grubs with brown heads and 3 sets of prolegs at the anterior (head) end.
Cause
Insect
Comments
Beetles are nocturnal and fly at night; also a damaging pest of oil palm.
Management
Destroy any decaying logs in plantation by chopping and burning to kill any larvae that may be inside; remove any dead trees from plantation and destroy by burning; plant a cover crop to deter egg laying by females as they do not lay eggs in areas covered by vegetation; hooked wire can be used to extract larvae that are boring into young crowns.

Coconut scale Aspidiotus destructor

coconut scale (Aspidiotus destructor) infestation

coconut scale (Aspidiotus destructor)

Scale on coconut foliage

Coconut scale (Aspidiotus destructor) adults

Coconut scale infestation

Coconut scale damage

coconut scale (Aspidiotus destructor) adults and early instars

coconut scale (Pinnaspis buxi)

Coconut scale damage
Symptoms
Pale yellow spots on leaves; entire leaves yellowing; leaves turning brown and dropping prematurely; adult insect is a flattened oval, resembling a scale, which is red-brown in color.
Cause
Insect
Comments
Insect also attacks other crops such as tea and mango.
Management
May be possible to control coconut scale by pruning infested parts of trees and destroying by burning; chemical control may be necessary.

Mealybugs (Pineapple mealybug, Striped mealybug, Cocoa mealybug, etc.) Dysmicoccus brevipes
Ferrisia virgata
Planococcus lilacinus

Coconut (Cocos nucifera): Mealybugs and scales on leaflet

coconut mealybugs (Nipaecoccus nipae) tended by ants

Coconut mealybug damage

Coconut mealybugs (Nipaecoccus nipae)

Coconut mealybug (Nipaecoccus nipae) adult

Colony of coconut mealybugs (Nipaecoccus nipae)

Adults of coconut mealybug (Nipaecoccus nipae)
Symptoms
Flattened oval to round disc-like insect covered in waxy substance on tree branches; insects attract ants which may also be present; insect colony may also be associated with growth of sooty mold due to fungal colonization of sugary honeydew excreted by the insect; symptoms of direct insect damage not well documented but trees may exhibit symptoms of cocoa swollen shoot (see disease entry).
Cause
Insect
Comments
Insects have a wide host range; often tended by ants which farm them for their sugary honeydew secretions; transmit Cocoa swollen shoot virus.
Management
Mealybugs can potentially be controlled by natural enemies such as lady beetles but are commonly controlled using chemicals; chemical pesticides may also decrease populations of natural enemies leading to mealybug outbreaks.
Category : Mites

Eriophyid coconut mite Aceria guerreronis

Coconut: Eriophyid mites injury to nuts

Coconut mite damage coconut fruits

Coconut mite feeding injury

Mite damage
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Management
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Cause
Virus
Comments
Transmitted by leaf hoppers
Category : Other
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Infected trees

Damage due to lethal yellowing

Lethal yellowing infected coconut trees

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Coconut leafroller (Hedylepta blackburni) damage to coconut plant

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Coconut leafroller larvae

Coconut leafroller (Hedylepta blackburni) adult

Coconut leafroller (Hedylepta blackburni) larvae damage to coconut leaves.

Coconut leafroller pupae and frass

Coconut leafroller feeding on leaves

Coconut leafroller pupa, larva and frass.

Coconut leafroller rolls leaf near midrib of frond
Symptoms
The larvae feeds on under surface of leaves. Usually they found protected by silken web. Initially they feed on the lower epidermis leaving the upper epidermis intact. The larvae often fold two sides of leaflets by a silken thread and feed inside. The later stage larvae feeds on both upper and lower epidermis of leaves. Severe infestation leads to skeletonization of fronds.
Cause
Insect
Comments
The insect is quite common in high wind areas.
Management
Encourage natural enemies in the orchard.
Coconut rhinoceros beetle Oryctes rhinoceros

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coconut rhinoceros beetle injury to young coconut tree

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Damage due to coconut rhinoceros beetle

Rhinoceros beetle damage

Coconut rhinoceros beetle larvae

coconut rhinoceros beetle (Oryctes rhinoceros) injured trees

Damage due to rhinoceros beetle

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The Asiatic rhinoceros beetle or coconut rhinoceros beetle (Oryctes rhinoceros) damage to coconut
Symptoms
V-shaped cuts in palm fronds or holes in leaf midribs caused by beetles boring into crown to feed; adult insect is a large black beetle with a curved spine on its head; larvae are creamy white grubs with brown heads and 3 sets of prolegs at the anterior (head) end.
Cause
Insect
Comments
Beetles are nocturnal and fly at night; also a damaging pest of oil palm.
Management
Destroy any decaying logs in plantation by chopping and burning to kill any larvae that may be inside; remove any dead trees from plantation and destroy by burning; plant a cover crop to deter egg laying by females as they do not lay eggs in areas covered by vegetation; hooked wire can be used to extract larvae that are boring into young crowns.
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Coconut scale damage

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Symptoms
Pale yellow spots on leaves; entire leaves yellowing; leaves turning brown and dropping prematurely; adult insect is a flattened oval, resembling a scale, which is red-brown in color.
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Comments
Insect also attacks other crops such as tea and mango.
Management
May be possible to control coconut scale by pruning infested parts of trees and destroying by burning; chemical control may be necessary.
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Coconut (Cocos nucifera): Mealybugs and scales on leaflet

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Colony of coconut mealybugs (Nipaecoccus nipae)

Adults of coconut mealybug (Nipaecoccus nipae)
Symptoms
Flattened oval to round disc-like insect covered in waxy substance on tree branches; insects attract ants which may also be present; insect colony may also be associated with growth of sooty mold due to fungal colonization of sugary honeydew excreted by the insect; symptoms of direct insect damage not well documented but trees may exhibit symptoms of cocoa swollen shoot (see disease entry).
Cause
Insect
Comments
Insects have a wide host range; often tended by ants which farm them for their sugary honeydew secretions; transmit Cocoa swollen shoot virus.
Management
Mealybugs can potentially be controlled by natural enemies such as lady beetles but are commonly controlled using chemicals; chemical pesticides may also decrease populations of natural enemies leading to mealybug outbreaks.
Category : Mites
Eriophyid coconut mite Aceria guerreronis

Coconut: Eriophyid mites injury to nuts

Coconut mite damage coconut fruits

Coconut mite feeding injury

Mite damage

Scarring of coconut fruits due to coconut mites

Eriophyid mites feeding injury to coconut

Mite feeding injury

Symptoms due to coconut mite infestation

Coconut mite damage on fruits of coconut
Symptoms
The mites suck sap from young nuts. Generally they feed on meristematic zone, i.e., the area which is covered by perianth. The infestation starts very early. As the nut develops the feeding leaves brown fissures that extending down from the perianth. The nut becomes small and distorted.
Cause
Mites
Comments
The mites spread through the wind. It causes yield loss from 30 to 60 per cent.
Management
Provide proper fertilizer and water for trees to withstand mite damage. Encourage natural enemies of mite in the orchard. If infestation is severe, apply suitable insecticide by root feeding or stem injection.
Category : Nematodes
Red ring nematode (Coconut palm nematode) Bursaphelenchus cocophilus
Symptoms
Nuts falling prematurely; withering inflorescences; yellowing leaves which then turn brown; orange to red-brown ring of discoloration when a cross section is taken of lower stem.
Cause
Nematode
Comments
Nematode spread to palms via American palm weevils and sugarcane weevils.
Management
If a tree becomes infected it should be removed and destroyed; control of the disease is currently limited to efforts to control the weevil which transmits the nematode to the palms.

Scarring of coconut fruits due to coconut mites

Eriophyid mites feeding injury to coconut

Mite feeding injury

Symptoms due to coconut mite infestation

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Nematode spread to palms via American palm weevils and sugarcane weevils.
Management
If a tree becomes infected it should be removed and destroyed; control of the disease is currently limited to efforts to control the weevil which transmits the nematode to the palms.

Disease management **I. Basal stem rot -** ***Ganoderma lucidum*** **Cultural Method** • Apply *Bacillus subtilis* (Pf1) @ 200 g/ palm + *Trichoderma viride* @ 200 g/palm/ year • Apply 200g phosphobacteria and 200 g Azotobactor mixed with 50 Kg of FYM/palm • Green manure crops must be raised and ploughed *in situ* • Neem cake 5 kg/tree must be applied along with fertilizers **Chemical** • Aureofungin-sol 2 g + 1 g Copper sulphate in 100 ml water or 2 ml of Tridemorph in 100 ml water applied as root feeding. (The active absorbing root of pencil thickness must be selected and a slanting cut is made. The solution to be taken in a polythene bag or bottle and the cut end of the		

root should be dipped in the solution).
Forty litres of 1% Bordeaux mixture should be applied as soil drench around the trunk in a radius of 1.5 metre.

II. Bud rot - *Phytophthora palmivora*

The infective tissues from the crown region should be removed and protected with Bordeaux paste. Spray Bordeaux mixture at 1% or Copper oxy chloride 0.25 % on crown region as pre-monsoon spray. Spray Copper oxy chloride 0.25 % after the onset of monsoon.

III. Stem bleeding disease

The bark of the trunk should be removed in the bleeding area and Bordeaux paste should be applied in this area.

IV. Pencil point disease

Because of micronutrient deficiency, the stem will taper towards its tip with lesser number of leaves. The leaf size will be greatly reduced and the leaves will be pale and yellow in colour. Along with the

recommended fertilizer dose, 225 g each of Borax, Zinc sulphate, Manganese sulphate, Ferrous sulphate, Copper sulphate and 10 g of Ammonium molybdate may be dissolved in 10 1 of water and poured in the basin of 1.5 m radius.

a. Preparation of 1% Bordeaux mixture

A quantity of 400 g of copper sulphate should be dissolved in 20 litres of water and 400 g of lime in another 20 litres of water separately. The copper sulphate solution should be added to the lime solution constantly stirring the mixture. Earthen or wooden vessels alone should be used and metallic containers should not be used. To find out whether the mixture is in correct proportion, a polished knife should be dipped in the mixture for one minute and taken out. If there is reddish brown deposit of copper, additional quantity of lime should be added till there is no deposit in the knife.

b. Preparation of

Bordeaux paste

Take 200 g of Copper sulphate and dissolve it in one litre of water and 200 g of lime in one litre of water separately. Both are mixed simultaneously in a third vessel and the resultant mixture can be used as a paste.

Harvest and post harvest technology

Harvest 11-12 months old fully matured nuts at an interval of 30-45 days depending on the yield level of the garden. For household use keep the nuts in vertical direction. Dry copra either by sun drying or by using copra dryers. Store the copra at 5-6 % moisture content. Store the copra in polythene tar coated gunny bags.

The diseases of the coconut palm are

Bud Rot - *Phytophthora palmivora*

Leaf Rot - *Bipolaris halodes*

Stem Bleeding - *Ceratocystis paradoxa* and *Chalara paradoxa*

Root (Wilt) Disease - Unknown Etiology

Thanjavur Wilt -

Ganoderma lucidum Mahali - *Phytophthora palmivora* Crown Chocking Leaf Blight or Grey Leaf Spot - *Pestalosia palmivora* Lethal leaf blight - *Lasiodiplodia theobromae* Tatipaka Disease - Phytoplasma Botryodiplodia Nut Fall - *Botryodiplodia theobromae* Inflorescence Blight and Nut Fall - *Colletotrichum gloeosporioides*, *Gloeosporium spp* Mid Whorl Yellowing / Quick Yellow Declining - *Phytoplasma*		
Last Update :Jan 2023		

Bud Rot - *Phytophthora palmivora*
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Thanjavur Wilt - *Ganoderma lucidum*
Mahali - *Phytophthora palmivora*
Crown Chocking
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