

Pocket Book on Pests and Diseases of Tropical Tuber Crops in India

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CONTENTS

Sl. No	Topic	Page No.
1	Cassava Pests & Diseases.....	1
2	Sweet potato Pests & Diseases.....	25
3	Yams and Aroids Pests & Diseases.....	37
4	Chinese Potato Pests & Diseases.....	71
5	Selected References.....	72



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From the Director



ICAR–CTCRI is a premier institute conducting basic, strategic and applied research on 15 tropical root and tuber crops to support farmers and other stakeholders across India. Over the past six decades, the institute has developed 79 improved varieties with traits such as higher productivity, better nutrition and resistance/tolerance to biotic and abiotic stresses, along with several technologies for crop production, protection, processing and value addition.

Tropical tuber crops are grown on about 4.20 lakh ha with a production of 10.75 million tonnes, but diseases and pests cause significant yield losses. Major problems occur in cassava, sweet potato, aroids, yams and Chinese potato. Scientists of ICAR-CTCRI, in collaboration with 21 AICRP–TC centres, have studied the identification, symptoms, spread and management of these pests and diseases.

To facilitate better understanding of crop protection, a pocket book on pests and diseases of tropical tuber crops in India has been prepared. The book provides information on causal organisms, symptoms, spread and integrated management practices, serving as a handy reference for farmers, researchers and other stakeholders.

April, 2026


G. Byju
Director

CASSAVA *(Manihot esculenta Crantz)*





Pest: In India, there are three major types of mealy bugs infests the crop (Striped mealy bug (*Ferrisia virgata*), papaya mealy bug (*Paracoccus marginatus*) and cassava mealy bug (*Phenacoccus manihoti*)

Damage: Causes deformation of terminal shoots, reduction of internodal length, stunted growth and subsequently the development of 'bunchy tops'. Honey dew excretion by the insects and the associated black sooty mold formation leads to heavy yield loss to the extent of 60-80%.

Management: Monitoring/ scouting to detect the infestation, pruning and burning of infested branches, avoiding the use of planting materials from infested cassava fields, destruction of ant colonies, soaking of cassava setts in Dimethoate 30 EC @ 1% (10 ml L⁻¹) for one hour before planting, spraying ICAR-CTCRI developed *Shreya* @ 1% twice at weekly interval or neem oil-soap solution (7:3) @ 1.5% twice at weekly interval. In the case of chemical insecticides, spraying either Thiamethoxam 25 WG @ 0.6 g L⁻¹ or Imidacloprid 17.8 SL @ 0.6 ml L⁻¹ to cover infested portions of the plants.

PESTS MEALYBUGS



Striped mealybug



Papaya mealybug



Cassava mealybug



Cassava mealybug infested plant

Pest: In India, there are four major species of mites reported to infest the crop. viz., *Tetranychus telarius*, *T. noecaledonicus*, *Eutetranychus orientalis* and *Oligonychus biharensis*.

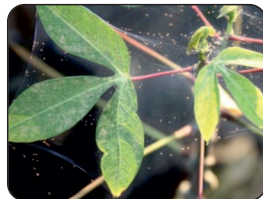
Damage: Infestation occurs in dry situations and it aggravate during prolonged moisture stress. The infested leaf shows yellow specks along the main leaf vein, and during severe infestation, leaf withers off. Feeding by the mite on the lower surface of the leaves causes characteristic blotching. Lower leaves develop yellow dots along the veins; these dots become reddish, and if the dry season is prolonged, the infestation spreads to higher leaves. Leaves dry up and fall and some plants die.

Management: Foliar spraying of magnesium sulphate (0.1 %) followed by spraying of water at the beginning of mite infestation, spray ICAR-CTCRI developed *Shreya* @ 1% twice at weekly interval or neem oil-soap solution (7:3) @ 1.5% twice at weekly interval, in case of severe infestation spray Spiromesifen 22.9 SC (1 ml L⁻¹).

MITES



Mites



Leaf webbing



Leathery/bronzy leaves



Cassava mealybug

Pest: *Bemisia tabaci*

Damage: Whiteflies suck the plant sap and devitalize the plant. They spread *Cassava mosaic virus* while feeding, which causes cassava mosaic disease and it can reduce yield up to 40%. In severe infestation, black sooty mold develops.

Management:

- Proper field sanitation and cultivation of CMD resistant varieties
- Installation of yellow sticky trap 1.5 x 1 feet size @ 15-20 ha⁻¹
- Releasing parasitoids *Encarsia* or *Erectmocerus* @ 0.4 sq. ft⁻¹
- Spraying either ICAR-CTCRI developed 'Nanma' 7ml L⁻¹ or Neem oil 10 ml L⁻¹
- Spraying of any one of the insecticides viz., Thiamethoxam 25 WG @ 0.3 g L⁻¹, Imidacloprid 17.8 SL @ 0.3 ml L⁻¹ only if necessary

WHITEFLY



Whitefly infestation in cassava



CMD symptoms in cassava

Pest: *Aleurodicus dispersus*

Damage: Immature and adult stages suck sap, causing yellowish specks on the leaves and damage the host plant. Severely infested leaves are covered with black sooty mold due to the secretion of honeydew by whitefly, and that hinders the photosynthesis of the host plant. Premature fall of leaf is one of the symptoms of its severe infestation.

Management:

- Spraying neem oil (0.1%) or cotton seed oil (0.01%)
- Spraying fish oil insecticidal soap @ 2.5 %
- Installation of yellow sticky traps 1.5 x 1 feet size @ 15-20 ha⁻¹
- Spray Imidacloprid 17.8 SL (0.5ml L⁻¹) or Thiamethoxam 25WG (0.5g L⁻¹)

SPIRALLING WHITEFLY



Spiralling whitefly infestation in cassava



Pest: *Aonidomytilus albus*

Damage: Stem surfaces covered with white waxy substance. The insect sucks sap from cassava stems. Due to sucking of sap, the stems dry up. Infestation occurs in dry situations and it aggravate during prolonged moisture stress, causes wilting of leaves and dropping from plant. Severe infestations may result in stunted plants and poor tuber yields. Cutting from the infested plants do not sprout.

Management

- Storing the cuttings in hygienic conditions
- Dipping the setts in Dimethoate (0.05%) for 10 min.
- Spraying ICAR-CTCRI developed *Nanma* (7ml L⁻¹) or Imidacloprid 17.8 SL @ 1 ml 3L⁻¹

CASSAVA SCALE



Scale infestation in cassava stem

Pest: *Odontotermes* spp.

Damage: Adults are cream-colored, tiny insects resembling ants with a dark-colored head. They attack the setts and young seedlings; eat the bark away and tunnel the pith. Affected stem cuttings grow poorly, die and rot. This weakens the stems and makes them easy to break. Termite damage occurs primarily during the dry season and 20-40% plant mortality is observed.

Management

- Soil drenching with Chlorpyrifos 20 EC @ 2.5 ml L⁻¹
- The biological control of termites through entomo-pathogenic nematodes (EPN), viz., *Steinernema* and *Heterorhabditis*

TERMITE



Odontotermes spp. attacking cassava

Causal organism

Indian cassava mosaic virus (ICMV) and *Sri Lankan cassava mosaic virus* (SLCMV).

Symptoms: Yellow or pale green chlorotic mosaic on leaves, commonly accompanied by distortion and crumpling. Affected leaves are reduced in size, deformed, twisted and distorted to give shoe string appearance. In severely infected plants the deformed plants result in stunting with bushy appearance.

Management:

- Growing of resistant varieties like Sree Reksha, Sree Suvarna, Sree Sakthi and Sree Kaveri
- Use of disease-free planting material obtained from healthy plants
- Removal of infected plants and strict field sanitation
- Vector control- spraying of Imidacloprid 17.8 SL (0.3 ml L^{-1}) or Thiamethoxam 25 WG ($0.3\text{-}0.4 \text{ g L}^{-1}$) at 14 days interval

DISEASES

CASSAVA MOSAIC DISEASE



Mosaic infected cassava plant



Mosaic symptom



Leaf distortion

Causal organism: *Phytophthora palmivora*

Symptoms: Dark coloured round to irregular shaped water-soaked lesions on mature tubers in the field with white mycelial mats of the fungus around these lesions. The lesions enlarge cause internal browning, oozing of internal fluids, rotting of the tubers and emit a characteristic foul smell and rot within 5-7 days depending on the soil conditions. The leaves and stem of infected plants show no apparent symptoms

Management

- Removal of diseased plants from the field after harvest if any
- To prevent water stagnation in the field, avoid overwatering and enhance drainage
- Crop rotation with other crops which are non-hosts for *Phytophthora* spp.
- Deep ploughing using chisel plough up to 20" to enhance the water percolation and planting in ridges
- Addition of organic amendments (neem cake @250 kg ha⁻¹) and incorporation of biocontrol agent *Trichoderma asperellum* @ 1 Kg plant⁻¹ or 12 t ha⁻¹ (prepared by mixing 2.5 kg of *Trichoderma* with 250 kg farm yard manure, incubated under shade by covering with polythene sheet)

CASSAVA TUBER ROT



Rotting of tubers



Rotting of flesh inside



Chisel plough

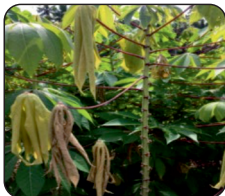
Causal organisms: *Fusarium* spp.

Symptoms: Collar area of the setts will first degrade after planting before rooting. The mature plants displayed yellowing and drooping of lower leaves, stem and tuber rotting and finally wilting occur. The rotted stem close to the soil turns dark and displays fungus pustules with white mycelia

Management:

- Sanitation, proper soil drainage and use only healthy uninfected setts as planting materials and avoid planting of setts from infected fields
- Deep ploughing or digging upto 50 cm and farm yard manure (FYM) application (*Trichoderma asperellum* (Tr 15) enriched FYM @ 1 Kg plant⁻¹) and application of soil ameliorant, either phosphogypsum or lime @ 1.5 t ha⁻¹ and application of neem cake @ 20 g plant⁻¹
- Following balanced application of primary, secondary and micronutrients as per recommendation
- Dip the setts in Carbendazim 50% WP solution (prepared by dissolving 1 g in one litre of water) for 10 minutes. After rainfall, if the initial symptoms are observed, drench the soil around the stem with Carbendazim 50% WP solution

CASSAVA STEM AND ROOT ROT



Wilting and drooping of leaves



Rotting of roots and tubers



Stem rotting near collar region



Tuber rotting

Causal organism: *Cercospora henningsii*

Symptoms: Small brown spots with dark borders appear on both sides of the leaves. Spots on the lower surface has less distinct margins and appear grayish in the center because of the presence of fruiting bodies of the fungus. The spots expand and become irregular and angular in shape as they are limited by leaf margins and veins. An indefinite halo appears round the lesions. As the disease advances, the infected leaves turn yellow, become dry, and fall off

Management

- Wider spacing reduces the humidity within the stand of cassava and reduces the incidence.
- Shifting of planting in a way that the most susceptible growth stage (over 5 months old) does not coincide with the wet season.
- Cultivation of resistant varieties, Sree Prakash, Sree Visakham
- Spraying 0.15 % (1.5 g L^{-1}) Copper oxy chloride three times at fortnightly interval

CASSAVA BROWN LEAF SPOT



Yellowing and drying of leaves



Leaf spots with distinct margin



Leaf spots coalesce and drying of leaves

Causal organism: *Colletotrichum gloeosporioides* f. sp. *manihotis*

Symptoms: Cankers on stems, leaf spots, leaf drying and tip die-backs, wilt, shoot death and easy breaking by wind action. Sprouting new twigs from axillary buds below the necrotic area which shows bunchy appearance is the typical symptom

Management

- Using planting materials from healthy plants
- Removal of infected plants and destroying
- Spraying Carbendazim 50% WP 1 g L⁻¹

CASSAVA ANTHRACNOSE



Stem canker



Drying of leaves



Shoot death

SWEET POTATO

(Ipomoea batatas (L.) Lam.)



Pest: *Cylas formicarius*

Damage: Thickening and malformation of vines and often cracking of the tissue, discoloration, cracking, or wilting of damaged wines. An infested tuber is often riddled with cavities or tunnels. Attacked tubers become spongy, brownish to blackish in appearance. Start rotting from the top and develop an unpleasant smell and a bitter taste

And become unfit for human consumption.

Management:

- Field sanitation, removal of alternate hosts, earthing up and mulching
- Vine dipping in 0.2% Chlorpyrifos for 10 minutes before planting
- Installation of sex pheromone traps @ 10 ha^{-1}
- Drench the collar portion of the plant and spray with Imidacloprid 17.8 SL @ 1 ml L^{-1} , after one month of planting at fortnightly intervals
- Timely harvest

PESTS

SWEET POTATO WEEVIL



Pest: *Omphisa anastomosalis*

Damage: The larvae boring into the main stem leading to the storage roots. Frass accumulates on the soil surface near the opening of the larval tunnel. In older plants there may be several holes in the stem at the crown. These holes result from the emergence of adult *O. anastomosalis* from pupae in the stems at the crown. Vines with severe tunneling show weak growth and poor foliage development; this foliage later yellows and wilts. The distal part of the vine above the damage site often dies.

Management:

- Filed sanitation, crop rotation, flooding after harvest
- Vine dipping in 0.2% chlorpyrifos for 10 minutes before planting
- Spray entomopathogenic fungus, *Metarhizium anisopliae*/ *Beauveria bassiana* @ 10^8 cfu ml⁻¹
- Drench the collar portion of the plant and spray with Imidacloprid 17.8 SL @ 1 ml L⁻¹, after one month of planting at fortnightly intervals

VINE BORER





Causal organism: *Sweet potato feathery mottle virus* (SPFMV)

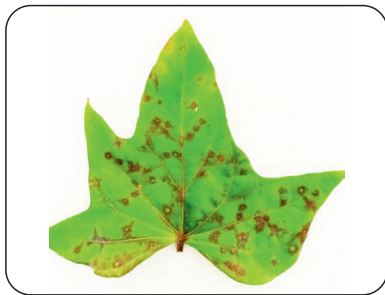
Symptoms: Leaves exhibit irregular, feather-like chlorotic patterns along the midribs, with faint to distinct chlorotic spots, frequently bordered by purple margins or rings on older foliage, along with vein clearing and occasional puckering or crinkling

Management:

- Use of disease-free planting material
- Using resistant plant varieties
- Roguing

DISEASES

SWEET POTATO FEATHERY MOTTLE DISEASE



Leaf damage



Tuber damage



Causal organism: *Sweet potato chlorotic stunt virus* (SPCSV)

Symptoms: Causes mild foliar symptoms, including chlorotic yellowing or purpling of older leaves, slight plant stunting, and vein clearing. Frequently occurs in synergistic association with other viruses, particularly *Sweet potato feathery mottle virus* (SPFMV), leading to sweet potato virus disease (SPVD), which is characterized by severe stunting, leaf narrowing, and pronounced leaf distortion.

Management:

- Use of disease-free planting material
- Using resistant plant varieties
- Roguing
- Vector control
- Crop rotation and isolation

SWEET POTATO CHLOROTIC STUNT DISEASE



Disease symptom

Causal organism: *Sweet potato leaf curl virus* (SPLCV)

Symptoms: The most frequently observed symptom is upward rolling or curling of the leaf margins, particularly in young or newly emerged foliage. Affected leaves often appear crinkled, malformed, or reduced in size compared to healthy tissue. In addition, leaves may exhibit chlorosis, which can occur uniformly or present as a mosaic pattern across the leaf surface.

Management:

- Use of disease-free planting material
- Using resistant plant varieties
- Roguing

SWEET POTATO LEAF CURL DISEASE



Damage symptom

YAMS AND AROIDS





Pest: *Spodoptera litura*

Damage: Young larvae feed on the young leaves gregariously. They scrape the chlorophyll content and skeletonize the leaves. Full grown larvae feed on the leaf and, to some extent, vine also.

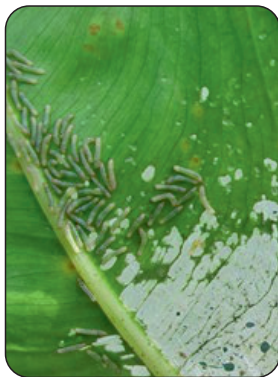
Management:

- Hand pick and destroy the pest at initial stage
- Plough the soil to expose and kill the pupae
- Grow castor along border and irrigation channel as trap crop
- Spray SI NPV @ 1.5×10^{12} POBs ha^{-1} + 2.5 Kg crude sugar + 0.1 % teepol

Spray Chlorpyrifos 20 EC 2 L ha^{-1} or Dichlorovos 76 WSC 1 L ha^{-1}

PESTS

TARO CATERPILLAR



Shoot damage by caterpillars

Pests: *Aphis gossypii* and *Pentalonia nigronervosa*

Damage: It is one of the important sucking pests of taro which reduce the chlorophyll content of leaves causing yellowish, speckling and curling. They attack both sides of leaves and petioles. Indirect damage is caused by the accumulation of honeydew produced by the aphids. Honeydew serves as a substrate for sooty molds, which blacken the leaves, reducing photosynthesis and plant vigour. Aphids are vectors of dasheen mosaic potyvirus.

Management:

- Avoid planting Colocasia close to alternate hosts such as melon, cotton, cucumber, or other cucurbits
- Provide hedges to limit movements of aphids from a crop to another
- Control ants in the field, as these will disrupt natural enemy activities, destruction of infested leaves after harvesting
- Spray Neem oil/ Neem based formulation (7 ml L^{-1}) or Imidacloprid 17.8 SL (0.3 ml L^{-1})

APHIDS



Pests: *Aspidiella hartii*

Damage: It is a significant armoured scale insect pest that infests yams (*Dioscorea* spp.) and, to a lesser extent, aroids (such as taro and tannia). The scale feeds on the phloem sap of the tuber, causing it to become dry, wrinkled, and fibrous. While mainly a storage pest, *A. hartii* can infest the plant in the field, causing yellowing, reduced vigor, and in rare cases, death of the plant.

Management

- Use a mixture of neem oil and soap solution for spraying and dipping
- Use of CTCRI developed bioformulations '*Shreya*' (10ml L⁻¹) followed by '*Nanma*' (7ml L⁻¹) after one week
- Insecticides like *Imidacloprid* 17.8 SL-0.5ml L⁻¹; *Dimthoate* 30 EC- 2 ml L⁻¹

SCALE INSECT





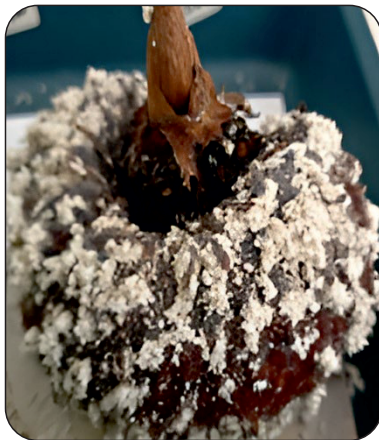
Pest: *Rhizoecus amorphophalli*

Damage: It is a destructive root mealybug that causes severe damage to stored elephant foot yam, leading to up to 90% of tubers failing to germinate. These insects suck sap from tubers, causing shriveling, desiccation, and covering them with white, powdery secretions, which reduces marketability.

Management

- Use a mixture of neem oil and soap solution for spraying and dipping
- Use of CTCRI developed bioformulations '*Shreya*' (10ml L⁻¹) followed by '*Nanma*' (7ml L⁻¹) after one week
- Insecticides like *Imidacloprid* 17.8 SL-0.5ml L⁻¹; Dimthoate 30 EC- 2 ml L⁻¹

MEALY BUG



Pest: *Meloidogyne incognita*, *Pratylenchus coffeae*

Symptoms: Yellowing of leaves, day wilting, stunting, galls on corms and cormels, malformed and distorted corms, black discoloration and tuber rot.

Management: Crop rotation with non-hosts (maize, sorghum); trap crop (sweet potato cv. Sree Bhadra) and antagonistic crop (marigold). Treat corms with *Trichoderma*-enriched cow dung slurry @ 5 g kg⁻¹ corm 3 days before planting and apply *Trichoderma*-enriched cow dung slurry @ 2.0-2.5 kg pit⁻¹ at planting. Use Fluopyram 34.48% SC @ 0.5 ml L⁻¹ or Fluensulfone 2% GR @ 1 g plant⁻¹.

NEMATODES



Pratylenchus coffea



Root-knots on corms

Pest: *Meloidogyne incognita*, *Pratylenchus coffeae*, *Scutellonema bradys*

Symptoms: Yellowing of leaves, day wilting, stunted plants, knots on roots, longitudinal cracking, malformed/ brown discolored tubers and tuber rot.

Management: Crop rotation with non-host cereals; changing the site of cultivation each season; trap crop (Sweet potato cv. Sree Bhadra) and antagonistic crop (marigold). Treat seed tubers with *Trichoderma*-enriched cow dung slurry @ 5 kg⁻¹ tuber, before planting.

NEMATODES



Nematode damage in yams

Causal organism: *Colletotrichum gloeosporioides*

Symptoms: Appeared as small dark brown or black spots or lesion on leaves, petioles and vines. Extensive necrosis of the leaves cause leaf fall and die-back of the vines. It causes cupping of the leaves also

Management

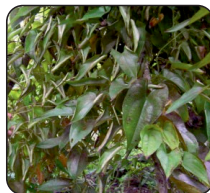
- Removal of debris of the harvested crop which is the source of propagules
- Summer ploughing after harvest to expose the propagules in soil
- Using only healthy uninfected tubers as planting materials and avoid planting of tubers from infected fields
- Growing resistant (Sree Karthika) /tolerant (Sree Keerthi, Sree Roopa and Sree Swathy) varieties
- Tuber treatment with *Trichoderma asperellum* (Tr 15) in cowdung slurry (5 g L^{-1}) followed by shade drying before planting and Soil application @ $50\text{ g of }10^7\text{ cfu g}^{-1}$
- Foliar spraying of Carbendazim 50% WP (1 g L^{-1}) (or) Azoxystrobin (18.2%) + Difenoconazole (11.4% SC) (1 ml L^{-1}) 7 times, first after initiation of symptom followed by two at fortnight interval and further four monthly

DISEASES

GREATER YAM ANTHRACNOSE



Die-back symptom



Leaf cupping



Leaf spots

Causal organism: *Cercospora contraria*

Symptoms: The symptom starts as chlorotic spots, which turns into dark brown to black necrotic spots with regular margin. Extensive necrosis of the leaves cause leaf fall

Management:

- Removal of debris from the field after harvest
- Summer ploughing after harvest to expose the propagules in soil
- Spraying 0.15 % (1.5 g L^{-1}) Copper oxy chloride

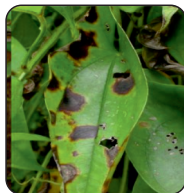
LEAF SPOT



Chlorotic spots turning necrotic



Initial chlorotic spots



Matured dark brown spots



Causal organism: It is caused by three different viruses namely *Yam mosaic virus* (YMV) and *Yam mild mosaic virus* (YMMV) belong to potyvirus group and *Yam chlorotic necrosis virus* (YCNV) belong to Macluravirus group

Symptoms: The prominent symptoms include, mosaic, green vein banding, green spotting or flecking, blistering and leaf mottling, Interveinal chlorosis, puckering and leaf deformation. These symptoms, which mainly affect the foliage, lead to a reduction in the photosynthetic ability of the infected plant with deleterious effects on the tuber yield.

Management:

- Selection of planting material from healthy plants which are free from yam virus infection
- Use of tubers obtained from meristem derived virus free plants

YAM MOSAIC



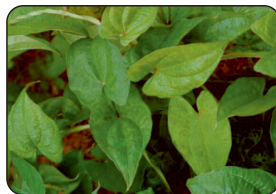
Mosaic in lesser yam



Interveinal chlorosis
in greater yam



Mosaic in greater yam



Mosaic in lesser yam

Causal organism: *Sclerotium rolfsii*

Symptoms

Water-soaked lesions develop on the pseudostem just above the soil surface. The leaves turn yellow from the tip which steadily extends to other portions causing complete chlorosis of the plant. Finally, the pseudostem shrinks and the plant collapses due to rotting of the collar region.

Management:

Use disease free corms for planting and remove infected plants from the field, improve drainage in field and plough deeply to bury or kill sclerotia and hyphae of the pathogen in the field, rotate with non-host crops and mulch the plants with paddy straw or any other organic wastes, treat the corms three days before planting with combination fungicide, Mancozeb + Carbendazim @ 2 g L⁻¹. Drench the plants immediately after intercultural operations with the above fungicide at the rate of 2 g L⁻¹. Remove infected plants carefully and give an additional drenching with the fungicide to the nearby plants.

COLLAR ROT DISEASE IN ELEPHANT FOOT YAM



Plants showing yellowing and infection at the collar region



Shrinkage at the collar region and collapse of the plant



Causal organism: More than three pathogens are involved, with species of *Colletotrichum* and *Fusarium* being the most common.

Symptom

Various types of leaf spots and blights are observed. Spots begin as small orange-brown lesions, spread quickly, causing the foliage to yellow, and irregular spots dry out, leaving holes are the most common symptoms. Symptoms such as overall yellowing of the plant and rotting that spreads to the pseudostem are also commonly seen.

Ad-hoc management

- Selection of planting material from healthy plants
- Treat corms three days before planting with *Trichoderma*-enriched cow dung slurry (5 g kg⁻¹ corms)

Spray carbendazim @1g L⁻¹ immediately after the first symptom appears and repeat after 2 weeks

LEAF AND PSEUDOSTEM ROT IN ELEPHANT FOOT YAM



Symptoms of leaf rot infection in elephant foot yam

Causal organisms: The major ones are *Sclerotium rolfsii*, *Lasiodiplodia theobromae*, *Fusarium* spp, *Colletotrichum gloeosporioides* and *Erwinia carotovora*

Symptom

The affected corms show discoloration, softening of the tissue and rotting. In some cases, white powdery appearance will be seen on the outer surface of the corm. Many a times, the surface of the tuber became completely rotten. Inside tissues shows brown/ black colour spots and the adjoining spots coalesce and form bigger irregular patches.

Management

Minimise injury to corms during harvesting, carefully remove infected portion and dip the corms in combination fungicide, Mancozeb + Carbendazim @ 2g L^{-1} for 10 minutes OR treat the corms with *Trichoderma* enriched cow dung slurry (@ 5g kg^{-1} corm) or 0.7 % ICAR-CTCRI developed bio-formulation *Nanma* for 10 minutes, shade dry for 2-3 days and store in a ventilated place.

POSTHARVEST ROT IN ELEPHANT FOOT YAM



Tubers showing fungal and bacterial rot during storage



Treating the corms before storage and storing the corms in ventilated room

Causal organism: This disease is caused by *Dasheen mosaic virus* (DsMV) which belongs to potyvirus group.

Symptom

Various types of symptoms like mild mottling, mosaic, leaf puckering, cupping, filiformy, leaf thickening and narrowing like shoe string are observed on elephant foot yam plants.

Management

- Selection of planting material from healthy plants which are free from DsMV infection
- Growing of plants obtained through meristem tip culture and
- Roguing of infected leaves, self-sown elephant foot yam or taro plants
- Vector control- spraying of Imidacloprid 17.8 SL (0.3 ml L⁻¹) or Thiamethoxam 25 WG (0.3-0.4 g L⁻¹) at 14 days interval

MOSAIC DISEASE IN ELEPHANT FOOT YAM



Symptoms of DsMV infection in elephant foot yam

Causal organism: *Phytophthora colocasiae* Racib.

Symptoms

P. colocasiae affects the leaves, petioles, and cormels of taro. Water-soaked light brown spots appear on leaves, rapidly enlarge, and coalesce, leading to complete leaf destruction. Bright orange to reddish-brown exudates ooze from affected areas and later harden. Lesions on petioles cause brown exudation and plant collapse. Infected corms turn brown and firm, rotting quickly after harvest.

Management

Cultivate resistant varieties like Muktakeshi, Bhu Sree, and Bhu Kripa. Use disease free cormels, remove infected plant parts, and practice crop rotation with non-hosts like okra. Mulch with paddy straw or other covers. Apply Metalaxyl-Mancozeb (1 g L^{-1})/ Mancozeb (2 g L^{-1}), or Potassium phosphonate (3 ml L^{-1}) at 45 days after planting, followed by 15-day intervals if disease appears. Alternatively, treat cormels with *Trichoderma*-enriched cow dung slurry (5 g kg^{-1}) and apply *Trichoderma*-enriched vermicompost (100 g plant^{-1}) at planting and during intercultural operations.

TARO LEAF BLIGHT



Phytophthora colocasiae infection on leaf, cormel and petiole

Causal organism: *Cladosporium colocasiae* Sawada

Symptoms

Irregular reddish-brown with light brown centres coalesces and seen as patches, not penetrating to the under surface. Ghost spot has probably the widest distribution, and is likely to be present wherever the crop is grown. Since not causing severe damage, it is considered as minor disease.

Management

Since it is a minor disease and the symptoms are superficial, management practices are not needed.

GHOST LEAF SPOT IN TARO



Taro leaves showing ghost leaf spot symptom

Causal organism: *Dasheen mosaic virus*

Symptoms

The disease is characterized by interveinal yellowing along the major veins and vein lets. In severely infected plants leaf distortion symptoms like cupping, curling and shoestring appearance are observed. Transmission is through planting material (cormels) and aphids.

Management

Selection of planting material from healthy plants, which are free from DsMV infection.

MOSAIC DISEASE IN TARO



Taro leaves affected with *Dasheen mosaic virus*

Pest: *Meloidogyne incognita*

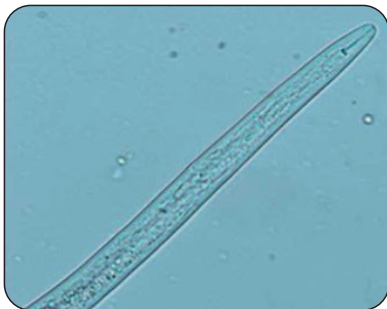
Symptoms: Yellowing of leaves, day wilting, stunting, patchy areas of poor growth, galls on roots/tubers, malformed, undersized and rotting tubers.

Management: Soil solarization of nursery beds, crop rotation with non-host cereals and shifting the site of cultivation each season. Apply *Trichoderma*-enriched FYM @ 10 t ha⁻¹. Use Fluopyram 34.48% SC @ 0.5 ml L⁻¹ or Fluensulfone 2% GR @ 1 g plant⁻¹

CHINESE POTATO

Plectranthus rotundifolius

NEMATODES



Meloidogyne incognita



Galls on Chinese potato roots

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