



Complete death of the palm

Before the onset of monsoon

- Remove all the dead palms and palms beyond recovery and dispose them by burying or burning.
- Clean the crowns of the palm of any debris and other materials
- Maintain general field hygiene by removing the weeds etc.
- Follow recommended integrated nutrient management practices
- Provide adequate drainage in case of low lying areas
- Follow management strategy for the control of rhinoceros beetle: Place a perforated sachet containing 5g phorate+ 50g sand or 5g chloridust+ 100g sand in the in the two innermost leaf axils



Removal of infected tissues and treatment

Prophylactic fungicide application:

- Spray 1% Bordeaux mixture to the crowns of the trees as prophylactic measure before the onset of monsoon (or)
- Apply fungicide solution in the two innermost leaf axils (@5g mancozeb in 300 ml of water per palm) just before the onset of monsoon
- Place two sachets of mancozeb (5 gm mancozeb in a perforated polythene sachet) in the two innermost leaf axils just before the onset of monsoon (end of May)

During rainy season

- Repeat the prophylactic fungicide application at 2 months interval
- Observe the palm at regular intervals (15 days) for the incidence of bud rot if any in the initial stage
- Remove the infected tissues from affected crown, clean the dead tissues from tree base of the spindle and treat with fungicide:



Emergence of new leaf after treatment

- Apply 10% Bordeaux paste to the wounds / cut end. Cover the treated bud with protective covering till the normal shoot emerges (or)
- Apply fungicide solution in the two innermost leaf axils (@5g mancozeb in 300 ml of water per palm) and place two sachets of mancozeb (5 gm mancozeb in a perforated polythene sachet) in the two innermost leaf axils. Cover the treated bud with protective covering till the normal shoot emerges.

Post- monsoon

- Continue the prophylactic fungicide application till December
- Observe the palm at regular intervals (15 days) for the incidence of bud rot if any for curative treatment

Control rhinoceros beetle in the FYM/ compost yard by regularly treating the compost pit with biocontrol agent (*Metarhizium anisopliae*) or drenching with chlorpyrifos (0.05%). This will reduce the population of the insect pest in the vicinity, so that the damage caused by the adult beetle in the coconut plantation is reduced.

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MANAGEMENT OF BUD ROT DISEASE IN THE COCONUT PLANTATIONS OF GOA



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Introduction

Coconut (*Cocos nucifera* L) is an important plantation crop of India, grown in more than 1.9 m.ha with an annual production of over 12 billion nuts. More than 10 million people mostly from peninsular India derive their livelihood securities from this crop. Coconut is attacked by a wide range of insect pests and diseases. Some diseases are lethal to the tree and others reduce the growth and productivity of the palm. Among the many reported diseases, bud rot is economically important as it kills the palm when unattended. This article discusses the nature of damage and management practices to be adopted for bud rot of coconut in the Goa region.

The pathogen

Bud rot disease is caused by the fungus *Phytophthora palmivora*. In India, bud rot was first reported by Butler in 1906. In recent years the disease has become very serious proportion in almost all parts of the state due to various reasons.

Palms of all ages are susceptible to this disease, but more severe in the young palms of 5-20 years. The tree is killed if not treated during early stage of infection. High rainfall, high humidity and wounds caused by tappers and rhinoceros beetle favour the disease development. Early detection of the infected palm and the treatment at the earliest possible time are the major factors in the success of the management of this disease.

Symptoms

- Yellowing and withering of one or two young leaves in the spindle is the earliest symptom which can be noticed from a distance.
- Brown / black spots on the spindle leaves are noticed when observed closely followed by bending and drooping of spindle.

- Rotting of internal tissues in the affected areas with foul smell and death of the spindle.
- Affected spindle can easily be pulled out as the basal portion is dead.
- Symptoms are later observed in younger leaves next to the spindle. Later the inner leaves also fall away one by one leaving only outer whorl of matured leaves in the crown.
- Ultimately the palm succumbs to the disease with the death of the growing bud.



Initial symptoms on the spindle leaves



Damage by rhinoceros beetle predisposes bud rot



Initial view of the incidence on the palm



Advanced stage of disease

Management

Integrated disease management strategies should be adopted throughout the year especially in endemic areas for effective management of the disease.