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# Diagnostic Symptoms and Management of Bud Rot Disease in Coconut

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## Abstract

**B**ud rot disease caused by *Phytophthora palmivora* is the most debilitating disease of coconut inflicting economic losses both in the nursery and young coconut garden. The characteristic symptoms of the disease are browning and drying of the spindle leaf followed by rotting of growing bud which emits foul smell. Infected seedlings or young palms succumb to death if suitable management strategies not adopted at the early stage of infection itself. It is widely prevalent in all the coconut growing regions of India and in Tamil Nadu, it is observed in all the coconut growing districts especially in young coconut garden of below 10 years old. The disease can be managed by maintaining proper sanitation, improving drainage, regular crown cleaning and crown application of Copperoxy chloride @ 2.5 g/litre of water.

## Introduction

**C**oconut (*Cocos nucifera* Linn.) is an important plantation and perennial oil seed crop of India. It provides food, fuel shelter and employment opportunities to millions of people in the tropics. It provides raw materials for coir industry and coconut shell is a good source of activated carbon. Coconut is prone to attack by many diseases. Among these, bud rot disease caused by *Phytophthora palmivora* is one of the important diseases which mainly infects seedlings in the nursery and the palms of all the age are infected, but young palms of less than 10 years are more vulnerable to this disease. The disease occurs in Kerala, Karnataka, Andhra Pradesh and Tamil Nadu. The bud rot incidence up to 7.5 percent was recorded in coconut growing regions of Tamil Nadu. The disease is more severe during rainy season and in poorly maintained garden, especially in low lying areas and it is favoured by low temperature and high relative humidity.

## Symptoms

**T**he initial symptoms appear on the central shoot of the tree (spindle). The heart leaf becomes brown or black instead of yellowish brown followed by drooping and breaching off the heart leaf. The affected internal tissue of the spindle leaf shows rotting and emits foul smell. Under favourable environmental condition, the pathogen produces whitish fungal coating on the infected portion and secondary infection also occurs due to insect larvae. The central shoot comes off easily on slight pulling as the basal portion is dead. In the advanced stage of infection more number of leaves are affected and lost their lustre and turn pale yellow. The leaves fall in succession starting from the top of the crown. The leaf falling and bunch shedding continue until a few outer leaves are left unaffected. Within few months the infection complete shedding of leaves occur which resulted in death of the palm. Infection on nuts resulted in rotting and immature nut fall.

## Symptoms of Bud Rot



Figure 1: Brown discoloration of heart leaf



Figure 2: Rotting of central shoot



Figure 3: White fungal growth on infected portion



Figure 4: Secondary infection by larvae

## Causal Organism

The disease is caused by *Phytophthora palmivora*. The fungus produces intercellular, non septate, hyaline mycelium. sporangiophores are hyaline and simple or branched, thin walled, pear shaped with a prominent papillae. Sporangia release reniform, biflagellate zoospores upon germination. The fungus produces thick walled, spherical oospores. In addition, thick walled, yellowish brown chlamydospores are also produced.

## Favourable Conditions

The favourable conditions are high rainfall, atmospheric humidity (above 90 percent), and low temperature (18-20 °C). The infestation caused by tappers and Rhinoceros beetle.

## Mode of Spread

The fungus survives in the form of dormant mycelium in the infected tissues and chlamydospores and oospores in crop residues in the soil. The disease spread is mainly through air-borne sporangia and zoospores. The pathogenic inoculum also spreads through rainfall, insects' viz., ants and tappers.

## Management

### Cultural Practices

- All the dead palms in the coconut garden should be removed and disposed by burning.
- Maintaining good sanitation in the garden by removing weeds and debris.
- Improving drainage facilities to avoid water stagnation.
- Adopting integrated nutrient management strategies.
- Regular crown cleaning.

### Biological Control

- Seed nut dipping, soil drenching and foliar spraying of bio-control agent (*P. fluorescens* – talc based formulation @ 1 percent (Surilirajan *et al.*, 2014).
- Application of 50 g each of *Pseudomonas fluorescens* and *Trichoderma viride* along with 10 Kg of farm yard manure per palm at once in 6 months interval.

### Chemical Control

- The infected crown should be poured with the 1% Bordeaux mixture or 0.25 percent copper oxy chloride.
- Before on set of monsoon, two sachets of Mancozeb is placed (5 g of Mancozeb in a perforated polythene sachet) in the two innermost leaf axils.
- Perforated sachets containing phorate or naphthalene balls or Neem Seed Kernel powder @ 5 g/packet should be placed to get rid of rhinoceros beetle infestation.
- Combi fungicides viz metalaxyl 8% + mancozeb 64% , metalaxyl M 4.0% + mancozeb 64%, fenamidone 10% + mancozeb and cymoxanil 8% + mancozeb 64% inhibited each at 250 ppm showed 100 percent inhibition of mycelial growth of *P. palmivora* *in vitro* condition and on detached leaves (Sharadraj, K.M. and Chandramohan, 2014).
- Copper oxychloride 50% WP at 0.3 percent concentration exerted cent inhibition of mycelial growth of *P. palmivora* (Neeraja *et al.*, 2019) and it was found to be effective against bud rot in the nursery (Surilirajan *et al.*, 2014).

### Conclusion

Supply of disease free, true to type quality planting material is a prerequisite and it is highly essential for successful and sustainable coconut farming. Bud rot infects seedlings in the nursery resulted in qualitative and quantitative losses in terms of quality impairment and seedling death. Hence, the above mentioned management strategies should be adopted in the nursery as well as young coconut garden to control bud rot and to gain more profit from coconut farming.

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