



Integrated management of bud rot disease of coconut

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In India, coconut plays an important role in the social, economic and cultural activities of the people. With a production of 12.83 billion nuts from an area of 1.93 million ha under coconut India ranks third among the major coconut growing countries. Coconut provides livelihood to millions of farm families either directly or indirectly in Kerala state. Coconut occupies more than 40 per cent of the area under cultivation in Kerala. But the productivity is low compared to some of the neighboring States. The reason for low productivity is to some extent the incidence of pests and diseases. Bud rot, a serious fatal disease of coconut, occurs commonly in all coconut growing countries. In India, it causes considerable economic loss to the cultivators in certain areas in Kerala, Tamil Nadu, Karnataka and Andhra Pradesh. Bud rot incidence was also noticed in other States like Maharashtra, Goa and Madhya Pradesh. The disease is generally sporadic in nature; however, outbreaks of epidemics are also common. In recent years the disease has attained a serious proportion in some of the localities, especially hilly tracts with high humidity. Since coconut is a perennial crop, the loss due to the disease is very high.

symptom is withering of the spindle marked by pale colour. The spear leaf or spindle turns brown and bends down. Farmers often experience difficulties in the detection of the disease at this stage, though it is essential to diagnose the disease at the initial stage to take up curative measures. The affected spindle can easily be pulled out as the basal portion of the spindle is completely rotten emitting a foul smell. 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.

The microclimatic parameters are found to influence the incidence of budrot disease. Minimum temperature of 21-24°C and high relative humidity of 97-100 per cent were found optimum for the incidence of the disease. Disease development was found to be determined by the duration of such 'favourable days'. In young palms of 5 to 10 years, the occurrence of such favourable days was more frequent and hence there was more disease incidence in such young palms.

Disease Management

Effective disease management can be achieved only if the integrated plant protection measures are

Palms of all age groups are susceptible to bud rot disease caused by the fungus *Phytophthora palmivora*. The first visible



Rotting of spindle leaf



adopted at the right time. In all the technology transfer efforts for the control of bud rot disease, emphasis should be given to the following integrated management practices to achieve the desired goal.

Cut and removal of severely disease affected palms (beyond recovery) or dead palms: Cut and removal of palms which are in the advanced stage of bud rot or palms dead due to the disease are very important operations to be carried out in all the affected gardens for better control of the disease. This will help to reduce the inoculum load in the garden as well as secondary spread within the garden and to the neighbouring gardens. Rotten portion of the crown should be destroyed by burning.

Curative treatment : When the disease is diagnosed in the early stages, curative measures can save the palms. The appropriate period would be the stage when the spindle leaf has just started showing symptoms of withering. Remove the spindle leaf by pulling it out and cut and remove the infected tissues completely. Two or three healthy leaves adjacent to the spindle may have to be removed if necessary for easy removal of all rotten portions and thorough cleaning. Apply 10 per cent Bordeaux paste to the wound and cover with polythene sheet to prevent entry of rain water. The protective covering has to be retained till normal shoot emerges. All the rotten portion removed from the crown should be destroyed by burning.

Prophylactic spraying: The healthy palms which are in the vicinity of diseased and treated ones should be sprayed with 1 per cent

Bordeaux mixture as a prophylactic measure to prevent the disease. The spraying has to be directed to the spindle and to the base of 2-3 inner leaves. It is also important to give prophylactic spraying to all palms before the onset of monsoon, in gardens with a previous history of bud rot incidence. In certain dwarf palms, phytotoxic symptoms like brown sunken spots followed by nut shedding have been observed when Bordeaux mixture is sprayed. Therefore, in copper sensitive palms like Chowghat Orange Dwarf (COD) and Malayan Yellow Dwarf (MYD), keeping perforated sachets containing mancozeb (Indofil M-45) in the innermost leaf axils during rainy season is found to be useful. Studies on disease control by root feeding of systemic fungicides are in progress.

Nutrient management : Besides integrated disease management techniques, nutrient management practices for the affected palms as well as healthy palms are also important for improving the health and vigour of the palms for higher yield. The fertilizer dose generally recommended for an adult palm is 500 g N, 320 g P_2O_5 and 1200 g K_2O per palm per year. Under rainfed condition fertilizer may be applied in two split doses. After the receipt of summer showers, apply one third of the recommended dose of fertilizer around the palm within a radius of 1.8. Dig circular basins of 1.8 m radius and 25 cm depth around the palm in September-October and spread organic manure in the form of compost or green leaves @ 50 kg per palm in the basin. Then, apply two third of the recommended dose of fertilizer over the organic manure and cover the basin with soil.



Rotten tissue removed and wound treated with fungicide

Replanting : In order to maintain optimum population of palms in the gardens from where the palms in the advanced stage of disease or dead palms are cut and removed it is necessary to fill up the gaps by planting good quality coconut seedlings, wherever sufficient space is available.

Non-adoption of prophylactic measures against bud rot, climatic changes especially erratic rainfall pattern, non-adoption of scientific cultivation practices, improper and inadequate use of fungicides, lack of skilled climbers coupled with high wage rates, and high cost of input for plant protection measures have been often pointed out as the constraints in proper implementation of recommended integrated management practices against bud rot disease of coconut. The control of bud rot disease of coconut in disease endemic areas can be achieved with the active involvement of farmers, state extension agencies, developmental agencies, local organization and self-help groups.