

Basal stem rot disease

A bane to coconut grower

Dr. Manjunath Hubballi*, Dr. H. P. Maheswarappa**, Mr. R. Siddappa*,

*Horticulture Research and Extension Centre, Arsikere-573103

**ICAR-Central Plantation Crop Research Institute, Kasargod-671124

Coconut is an important plantation crop cultivated in the country. Looking into its multifaceted usages, the crop is named Kalpavriksha. In the recent past, there have been drastic changes with respect to coconut production, especially in the southern parts of the country. Coupled with persistent drought, the insect and disease attacks are also hindering coconut production. Of the major diseases, basal stem rot incited by *Ganoderma spp.* is a serious disease affecting coconut. The disease has been called with variety of names viz., Ganoderma wilt, Basal Stem Rot, Anabe Roga and Thanjavur wilt. This disease was reported way back in 1906 by Buttler in India. Later, during 1952 the disease appeared in Thanjavur district of Tamil Nadu and hence, named Thanjavur wilt.



The disease is prevalent in most of the growing areas of Southern India. This disease is considered as lethal disease, as it completely kills the palm in advanced stages. Surveys conducted in major growing areas of Karnataka indicated that on an average 10-15 per cent of palms are infected with BSR. The worst case of the disease is that, it remains asymptomatic till bleeding patches occur on stem. In general this disease is observed in all growing packets of Karnataka. However, Hassan, Tumkur and Chickmagalur districts have reported to have severe incidence of this disease.



Symptoms of the disease

The variety of symptoms exhibited in infected palms can be seen on the various parts of plant.

Root: The soil resident fungus enters through the young roots and the roots get infected. The infected root starts rotting and the same proceed towards the bole. Until then, there won't be any external symptoms visible in palms. As the infection progresses, root discoloration and extensive rotting of root systems are seen. Further, there will be progressive reduction in regeneration of new roots.



Stem: The exudation of reddish brown viscous fluid from the basal portion is the characteristic symptom of the disease. By the time when exudations are observed on stem, rotting of bole would have progressed from bole to basal portion of stem. The bleeding patches gradually increase up to 3-3.5 meter height as the disease advances. The internal tissues of the infected palm stem turns brown in colour and this discoloration will be usually confined up to the height to which external bleeding symptoms are visible. In advanced stages, basal portion of stem decays completely. Occasionally, some infected palm doesn't show any bleeding symptoms. The sporophores of the fungus, *Ganoderma* appear at the base of the affected trunks in some palms prior to wilting or just after the death of the palm.

Crown: The leaflets of outer most whorls start showing signs of yellowing and wilting. The drooping and drying of leaves is the most prominent symptom of the

disease. As the disease advances, the remaining leaves also droop down in quick succession. Under prolonged infection, the outer leaves fall off one by one leaving spindle with only few unhealthy leaves around. The spindle leaves which emerge subsequently are of reduced size and don't unfold properly. In some cases, leaves break off near the base of petiole. In certain cases, soft rot sets in at the base of the petiole. The affected tissues emit a bad smell and in advanced stages, the crown is blown off leaving a decapitated stem.

Etiology of the disease

The disease is incited by fungus named *Ganoderma lucidum* and *G. applanatum*. The aerial mycelium is hyaline, thin walled, branched with frequent clamp connections, 1.4-2.9 μ in diameter; chlamydospores formed abundantly which are slightly thick walled, terminal or intercalary and ellipsoid. The fungus grows very well in Walkman's medium.

Management of BSR

Restriction on movement of seedlings from infected gardens

The coconut seedlings used for planting should be obtained from healthy garden. Further, transport of seedlings from infected garden to other should be invariably avoided as the pathogen spreads through soil.

Phytosanitation

The dead palms remaining in gardens and also stumps present in diseased garden needs to be removed along with complete roots and burned. In most cases, the infected stumps harbor the *Ganoderma* brackets which are proven source of secondary inoculum. Hence, strict phytosanitary measures will reduce the inoculum load in the diseased gardens.

Agronomic practices

Special care should be taken not to make any injuries to the plant parts during intercultivation operations. The diseased palms should be separated from healthy palms by digging trenches of 30 cm wide and 60 cm deep. Adopt summer irrigation or moisture conservation by coconut husk burial in the basin. Avoid flood irrigation and deep ploughing in infected gardens in order to prevent inoculum spread. Adopt drip irrigation method. Cultivation of banana as an intercrop will reduce the disease incidence in coconut gardens.

Nutrient supply

1. Application of 5 kg neem cake, 25 kg vermicompost and 25 kg Farm Yard Manure per palm per year is essential. The recommended fertilizers viz. 500 g nitrogen, 320 g phosphorus and 1200 g potash per palm per year need to be given.

Biological agents

Growing of green leaf manuring crops in the infected gardens is helpful in reducing inoculum. Application of *Trichoderma* 100-125 g and 200 g phosphobacteria along



with FYM or neemcake or vermicompost per palm will reduce inoculum present in soil.

Chemical methods

Root feeding of Hexaconazole 5% EC @ 2 per cent (2 ml in 100 ml water) at once in three months is most effective in reducing the incidence. The young root with carrot colour of pencil size should be selected. Forty litre of 1% Bordeaux mixture or 0.2% Hexaconazole 5% EC (80 ml Hexaconazole in 40litre water) should be drenched around infected palms.

Research and Extension activities pertaining to Basal Stem Rot Disease at Horticultural Research and Extension Centre, Arsikere

The Horticulture Research and Extension Centre, Arsikere is under the umbrella of University of Horticultural Sciences, Bagalkot. The center is also operating Indian Council of Agriculture Research (ICAR) sponsored All India Coordinated Research Project on Palms (AICRP). Under this project, exclusive research and extension on the BSR disease is being undertaken. As part of research, root feeding of Hexaconazole 5% EC was identified as best chemical in curtaining the spread of disease in coconut gardens. Further, new molecules of fungicides are also being screened against disease. As an integrated approach, the combination of *Pseudomonas*, *Trichoderma* and chemicals are also being evaluated under field conditions. The experiments on evaluation of integrated approaches for the management of this disease is being taken at Gandsiin Chennarayapatnataluka of Hassan District. In addition to this, screening of genotypes of coconut against *Ganoderma* disease is also under progress at this centre.

An exclusive extension center for transfer of technology to the farmers is established at this center. As part of extension, various trainings, demonstrations and awareness programmes are being carried out. The integrated management practices for BSR are also being demonstrated in field at Bommasamudra village in Arsikere Taluka. ■