

GANODERMA DISEASE OF ARECANUT IN ASSAM

Ray A.K., Charkrabarthy R and Acharya G.C.

The arecanut palm, *Areca catechu* L., is the source of the common masticatory nut, popularly known as arecanut, betel nut or 'supari'. It is extensively used in India by all sections of the people as masticatory and is an essential requisite for a number of religious and social ceremonies. It is one of the important plantation crops in India and is mainly grown in Assam, Karnataka, Kerala, Tamil Nadu and West Bengal. Traditionally arecanut is grown in homestead gardens in Assam. However, in recent years farmers have shown interest in taking up arecanut as a commercial crop also. Use of arecanut in social and cultural life of people of this region shows the dignity enjoyed by the crop.

Among the diseases that affect arecanut palms, basal stem rot (BSR) or Ganoderma wilt (referred by many as 'anabe roga') caused by *Ganoderma lucidum* (Curtis Ex.Fr.) Karst is one of the dreaded disease. Ganoderma wilt causes a gradual and heavy reduction in production of nuts,

causing high economic loss to the farmers. BSR is a slow decline disease with a history of more than hundred years. Although sporadic incidence of this disease was reported in some parts of Assam as early as 1966, the disease has spread to considerable area in the recent years. Survey conducted by the CPCRI RC Kahikuchi in the arecanut growing areas of lower Assam districts viz., Goalpara, Dhubri, Kokrajhar, Bongaigaon and Barpeta have indicated incidence of the disease to an extent of even 55% and the same is spreading at a faster pace to other districts such as Kamrup, Darrang and Nagaon.

Symptoms

The initial visible symptom of the disease is yellowing of the outer whorl of leaves, which gradually extends to the inner whorls. In advanced stage of the disease, the leaves droop and drop off one by one leaving a tuft of one or two leaves along with the spindle at the centre (Fig.1). In some of

* Central Plantation Crops Research Institute Research centre, Kahikuchi - 781017, Assam.

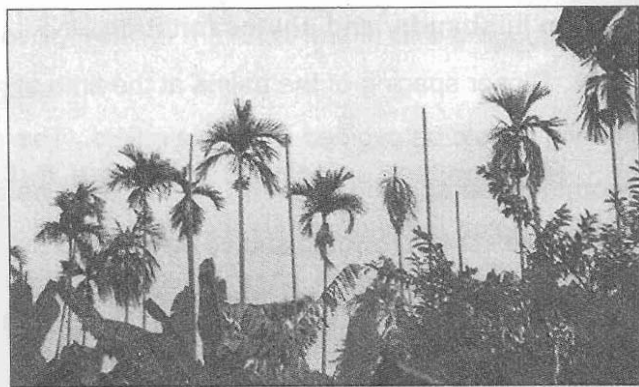


Fig. 1 : Basal stem rot disease affected arecanut garden.

the affected palms a brownish liquid oozes out from the basal portion of the trunk. The roots as well as interior tissues of basal portion of the infected trees show varying degrees of discoloration and rotting (Naidu *et al.*, 1966). The infection leads to interruption of water and nutrient uptake resulting in gradual death of the palm. The bracket shaped fruiting bodies of the fungus are formed at the base of the trunk (Fig.2).



Fig. 2 : Bracket formation at the base of the palm.

Causal Organism

The climate of Assam is mainly hot and humid and the annual rainfall is about 250 to 300cm. The relative humidity of the atmosphere ranges from 80 to 90% for most of the parts of the year. These climatic conditions are very much favourable for multiplication of the causal organism, *Ganoderma lucidum* (Curtis ex.Fr.) and further spread of this disease. The prevalence of the disease is noticed in closely planted and neglected arecanut gardens where drainage is very poor. Incidence of *Ganoderma* disease is also seen in gardens where the soil dries up during winter and holds excess water during rainy season. If roots of infected palms come into contact with that of healthy palms, the spread of the disease will be faster. Planting of annual and perennial fruit plants without proper spacing also enhances the chances of disease spread.

The fungus gets entry into the palm mainly through wounds in the roots. Gradually the organism blocks the movement of food materials, water and minerals in the plant, which results in the disruption of translocation system. In the advanced stage the whole system of translocation collapses and eventually the disease affected plant dies. Water stagnation at the base of the palm and frequent forking of soil in the infected gardens lead to the spread of the disease.

Management of the Disease

Since the causal organism of the disease is soil borne, a greater effort is needed to manage the disease. The following are the management practices recommended for Ganoderma disease.

1. Care of the infected garden

As the causal organism spreads through soil, it is very essential to adopt the recommended preventive measures at the proper time. The infected palm should be uprooted and the bole burnt *in situ* to destroy the fungus. The diseased palm at the initial stage should be separated from the healthy ones by digging a trench of 30 cm wide and 60 cm deep at a radius of 90 cm around the palm (Singh, 1985) (Fig. 3). This practice helps to reduce the root to root contact between health and infected palms.



Fig. 3 : Preparation of trench around affected palm to prevent spread of the disease.

2. Crop husbandry and phytosanitation

Closer spacing of the palms at the time of planting should be avoided in the main field. The recommended spacing of 2.7m x 2.7m is to be maintained. Over crowding should be avoided by removing unproductive palms. Necessary drainage should be provided during rainy season and irrigation provided during the dry spell. Growing banana in the inter space will be helpful to check the spread of the disease to a certain extent. Ploughing, digging and forking of the field should be kept to the minimum extent possible. Avoid use of planting materials from infected gardens. Strict phytosanitary measures are to be adopted by removing and burning the stumps along with the root system.

It is found that in most of the cases, arecanut farmers in Assam do not practise regular application of fertilizers and manures. Application of fertilizers and organic manures at recommended doses improves the health of the palms and increases productivity. For palms which are more than eight years old, fertilizers @ 220g urea, 250 g single super phosphate and 230 g muriate of potash may be applied in two splits, the first in April-May and the second during September-October. In addition to this, application of 15 to 20 kg compost or green manure per palm should also be done

every year to maintain health and productivity of palms.

3. Chemical and biological management

On the basis of several experiments conducted for the management of this disease, the following measures are found to be effective:

- a. Apply ten litres of 0.3% calixin in the basin of infected palm at an interval of three months, except during rainy season.
- b. During dry weather conditions, root feeding of calixin @ 100 ml of 1.5% is to be done in such a way that the feeder roots absorb the chemical properly (Kumar and Nambiar, 1966) (Fig.4). A couple of days after

application of the chemical, apply neem cake @ 2kg/palm in the basins.

- c. *In vitro* study of bio-control agents showed the maximum inhibition of *G.lucidum* by *Trichoderma viride*, which can be applied along with neem cake in the field (Islam and Dubey, 2003).

In vitro study conducted in the laboratory of CPCRI RC Kahikuchi to control the disease by using aqueous extracts of locally available botanicals showed that plants like *Allium sativum*, *Azadirachta indica*, *Clerodendron sp* and *Centella asiatica* have an antagonistic effect on the fungi.



Fig. 4 : Root feeding with Calixin.