STEM BLEEDING DISEASE OF COCONUT

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India ranks third in the world production of coconut, the first and second places being occupied by Philippines and Indonesia respectively. As the production in the country is not sufficient to meet our internal demands a quarter of our internal requirements is met by imports. Kerala with 7.3 lakh hectares under coconut accounts for 70 per cent of the total production in the country.

Although coconut is a sturdy palm the tree is affected by a number of diseases. Next to root (wilt) disease, stem bleeding disease is causing great concern. Stem bleeding is popularly known as "Chennir Olikkal" or "Kara Olikkal" in Malayalam, "Rektha Karuvudu roga" in Kanarese, "Saru ozhughalnoi" in Tamil and "Lakkaragadum" in Telugu. It is a symptom or expression of an abnormal condition due to many factors than as a disease like "bud rot", which is caused by a fungus. Stem bleeding was first reported from Sri Lanka in 1906 and subsequently in India during 1922. This disease is found to occur in all the coconut growing states of India in varying intensities. It is found to occur in all soil types, from the coastal sandy soil to laterite.

Symptoms of the disease: The characteristic symptoms of the disease is the exudation of a dark reddish brown fluid from cracks in the outer tissue usually found at the lower portion of the stem. The fluid turns black in colour as it dries up on the bark. The tissues beneath the bleeding patches become decayed and yellowish. In the initial stage bleeding occurs only through one or two cracks at the lower portion of the stem and later it spreads upwards. As the disease advances the general vigour of the palms decreases, the crown becomes smaller, yield gets reduced and ultimately the tree dies.

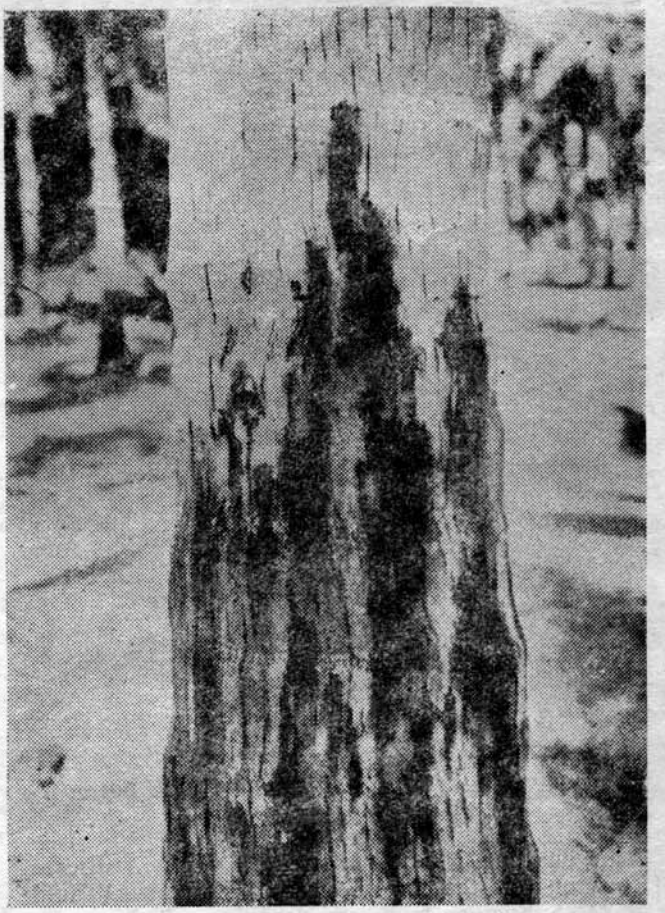
Types of bleeding: The symptoms of the disease vary slightly from state to state as given below:

1. Bleeding profuse through cracks from the base of the palms, progressing upwards in soils subject to inundation/drought. Death rate is variable from rare to common (Kerala, southern coastal parts of Tamil Nadu and coastal areas of Goa).

2. Bleeding moderate to extensive in isolated gardens—in shallow loamy and laterite soils with clay and rock underneath and in reclaimed soils.

3. Bleeding sparse limited to the lower part of the stem, patches of affected gardens in sandy and loamy soils, internal damage to the stem extensive, death common (Goa).

Associated factors: The fungus *Thielaviopsis paradoxa* (Ceratostomella) was isolated from the tissues underlying the bleeding patches and in the exudate. But inoculation trials with the above fungus could reproduce the symptoms of the disease only in two per cent of the inoculated palms.



A palm showing typical bleeding.

Stem bleeding is also one of the symptoms of *Ganoderma* wilt disease of Andhra Pradesh and of "Anabe roga" in Karnataka. The disease is caused by the fungus *Ganoderma lucidum* first attacking the root system. This disease spreads in sandy soils and sandy loam soils in higher percentage and the spread in black soils is negligble. The disease initially infects the underground roots gradually spreading into the trunk and the bleeding occurs out of the cracks of the trunk. The disease spreads rapidly up the trunk. In later stages the leaves in the outer whorl of the crown droop and consequently the fruit bunches also hang down. The drooping extends to the inner whorls also and finally the crown topples down leaving the bare trunk.

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Stem bleeding affected palm treated with hot coal tar.

Stem bleeding is also reported in the wilt disease of coconut from the coastal areas of Thanjavur (Tamil Nadu). Subsequently heavy drooping of the outer fronds, shortening of the spindle, chlorosis of leaves etc. take place. The tree succumbs to the disease within a period ranging from 6 months to 3 years after the initiation of the disease. Sub-soil in the diseased areas consists of a mixture of sand and yellow clay, which hardens considerably on drying in summer months and forms a hard pan which impede root penetration. Number of fungi such as *Ganoderma* sp., *Fusarium* sp., *Ceratostomella* sp. etc. are isolated from the diseased tissue.

Soil samples were collected from 17 sites (5 each in Kerala, Tamil Nadu and Goa and two in Karnataka) at two depths, 0—50 and 50—100 cm and were analysed for pH and electrical conductivity. The electrical conductivity was less than 1 millionhos in all the soils collected from the plots growing healthy and diseased trees. There was not much variation in the pH also. Laterite and alluvial soil samples were collected at 3 depths (0—30, 30—60 and 60—90 cm) from 4 places near Kasaragod and Calcareous soil from Agaram in Tamil Nadu. There was no significant difference between conductivity, pH and major nutrients between the soils from healthy plots and diseased plots.

Control measures

In a garden at Adat in Trichur district and in Goa stem bleeding could be cured by discontinuing the application of NPK fertilizers and by the application of organic manure (at Adat) and fish manure (in Goa).

Depending upon the nature of the causal factors various methods have to be adopted for controlling the stem bleeding disease.

After seeing the bleeding spots immediately the decayed and discoloured tissues beneath the bleeding spots should be removed completely by using a chisel. The chiselled tissues should be burnt to avoid spread of the disease to healthy trees. Afterwards the cleaned area should be smeared with hot coal tar or with Bordeaux paste (1 kg of copper sulphate and 1 kg of quick lime in 10 litres of water dissolved separately and mixed together). This treatment mostly controls the typical stem bleeding and in the case of other types of bleeding it will serve as a protective covering against the spread of the rotting of the stem. Photographs 1 to 3 show a tree with typical stem bleeding, a tree treated with coal tar and Bordeaux paste respectively.

Stem bleeding affected ... Bordeaux paste.

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