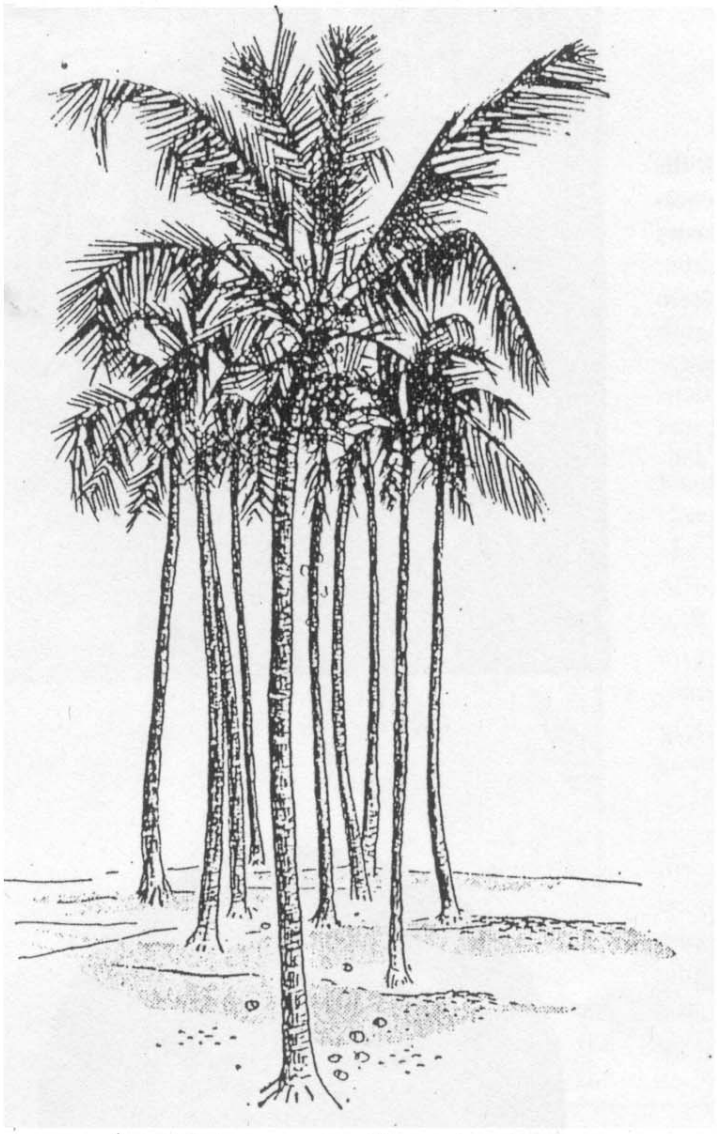
Preventing Wilt Disease Of Coconut In South India

P. SHANTA
Central Coconut Research Station, Kayangulam, Ochira, Kerala



A WILT DISEASE is taking a heavy toll of coconut plantations in the South. The disease was first discovered about 30 years back after a severe flood in two or three different localities in Central Travancore (South Kerala). From these separate foci of infection, it has slowly spread throughout South and Central Kerala. Nearly 80 per cent of the trees are affected by this disease in some localities.

The most distinguishing symptoms are slow wilting of the leaves, flaccidity of the leaflets, accompanied with an abnormal bending and consequent breaking of the petiole (stalk), marginal and tip necrosis (degeneration) of leaflets, and an abnormal button shedding. In the early stages of the disease, these symptoms may appear singly or in combination, often accompanied by a chlorosis of the older leaves. As the disease progresses, these symptoms get acute, the general growth-rate of the plant is retarded, so that fewer leaves are produced, the leaves themselves becoming short and stunted. The production of female flowers is curtailed and accompanied by premature nut-fall. The affected tree bears almost no fruits. The few nuts that are produced become poor in quality also.

The chlorosis of leaves that accompanies other symptoms starts as small specks or dots in the sixth or seventh leaf, later spreading and merging with one another in the older leaves. Yellowing and sudden wilting of intermediate leaves are also not uncommon. The natural resistance of the tree is broken and the foliage becomes susceptible to the attack of secondary parasites like fungi and bacteria that cause severe leaf-rot.

PROGRESSIVE DECAY

The root system also deteriorates as the disease progresses. The majority of roots and rootlets start drying from the tip backwards. The newly-formed rootlets get rotted due to the attack of weak soil parasites. Root production is greatly curtailed in the late stages.

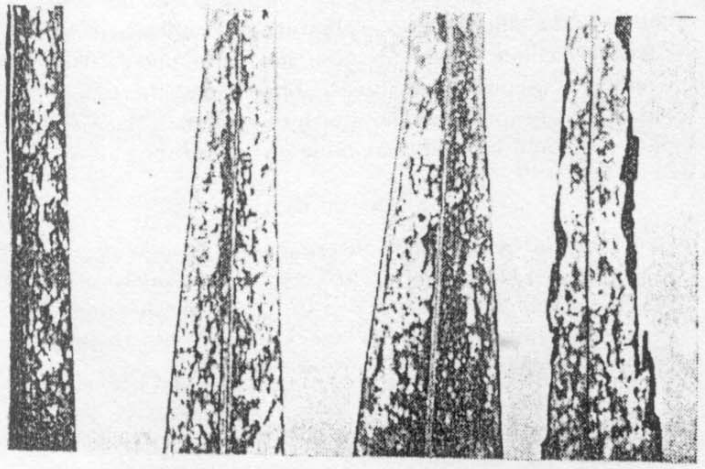
These symptoms are very slow in developing, so that an affected tree may continue living for 10 to 15 years after the first appearance of symptoms. Generally six to ten-year old palms are found to be most susceptible, infection on palms younger than five years being only rarely noticed.

DISTRIBUTION OF THE DISEASE

At present, the wilt disease has affected in South and Central Kerala an estimated area of 100,000 acres. In some of these places, especially where the water-table is high, the damage is severe. In these areas, secondary leaf parasites have also been active, causing almost complete destruction of the crop. The disease is spreading slowly, but steadily into new areas, especially towards North Kerala and the extreme south of the State, irrespective of the soil type. It is of some interest to note that in the heavily infected tracts of Central Kerala itself, some pockets of mild infection occur.

The disease is generally observed to occur in new areas in patches and not sporadically. On the other hand, in an affected plot, the pattern of spread on individual trees is sporadic, the percentage increase of the disease being about three to five per cent per annum in such plots.

Extensive studies on soil conditions in relation to the disease incidence showed some significant differences between the soils of healthy and diseased areas in many respects. The available potassium, total calcium, iron, total exchangeable bases and percentage base saturation were lower in soils of diseased areas, while these soils were generally found to be more acidic, with a comparatively higher water-table. Although these investigations showed that the soil in which the disease occurred was apparently of poor nutrient status, no particular defi-



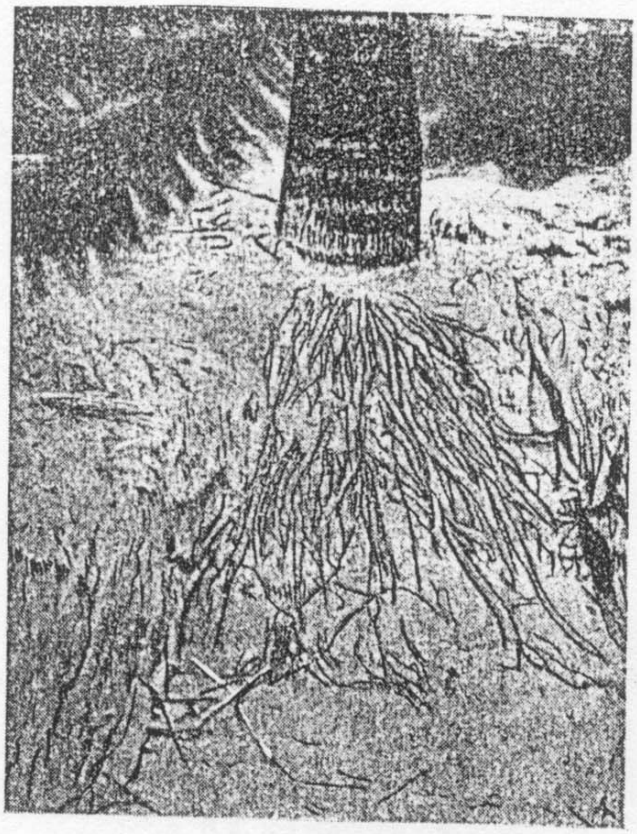
Chlorosis of leaflets with marginal necrosis on the leaflet at the extreme right

ciency of any macro- or micro-element was revealed as being the direct cause of the disease.

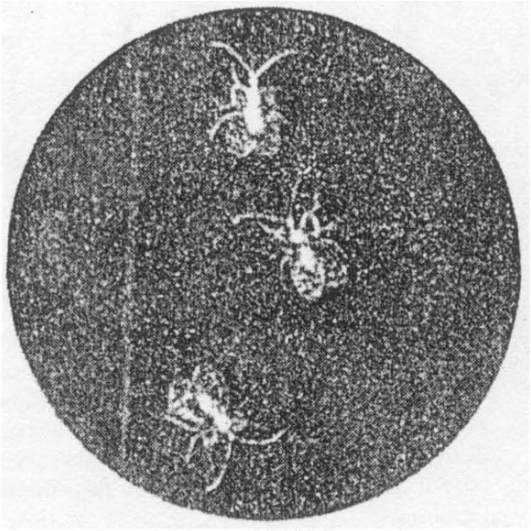
High water-table or poor drainage is, as mentioned earlier, often associated with the disease. This might be considered to be the pre-disposing factor, for it is known that prolonged water-logging deteriorates root health and generally lowers the resistance of the host. However, it must be stressed here that the disease is not confined to water-logged areas alone ; it is commonly met with in laterite soils also. Moreover, some of the best disease-free tracts of coconut found in Kerala are areas with high water-table where water-logged conditions obtain for some part of the year.

ROOT ROT AND RELATED STUDIES

The fungi *Rhizoctonia bataticola*, *R. solani* and *Botryodiplodia theobromae*, associated with the root rot, were



Decaying roots of a diseased tree



Adult of Stephanitis typicus *feeding on a coconut leaflet.*

found to cause only local infections on roots. Moreover, in addition to their facultative growth habit, these fungi were of cosmopolitan occurrence in coconut soils and were therefore considered as secondary parasites. That this fungus becomes parasitic under conditions of water-logging and low nutrient status of soil was shown by K.P.V. Menon and others (1952). Subsequent observations on the root system of coconut tend to confirm

This wilt-affected palm is fast going off.

the above hypothesis that root rot is only secondary, inasmuch as it is entirely absent in some palms in the early stages of disease. Experiments conducted in the field as well as under insect-proof conditions showed that a sap-transmissible virus was also involved in this complex disease. One of the vectors that actively helps in the spread of the virus is the common banana lace-wing bug *Stephanitis typicus* that breeds on the leaves of the coconut palm. This insect is observed in large numbers in the infected tracts. How far this virus is responsible in initiating this disease is, as yet, unknown.

CONTROL MEASURES

Experiments conducted over a number of years suggest that no single treatment is sufficient to control the disease. Strict plant quarantine is suggested to prevent the spread of the disease into new areas. In already-affected tracts, good cultural practices and crop hygiene will prevent the accumulation of infective material in any one place. Good cultural practices with regular manuring will not only enhance the disease resistance of the crop but also help in giving an economical yield even from diseased trees.

However, it must be stressed here that since no curative methods have yet been discovered for virus diseases, especially in perennials, the best method would be to destroy trees in the advanced stages of the disease and replant the area with quality seedlings. Meanwhile, the Central Coconut Research Station, Kayangulam, is evolving new and better measures to prevent the spread of the disease into new areas, and also to check its spread in the already affected tracts.