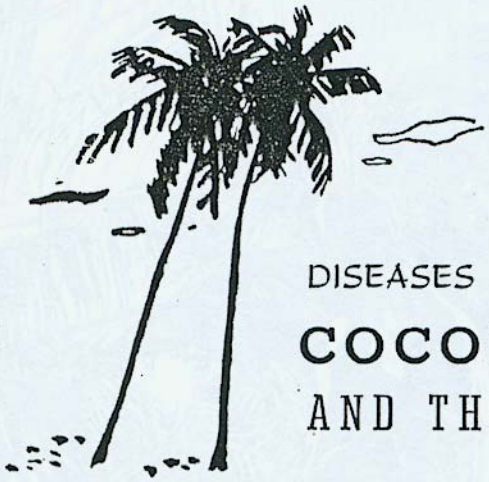
PLANT PROTECTION SEMINAR KERALA, 26-32 (1964).



DISEASES OF THE COCONUT PALM AND THEIR CONTROL

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IN common with all the other agricultural crops, coconut palm also is affected by a number of diseases causing considerable damage. Diseases which are of prime importance to the crop in our country are dealt with in the following pages.

1. Bud-rot

The characteristic symptom of the disease is the discolouration of the youngest two or three leaves before the heart-leaf collapses. Subsequently the leaves in the surrounding whorls are also affected leaving a ring of fully expanded older leaves. The soft, infected tissues of the bud region completely rot and degenerate leading to the death of the single vegetative bud and also of the palm. The disease is caused by the fungus *Phytophthora palmivora* (Butl). Although it is reported sporadically throughout the coconut growing areas of the country, the disease is more common on the East Coast where coconuts are inter-cropped with palmyra than on the West Coast.

An young palm showing typical symptoms of leaf-rot

Destruction of the badly infected tree on the spot, application of Bordeaux paste on

Application of Bordeaux paste on the crown of the rot-affected palm

the crown after thorough cleaning and a prophylactic spray of Bordeaux mixture to the apparently healthy palms in the vicinity of the diseased ones are the practical means of control. However, unless the infection is detected in the early stages, the curative measure may not prove successful.

2. Leaf-rot

Typical symptom of the disease is a blackening and shrivelling up of the distal ends of leaflets in the inner whorl of leaves. The primary symptoms manifest themselves as reddish brown spots occurring in the central shoot as it emerges. The lesions enlarge and coalesce and consequently a soft-rot sets in which affects the successively formed leaves. Reduction in leaf area adversely affects the general health of the palm resulting in losses in yield. The disease generally flourishes on young palms below 25 years of age, although it occurs in palms of all ages The seedlings in the nursery are rarely affected.

This is also a fungal disease, *Helminthosporium (Bipolaris) halodes* (Drechs), *Gleosporium* sp. and *Gliocladium roseum* (Baines) being the fungi associated with it. This disease is prevalent in Central Kerala affecting about a lakh of acres under coconut and causing considerable loss in yield.

Low temperature and high atmospheric humidity are conducive to the disease.

Eradication of the diseased material, application of a copper fungicide, preferably 1 per cent Bordeaux mixture during the non-rainy seasons, prophylactic spraying of the healthy

neighbouring palms and adoption of regular cultural and manurial practices are known to control the disease.

3. Stem Bleeding

This disease was first reported in India in 1922.

The main symptoms of the disease are the exudation of a dark reddish brown fluid from the cracks on the bark, usually at the lower portion of the trunk and rotting of the internal tissue which later develops into a general decay. The spread of the disease is rapid in young palms. A general rotting of the inner tissues leads to the formation of a cavity in the pith portion of the stem and accumulation of a thin yellow fluid.

A fungus, *Ceratostomella paradoxa* is often found to be associated with the infected tissue. However, there is little proof at hand to establish the pathogenicity of this fungus. It has been generally noticed that palms growing under adverse soil conditions are predisposed to infections. Any drastic or sudden measure which would tend to change the moisture holding capacity of the soil will also enhance disease incidence. Adverse subsoil conditions like too high acidity or alkalinity of subsoil water may also lead to incidence of this disease.

A palm affected by stem bleeding

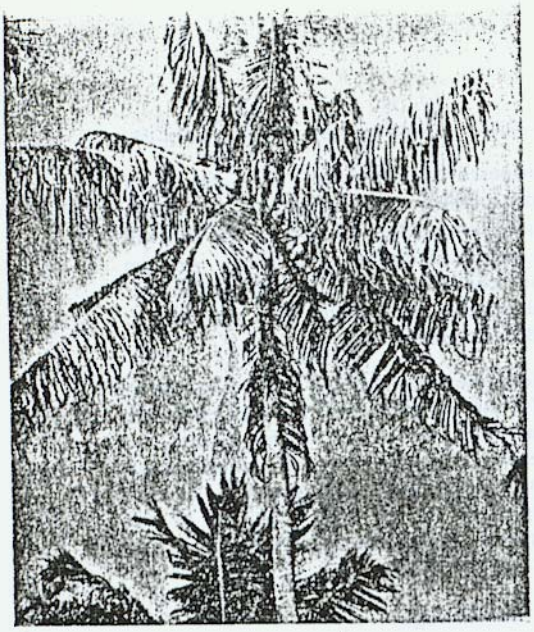
General improvement of cultural condition is of utmost significance in protecting the palms from the attack of the disease. A systematic drainage, regular caltivation and proper manuring will give excellent control. Scraping of the bleeding portions of the stem and application of Bordeaux paste is also recommended.

4. Anabe roga

This is a serious disease of the coconut palm mostly confined to the state of Mysore. The disease takes a heavy toll in the important coconut growing districts of Hassan and Tumkur.

The leaves in the outer whorls of the infected palms turn yellowish, then wilt, dry up and fall in succession. This leads to reduction in size of the crown. Suppression of the flower bunches is often associated with the disease. Bleeding wounds occur on the trunk, usually towards the bottom, through which a dark brown gummy liquid often oozes out. As the disease advances, the fruiting bodies of the causal fungus—locally known as 'Anabe' and hence the name given to the disease—appear around the bole of the palm. The fruiting bodies sometimes develop only after the palm is killed. An infected palm would usually succumb to the disease in about two years.

The disease is caused by the fungus *Ganoderma lucidum*. Palms mostly above ten years of age are susceptible to infection.



Root-wilt affected palm

The disease is soil-borne and infects the palms through the roots.

Proper sanitary measures like removal and destruction of dead tree stumps along with the fruiting bodies of the fungus should be adopted to check the spread of the disease. Replanting at the site should be avoided. Isolation trenches–1 foot wide, 2 feet deep and about 3 feet away from the bole–may be made around the affected palms to prevent the surrounding healthy palms from getting infected. Application of sulphur and lime to the soil around the trees has been found to be beneficial. Judicious manuring, proper drainage and intercultivation are essential for keeping the palms healthy to resist infection.

5. Wilt (Root) disease

This is the most serious of all coconut diseases in India and is known for about 80 years. The disease is prevalent in Central Kerala and affects nearly 1,00,000 acres of coconut plantations. The areas of occurrence of this disease mainly coincide with those of the leaf-rot disease.

Distinguishing symptoms of the disease are an abnormal bending of petioles, and flaccidity and ribbing of leaflets. The affected palms develop necrosis and curling of leaflets. Yellowing of the outer whorl of leaves is not uncommon. Shedding of buttons in affected bearing palms leads to reduction in yield. As the disease advances, progressive reduction in the number and size of leaves sets in. Total cessation of production of spathe, which renders the palm barren may occur in advanced stages of the disease. Deterioration of the root system by rotting of roots succeeds foliar symptoms. Copra quality and oil content of nuts in the diseased palms are adversely affected. Seedlings below 3 years of age do not usually get diseased. Palms in the pre-bearing stage on the other hand are most susceptible.

Early workers observed the association of a number of fungi, e.g., *Rhizoctonia bataticola*, *R. solani* and *Botryodiplodia theobromae* with the decayed roots of affected palms. However these organisms could not reproduce the symptoms of the disease in healthy palms. These organisms are now known to play a secondary role. Investigations on the nutritional aspect of the affected palms revealed that no macro or micronutrient is directly responsible for the disease. However the nutritional status of the soils of the affected tracts had been found to be consistently low. Further investigations revealed the active association of a mechanically transmissible virus with the disease. The virus is also transmitted by the banana lace-wing bug, *Stephanitis typicus* which commonly breeds on coconut palms. Recent trials confirmed that the virus also spreads through the soil.

Coconut palms infected with the disease in very young age suffer most and may not bear at all. Those which get the infection in the middle age generally suffer with a slow decline in yield, which can be made up to a considerable extent by proper manurial and cultural attention. Judicious manuring and cultural practices are therefore recommended. In order to prevent the accumulation of infective material in the affected tract, crop hygiene is of utmost importance. Diseased uneconomic palms should, therefore, be removed.

No resistant variety is available and production of a resistant variety is no easy task either in the highly heterozygous coconut palm. While the work continues in this direction the only choice for replanting purposes is the use of quality seedlings which by no means will be free from danger of infection. Strict quarantine on movement of seednuts and seedlings from diseased areas should be practised.

Spraying with Bordeaux mixture for the control of leaf-rot

6. Band disease

This disease occurs in the coastal districts of Colaba and Retnagiri of the Bombay State. In the local language the word 'Band' means barren which indicates the ultimate effect of the disease.

The primary symptom of the disease is the appearance of dark green shortened leaves with glabrous fasciatted leaflet . Reduction in the number and size of leaves produced as well as reduction in the number of leaflets per leaf are characteristic symptoms. The yield of the diseased palms is abruptly reduced due to malformed inflorescences and poor fruit set resulting in barrenness. The stem often tapers at the apex and assumes the pencil point condition allowing the crown to topple over. The disease is widespread in neglected and in over-crowded gardens.

Analysis of soil samples from healthy and diseased areas failed to indicate any deficiency of plant nutrients. The association of a probable virus with the disease was also suggested. Microbiological analysis of soils suggests that the soil condition at the base of the diseased palm is not favourable for normal microbial activity. Lack of proper drainage, soil acidity and manganese toxicity were considered as causal factors but none of these hypothesis are supported by sufficient experimental proof and the nature of the disease cotinues to be obscure.

Since the causal agent of the disease still remains unknown, no specific control measures can be recommended. Proper

plantation management by way of drainage, manurial applications and cultural practices were found to improve the general condition of the affected palms and to keep a low incidence of the disease.

7. Thattipakka disease

This is another important disease prevalent in Andhra Pradesh and is characterised by stunted growth, paling and fasciation of leaves and a sudden bumper crop followed by the production of atrophied and barrennuts. Work on this disease which is also called the decline of coconuts has been in progress under the Department of Agriculture, Andhra Pradesh. Preliminary investigations on this disease have not given any clue to its causal factors.

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