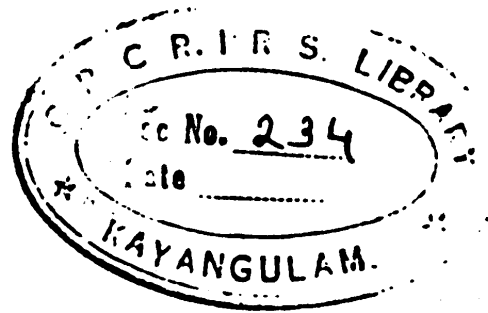


SPREAD OF ROOT (WILT)

DISEASE OF COCONUT

- SOME INTERESTING OBSERVATIONS



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THE aetiology of root (wilt) disease of the coconut palm is still enshrouded in mystery. The disease has been spreading continuously and is now noticed in many localities in Quilon, Alleppy, Kottayam, Ernakulam and Trichur districts and is spreading further both in the southern and the northern parts of Kerala.

The possible association of river water with the spread of the disease has long been realised. The reported out-

break of the disease with the great floods in 1882 at Erattupettah on the banks of Meenachil river and the subsequent reports by Varghese ("Diseases of the coconut palm", Varghese, M. K., 1934) about the rapid spread of the disease along the banks of the Meenachil, the Pamba, the Kulakada and the Kallada rivers support this view.

Recent investigations have shown the infective nature of the soil collected from the base of diseased palms. A

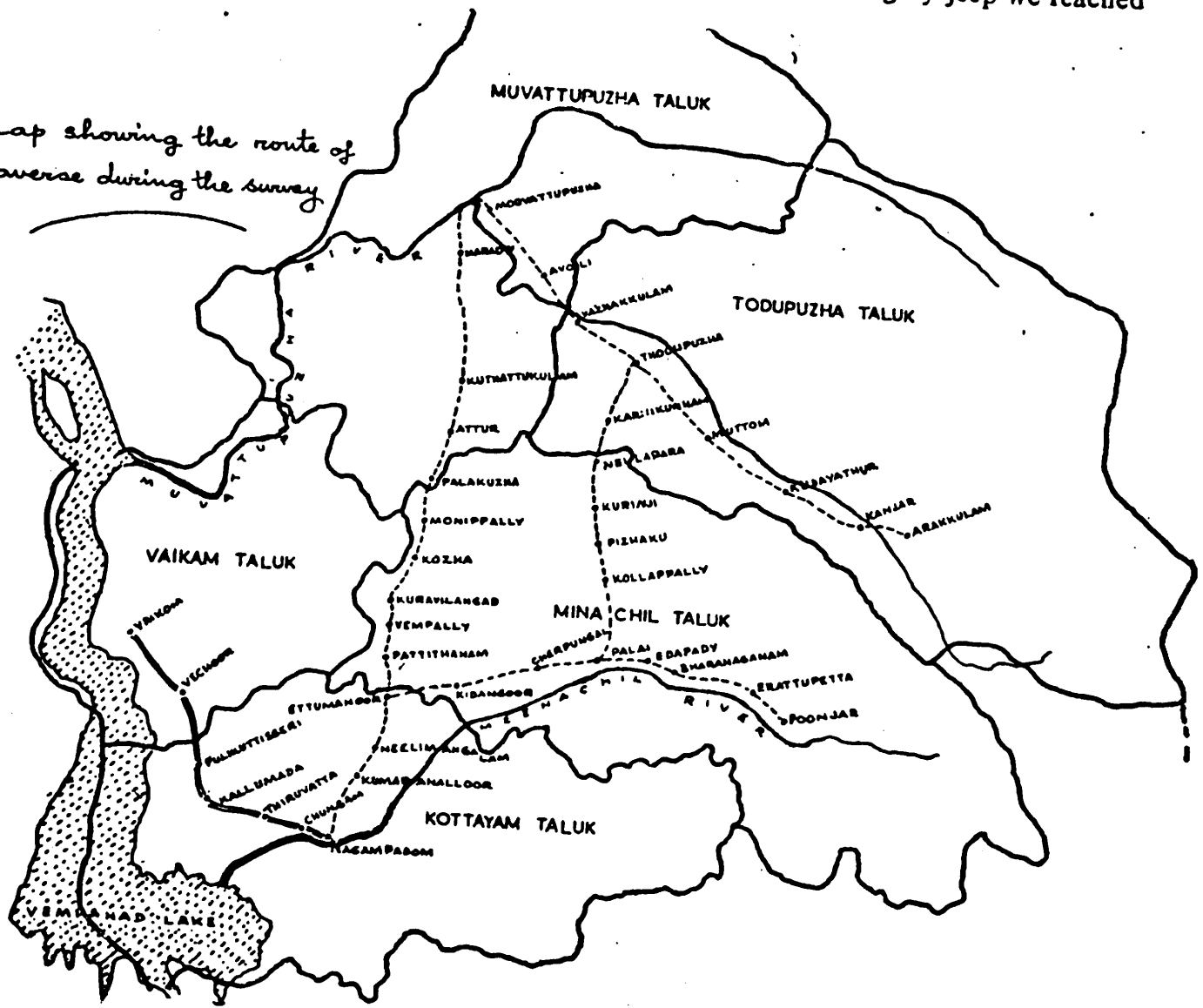
reconnaissance soil survey has also revealed that the disease is found more in places with high water table. These observations have brought into the picture the soil water as a carrier of the disease and have revived interest in the river water and silt as agents of spread. It was, therefore, thought worth-while to survey the beds of rivers and canals and to study in detail the chemical composition and infectivity of water and silt from the rivers in the diseased tracts as also the minerological composition and the disease-causing flora and fauna of the hills from where the rivers

originate. This study has been started with the Meenachil, Thodupuzha, and Moovattupuzha rivers and some of the salient observations made during a preliminary survey are discussed below.

THE MEENACHIL RIVER

Proceeding from Nagampadom bridge at Kottayam, we followed the Meenachil river upto Poonjar by road and down to Vaikom canal by water. The plantations on the banks of the river at Nagampadom were heavily infected. Proceeding by jeep we reached

Map showing the route of traverse during the survey



Ettumanoor passing through Kumaranallor and Neelimangalam. There was stray incidence of the disease at Kumaranallor, while the area from Neelimangalam to Ettumanoor was almost disease-free, the disease again appearing

at Ettumanoor. Diverting to the Palai road, we proceeded to Palai passing through Kidangoor and Cherpungal. The Meenachil river passed through these places which were heavily infected with disease.



FIG. I

A heavily infected plantation on the banks of the Meenachil river

Passing through Edappady, Bharananganam, Ampara - all in the vicinity of the Meenachil river - we reached Erattupettah. The areas on both sides of the river were found to be heavily infected with the disease. Diseased coconuts were found even on hill tops.

At Erattupettah the Kudayathoor river (Vadakkanar) and the Kudamurutti

river (Thekkanar) join and proceed to Kottayam as Meenachil river. Traversing by the side of the Meenachil river we reached Poonjar, again a heavily infected area. We proceeded about four miles towards Peringalam from where the Kudamurutti originated but did not go further owing to heavy rains and as the place was noted for cloud bursts.

It was thus observed that all the places on the banks of the river as we travelled up were heavily infected with disease. The road leading from Ettumanoor to Poonjar is liable to floods during monsoons and this may account for the rapid spread of disease in these areas. The water of the river was examined at several points along its course for its reaction and salt content. It was found

that the water was only slightly acidic (pH ranging from 6 to 6.1) while salt was either absent, or present only in traces. As the disease has become so acute in these places, people have switched over to rubber. Rubber plantations could be seen in almost all gardens, the underplantings of coconut seedlings having been completely abandoned.

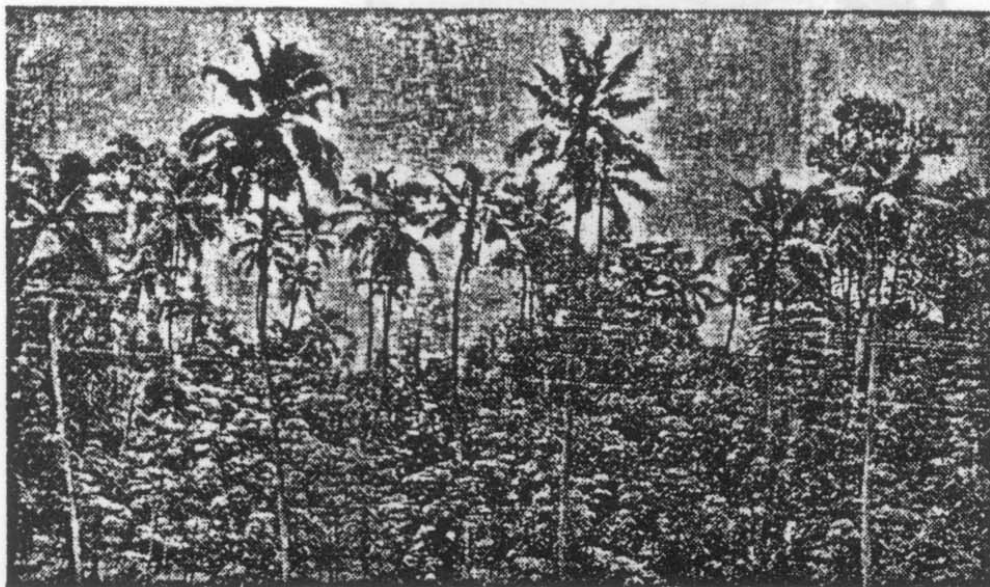


FIG. II

Old coconuts in a young rubber plantation

From Nagampadom to Vaikom canal down stream, we undertook the journey by boat and passed through Chungam, Thiruvatta, Kallumada (Aymanam) and Pulikkuttissery (here there is a diversion canal to Kumarakom.). A branch of the Meenachil river which started higher up at Neelimangalam rejoined the main river at Pulikkuttissery and, as though crossing each other, divided at the junction into two, one branch flowing through Kumarakom into the Vempanad lake and the other going to Vaikom as

Kottayam-Vaikom canal. We continued our journey along the Vaikom canal and reached Moniyaparampu. Upto this point the disease was prevalent on both sides of the river. There was practically no change in the reaction of water while the salt content had slightly increased owing to the influence of tidal water from the Vempanad lake nearby. As we left Moniyaparambu and entered the 'Kari' lands there was an abrupt change in the condition of the palms. The disease completely disappeared and healthy plantations were seen on 'Kari'

lands. The change in the condition of the palm was accompanied by a change in the properties of the river water which became more saltish and acidic, the pH changing from 6 to 4.5. The 'Kari' lands represent a peculiar soil type of high acidity, organic matter and salt contents, and stretch up to Vechoor and Vaikom, most of the places being paddy fields on the bunds of which coconuts are planted on reclaimed 'Kari'. The cultivation of coconut in 'Kari' lands with particular reference to root (wilt) disease has been discussed in more detail in a previous communication (N. G. Pillai and M. V. Pushpadas, 1965, Coconut Bulletin). This clear cut change in the health of the palm may be due to the change in the chemical property of the river water which might render the infective or toxic material inactive. The high acidity of the river water around the 'Kari' lands (pH 4.5) appears to assume some significance in as much as the infective principle of the wilt disease has been shown to have the maximum effect between pH 6 and 9 while it is almost inactivated at pH 3.0 (P. Santha and K. P. V. Menon, 1961. The Indian Coconut Journal). This aspect is to be clearly investigated and is apt to give valuable clues to the incidence and spread of disease.

PROXIMITIES OF THE MOOVATTUPUZHA AND THODUPUZHA RIVERS

In another trip by road starting from Lalam (Palai) we reached Thodupuzha via, Kollappally (intensive wilt), Pizhaku (wilt of slight intensity) Kurinji, Nalleppara, Karinkunnam, (healthy to stray incidence of disease).

The palms in the river bed of Thodupuzha were found to be diseased. From there we reached Arakkulam passing through Muttom, Kudayathoor and Kanjar (a branch of Thodupuzha river). A few cases of wilt were evident in all these places.

Returning to Thodupuzha we proceeded to Moovattupuzha via. Vazhakkulam and Avoli which were found to be healthy areas. At Moovattupuzha, the Thodupuzha river crossed the town, and infected palms were found only on the banks of the river. The Thodupuzha river joins the Kaliyar river two furlongs away from Moovattupuzha river. A few cases of wilt could be noticed at this junction also. Then we returned to Kottayam via. Koothattukulam, Marady (healthy) Attur, (healthy) and Palakkuzha. On the way just after the deviation road to Vaikom, a few wilt infected trees could be noticed near a paddy field. This field had apparently connection with the infected areas of Vaikom through water sources. Incidence of disease became more and more as we passed Monipally, Kozha and Kuravilangad. At Kuravilangad a small canal coming from Vaikom crosses the road and proceeds to join the Meenachil river. There is every reason to believe that this canal water was responsible for the heavy spread of the disease in that area. The disease became less intense as we passed Vempally and the palms were found to be perfectly healthy at Pattithanam and continued to be so until we reached Ettumanoor where the disease again appeared.

GENERAL OBSERVATION

Most of the diseased palms examined during the survey were severely

attacked by leaf blight which seemed to be different in appearance and virulence from those observed in healthy areas. The associated symptoms were bending of leaf tip, general paling of the foliage with acute yellowing in the outer whorls resulting from yellowish, brownish or pinkish spots distributed throughout the leaves and subsequent marginal drying. The highly humid condition prevalent on the banks of rivers and canals may be a factor in the incidence and spread of this disease with virulence in these areas. It would, therefore, be interesting to separate out and distinguish the symptoms produced by blight from those observed due to wilt disease. That pestalotia can assume destructively epidemic proportions has been indicated by Bernard in Java and Stockdale in Trinidad (E. B. Copeland, 1921, "The Coconut"). Many wilt diseased palms were also infected with leaf rot.

SUMMARY

1. A survey of the proximities of the Meenachil, Thodupuzha and Moolattupuzha rivers revealed that the

infection due to root (wilt) disease of coconut was more on the banks of these rivers and canals leading from them indicating that the river water (and probably the silt carried by it) may be a factor in the spread of the disease.

2. The chemical properties of the river water appear to influence the spread of the disease. The spread of the disease was found to become slow as the river water became more saltish and acidic.

3. It has been observed that most of the wilt diseased palms were severely infected with leaf blight and in many cases with leaf rot.

Until definite information about the origin and spread of the disease is available river silt, canal silt, and lake silt should not be allowed to be removed from infected areas to healthy areas; removal and transport of coconut and other plant materials as well as soil from infected to healthy areas should be discouraged and leaf blight and leaf rot, which enhance the damages to the coconut palms should be controlled with Bordeaux mixture spraying.