The Malayan Dwarf, Probable Answer to the Root-Wilt in Kerala

BY

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INDIA, with its nine lakh hectares under coconut, ranks third among the coconut growing countries. About 70 per cent of this is concentrated within the small State of Kerala. Unfortunately a serious, spreading and killing disease known as 'Kerala Wilt' or 'Root-wilt has spread over a fourth of the coconut tract in Kerala. The loss brought about by this disease to the coconut industry in India is considerable, and the country is still depending on imports to make up a deficit of about 25 per cent.

The Root-wilt disease has been in Kerala for over 80 years and no control measures could be evolved so far in spite of the investigations carried out on this problem during the past three decades. It is now fairly clear that the disease is of virus nature, and hence no cure is normally possible.

This being the situation and since the disease is fast spreading, threatening the survival of coconut in Kerala, one of the following courses seems inevitable. A disease-resistant variety of coconut has to be searched for, or alternatively, the disease belt has to be got rid of coconut palms and utilised for other useful crops.

The work on the search for disease-resistant varieties has not been given adequate importance in Kerala, whereas in Jamaica, the Malayan Dwarf variety has been found to be resistant to the devastating Lethal Yellowing disease. Now the Malayan Dwarf is fast replacing the Jamaica Tall which is susceptible to the Lethal Yellowing disease.

Jamaica has shown us the way to tackle the dreadful wilt disease of coconut

The Symptoms of Lethal Yellowing

The most characteristic symptoms of Lethal Yellowing in bearing palms are the shedding at short intervals of nuts of all stages; blackening or deep-browning of young spadices (or portions of them) as they emerge from the spathe; and development of a rich yellow colour on the lower leaves. The affected palm loses its crown and dies within a year from the onset of the disease. Many palms, however, succumb to the disease within a couple of months. No recovery from Lethal Yellowing is known.

Yellowing of the crown is the most striking symptom of the disease which attracts one's attention even from afar.

Discolouration of the fronds progresses from light yellow to light orange-yellow and finally to orange-yellow. Differences in shades of colour may be noticed from locality to locality.

The discolouration of the leaflets takes place from their tip down-

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wards, but the entire leaf may become yellow either from its tip, margins or its base. Leaflets showing deep orange-yellow discolouration start browning and soon dry up. The older leaves droop pathetically leaving only a few of the younger leaves in an upright posture which continue to be light green for a short while and then follow the older ones. Thus the entire crown is blown off leaving only the crownless trunk (Fig. 1).

Sometimes the weak leaves snap at different points on the rachis and their tip hangs. This symptom is more pronounced in the young Jamaica Tall palms underplanted in the disease belt (Fig. 2).

Fig. 1. Crowns of Jamaica Tall blown off due to Lethal Yellowing. Alongside are the healthy Malayan Dwarf

Shedding of immature nuts of all stages, as mentioned above, is an important early symptom of Lethal Yellowing in bearing palms. The stalk-ends of nuts show darkening and rotting tendency; the stigmatic-end however looks normal. The perianth cap of the nuts shed, is retained at the spadix.

Differences and similarities

While this is a universal symptom with Lethal Yellowing (Fig. 3), in the case of the Kerala Wilt only a small percentage of the disease-affected palms, especially the heavy bearing ones, shed their nuts at all stages of development. This is the first visible symptom. The shedding of nuts is followed by the withering of young spadices, in the case of Lethal Yellowing as well as Kerala wilt.

Once the palm is affected, only a few of the subsequent flower bunches emerge from the spathe. The tips of the spikes and the male flowers either rot or wither and turn dark brown. In acute cases, the spathes do not open, but the underdeveloped spadix rots within the spathe. Since the palms affected by Lethal Yellowing often wither within a couple of months, several dry spadices bereft of nuts still cling to the crown at the time it dies. This, however, is not the case with palms affected by the Kerala Wilt, because these palms take a much longer period to die, and the production of spadices is gradually suppressed, sufficiently before the final withering of the crowns takes place.

In all cases, the growing point of the affected palms rot, emitting a very strong nauseating odour of decaying cabbage leaves. Without much effort, the spindle leaves at this stage can be pulled out, and the rotten end appears very dark (Fig. 4). Cross section of the bud usually shows an internal discolouration even at an early stage.

Roots that had been examined after the setting in of premature nut-shedding are reported to

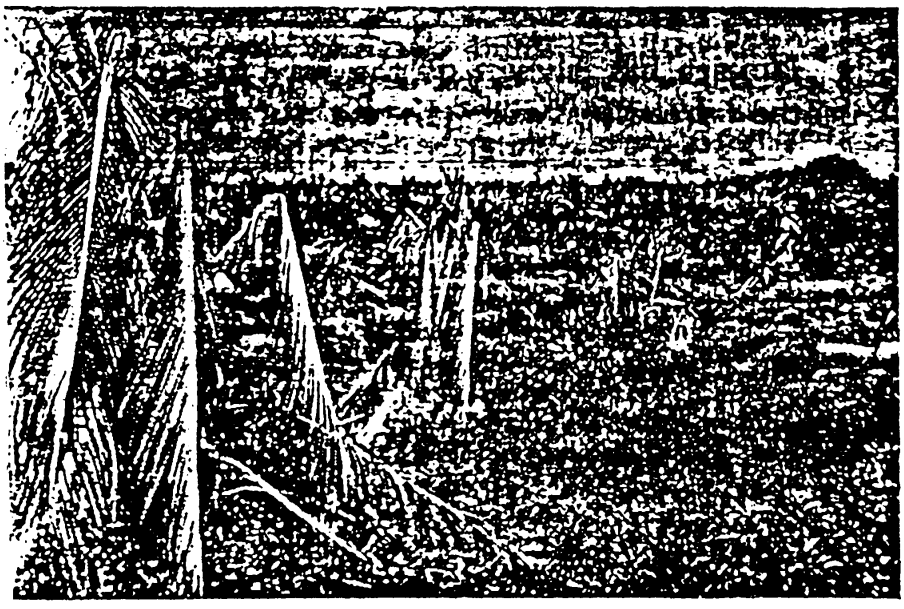

Fig. 2. Broken leaves of underplanted Jamaica Tall

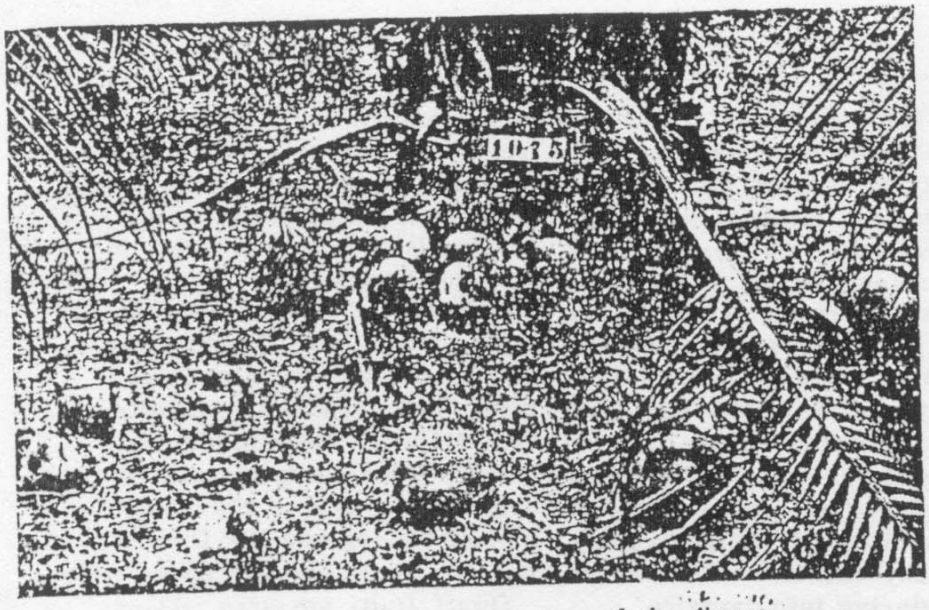

Fig. 3. Shedding of nuts—a symptom of the disease

appear severely affected and no new roots are produced afterwards. In this respect too, the Lethal Yellowing resembles the Kerala Wilt. Root discolouration is manifested by patches of dark brown colouring, interrupting the normal red colour of the roots. In dying roots, the outer layer often slides off when pulled, leaving the cortex intact. The mature trunk and the bole do not show any abnormality in their structure.

Lethal Yellowing is suspected to be a virus disease and transmitted by a slow-flying insect. However, no conclusive evidence is available to consider an insect as a positive vector for Lethal Yellowing. Investigations are being conducted in large insect-proof cages at the Research Institute as well as in the field (Fig.5) at Kingston on this aspect.

The results obtained in Jamaica during the past 25 years unquestionably establish the resistance, if not immunity, of the Malayan Dwarf coconut to this rapidly devastating disease (Fig.1).

Economics of the Dwarf and the Tall

Even from an economic point of view, a Dwarf pays higher dividends than the Tall. Under good conditions of rainfall, flowering in a Dwarf begins three years after planting. Poor conditions or lack of attention may delay it to four or even five years whereas a Tall takes five to ten years to flower.

The Dwarf reaches its maximum yield in the second or third year of bearing, (Fig. 6) whereas the Tall takes five to ten years of bearing to reach its maximum.

Dwarf trees have a long productive life. In fact, the oldest and extensive plantation in Jamaica are now 25 years old,

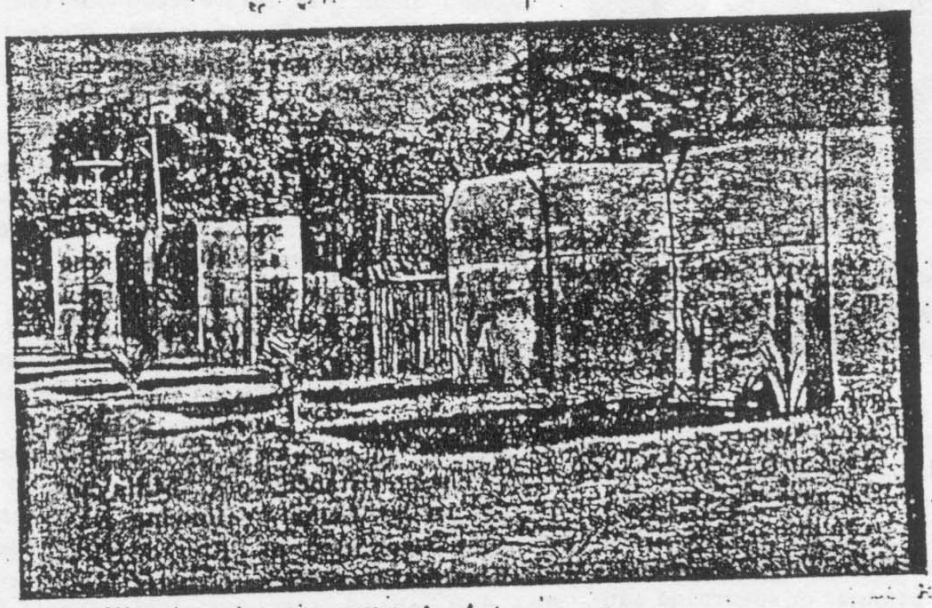

Fig. 5. Large insect proof cages

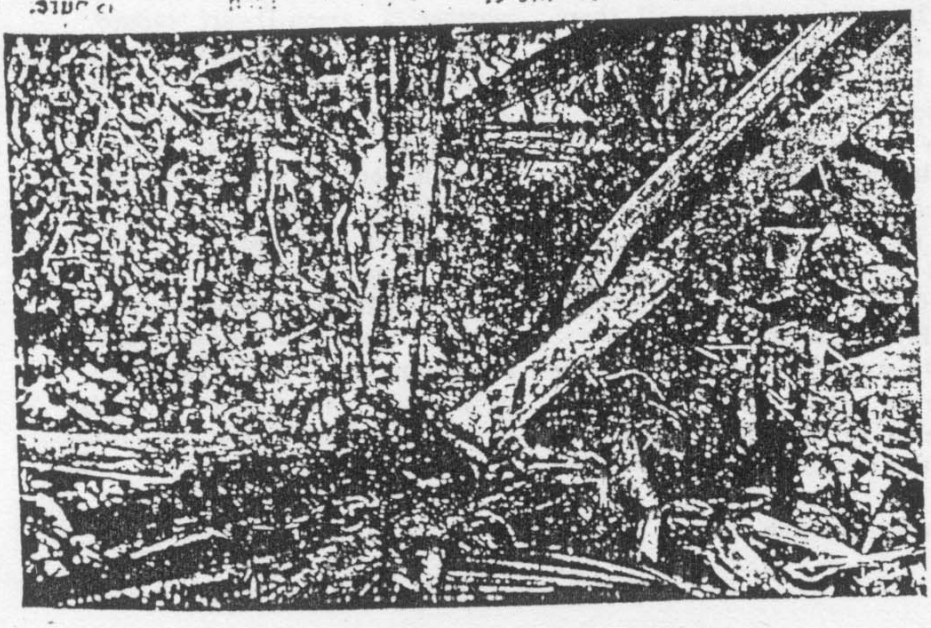

Fig. 4. Dark rotten end of the affected spindle leaves

Fig. 6. A two to three-year-old dwarf in its bearing

and yet bear well. In St. Lucia and Malaysia 40–60 year-old gardens of Dwarf produce good yields.

Yield and copra out-turn

A pure stand of Dwarf on good land yields 8,000 nuts per acre per year (i.e., 1.3 tons copra, at 6,000 nuts per ton). Under poor conditions, e.g., slopes where bananas or sugarcane cannot be grown, an yield of 5,000 nuts per acre per year can be expected (i.e., 0.7 ton copra, at 7,000 nuts per ton).

The yields obtained from the Dwarfs in the first two years of bearing cover their cost of establishment and maintenance up to that time whereas the Talls do not even start bearing in this period.

A 55.5 unit of Dwarf coconuts makes one ton of copra. Dwarfs have thinner husks than the Jamaica Talls. The Dwarfs require 155 lb. husked nuts to make one unit compared to 135 lb. of the Jamaica Talls.

The Malayan Dwarf

Although the origin of the Dwarf variety of coconut has not been determined satisfactorily, it is believed that the Dwarf forms are mutants of the Tall variety, appearing first in Java. From there the Dwarfs were supposed to have been introduced into Malaysia between 1890 and 1900 by planters from Krion. Only in Malaysia the Dwarf is cultivated on a plantation scale whereas it grows mixed with the Tall variety in many centres.

Introducing into Jamaica

Round about 1920, twelve seeds of the Malayan Dwarf were brought from Malaysia into St. Lucia which gave rise to several thousands of Dwarfs in St. Lucia From St. Lucia they were introduced into Jamaica after the hurricanes of 1944 and 1951, and, therefore, are sometimes called St. Lucia Dwarfs. Most of these introductions were of the green type but about 20 per cent were yellow and less than one per cent red.

Resistance to Lethal Yellowing

The resistance of Malayan Dwarf to Lethal Yellowing was first recognised at Round Hill. The first experiment was laid out at seven sites in the West of Jamaica in 1956. Of these, on four sites which were attacked by Lethal Yellowing, many Jamaica Talls died, but only a very small percentage of the Malayan Dwarf contracted the disease. Experiments conducted on trees planted between 1962 and 1966 on farmers' fields also confirmed the resistance of the Malayan Dwarf.

On a few occasions when the disease struck those trees considered to be Dwarf, inspection of them showed that the plants are not typically Dwarf but are hybrids or back-crosses of some kind produced as a result of occasional natural out-crossing of Dwarfs with Talls. Some of these back-crosses are so similar to Dwarfs that it is difficult to distinguish them.

However, a few deaths do occur among true Dwarfs, but in view of the very strong resistance shown by the vast majority of the Dwarfs these deaths may be considered insignificant. A hybrid often escapes the disease if planted along with the Dwarfs.

How to mark out the Dwarfs

Dwarf fruits are green, yellow or red. Tall fruits are green or shades of bronze. Most Jamaica Talls have bronze fruits. In all cases, the leaf-stalk has the same colour as the fruit. When crossing occurs, the bronze colour of the Tall is dominant to any Dwarf colour and therefore masks it completely. Seedlings with bronze leaf-stalks in a Dwarf nursery are therefore Hybrids and are rejected since the extent of disease resistance in hybrids is not yet completely known.

Research results to date indicate that no Dwarf colour is preferable with respect to resistance to different diseases, to yield or to copra out-turn and oil content. It should be remembered that there is some difficulty in determining whether a green Dwarf is pure, since the colour of a hybrid of a green Tall and green Dwarf is also green: Such a hybrid is likely to yield better than a Dwarf and be more vigorous, but it may not have resistance to Lethal Yellowing.

Production of Plants

The Jamaica Coconut Industry Board ensures pure Dwarf coconut seeds. Seeds are selected from fields containing a high proportion of Dwarfs. Some seed gardens have been planted with cent per cent pure Dwarfs.

Dwarf mother palms are selected and marked, and reaping of

these is done by the Board on a regular cycle. Poor plants are rejected in the nursery. Hybrids are rejected on the basis of leaf-stalk colour.

Raising a nursery is relatively simple (Fig.7). Ripe nuts are spread out closely and sand and/or saw dust spread over them and watered. In 1968, 240,000 Dwarf seedlings were planted by farmers and in 1969, 380,000 seedlings. This also indicates the enormous speed with which multiplication of the Dwarf is being done.

Conclusion

Compared to Kerala Wilt, the Lethal Yellowing disease of coconut is a much worse malady. It has killed to date about 3,00,000 palms and still takes a heavy toll of 80,000 trees every year. There are about 5.5 million coconut palms in Jamaica, mostly of Jamaica Tall.

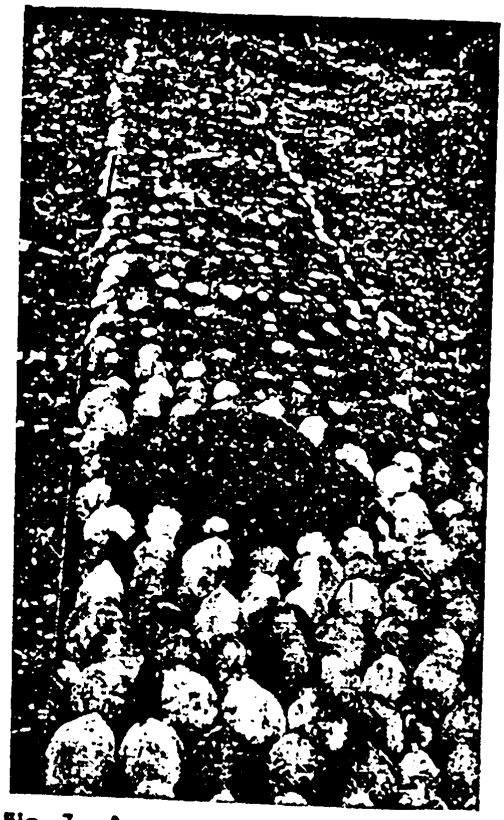

Fig. 7. A nursery of Malayan Dwarf

The Coconut Industry Board, Kingston, is working relentlessly to replace those disappeared ones with the Dwarf variety. The Dwarf plantings which were 2.50,000 in 1968 increased to 3,20,000 in 1969 and may have reached a high record of 5,00,000.

This way Jamaica has found a solution for its tough problem. Perhaps, if investigations on similar lines are carried out in India, they might prove successful in wiping off the dreadful Kerala Wilt diseease of the coconut.