

NEO-RHIZOSPHERE TECHNIQUE—A PROMISING LINE OF STUDY TO REJUVENATE ROOT WILT AFFECTED PALMS

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Although considerable research work has been done on the root (wilt) disease of the coconut palm, the aetiology of the disease still remains obscure with the consequence that no control measures could be evolved so far. The disease which made its first appearance sometime during the latter half of last century has already spread to over 30 per cent of the coconut acreage in Kerala State causing considerable economic loss to the multitudes of small holders.

The characteristic symptoms of the disease are observed both on the crown and root system. However, the inter-dependence or inter-relationship between the root damage and foliar symptoms has not been conclusively established. In the studies made at Kayangulam, root rot and functional disorder of roots were observed even in the apparently healthy palms growing in diseased areas. The intensity of the damage was also found to be more or less on par with that of the diseased palms. But, from the practical angle, the fact that even with the root damage the apparently healthy palms which grow in the same gardens where 30 per cent or more of the palms are diseased, do not show any foliar symptoms and behave exactly like healthy palms growing in disease free areas and give economic yields assumes considerable significance.

It is a known fact that coconut palms produce roots along the entire length of the trunk under favourable conditions. Also there is a continuous process of fresh root growth from the bole area to compensate the damaged and old roots. In the studies made at the CPCRI Regional Station Kayangulam, no comparison was made on the rate of fresh root growth in the diseased and apparently healthy palms. Whether the absence of foliar symptoms in the apparently healthy palms even when the root damage was similar to that of diseased palms was due to comparatively high rate of fresh root growth was not studied. Although the research has established that impeded drainage is one

of the major predisposing factors for the incidence of the disease, the influence of improved drainage on the root system and the resultant foliar changes have also not received adequate attention.

In the absence of effective control measures against the disease, the practical coconut grower will be satisfied if the root wilt affected palms could be rejuvenated and the rapidity in the rate of decline in yield is reduced. If economic and feasible management programmes could be evolved for such rejuvenation, the coconut growers would definitely adopt the new practices. With this objective in view, a preliminary trial was conducted to study whether the symptoms associated with the crown of diseased palms could be reversed and the vitality of the palms improved for normal productivity by creating a new rhizosphere above the soil surface.

MATERIALS AND METHODS

Two adjacent root wilt affected palms growing in the compound of the Directorate of Coconut Development, Cochin-11 were selected for the study. The palms were about 50 years old and in advanced stage of root wilt disease, on visual observation. The soil is sandy loam with impeded drainage and with a high water-table during 6-9 months in a year. A square brick wall with perforations on all sides was erected at a height of 1 m above the soil surface and at a distance of 2 m around the base of the palms. Two rings (cuts) of 3 cm. wide around the basal portion of the stem at a height of 0.3 m and 0.6 m above the ground level were made. These cuts or rings were so made as to remove not only the soft peripheral layer but also a very narrow strip of the stellar region with a sharp knife. River sand and cattle manure were spread around the base of the palms so as to cover the rings (cuts). Over the basal layer of sand and cow dung, decayed organic refuses rotten cattle manure and sand in alternate layers were heaped so as to cover

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Before Experiment



Crown of the Palm

Seven months after the experiment

the inside area of the brick wall embankment. About 5 kg. slaked lime was also added in between the layers. The trial was initiated in May, 1976. In September, a general dose of fertilizer mixture at the rate of 2 kg. ammonium sulphate, 1 kg. muriate of potash and 2 kg. superphosphate was added and covered.

Observations on leaf production and production of fresh roots were recorded.

RESULTS

Though the duration of this trial is not sufficient to draw any conclusions, some encouraging visual symptoms of improvement in the vegetative characters of the palms under study were observed.

LEAF PRODUCTION

Within a period of 7 months after the trial was started six new leaves emerged. All the leaves were found

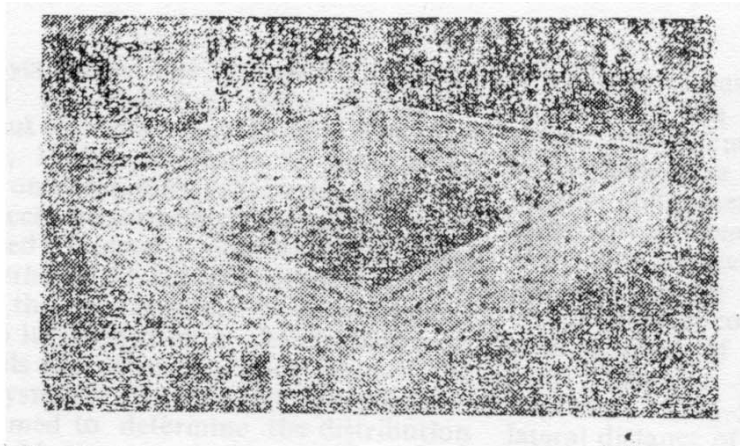
perfectly healthy, normal in growth and without any symptoms of leaf rot or root wilt. The new leaves were distinctly different in all external characters from the lower whorl of fronds which showed specific foliar symptoms of the disease. Even the old fronds showed general improvement.

PRODUCTION OF FRESH ROOTS

The basal portion of the trees was excavated and the fresh roots were counted 7 months after. On both the palms, a large number of fresh roots were found to have emerged both from the upper bole portion as well as from the rings. The production of fresh roots was 150 in number in each palm and the roots were found to be healthy and without any rotting or discolouration.

DISCUSSION

From the above results, it could be seen that with the emergence of new root system in badly diseased



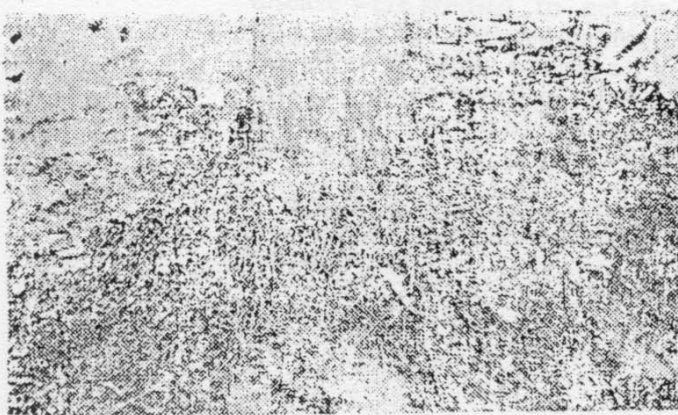
The brick wall embankment with perforations

palms, the foliar symptoms associated with root wilt were reversed. This is an indication of the possibility to rejuvenate diseased palms if congenial conditions for healthy root growth are provided. When a new rhizosphere is created in an area of 4 m diameter and 1 m high above the ground level, drainage from the root zone is also improved which under normal conditions is difficult to achieve in the low lying areas where the disease is widespread. The results of the present trial, therefore, indicate that better drainage, aeration and the use of organic manures and fertilizers in a

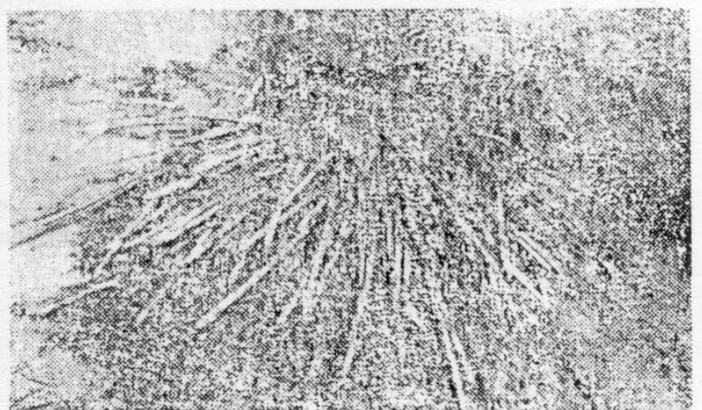
fresh rhizosphere above the bole region, are effective in producing fresh root system which could reverse the specific symptoms on the crown associated with root (wilt) disease. It is also logical to assume that the overall improvements are likely to continue and reflect on the yield potential after two or three years. ...

The results of the present trial and the logical conclusions drawn therefrom, are promising indications for detailed study with the objective of rejuvenating the diseased palms for normal productivity.

Production of roots



Before experiment



Seven months after the experiment