Basin Management Using Green Manure Legumes for Root (Wilt) Affected Coconut Palms

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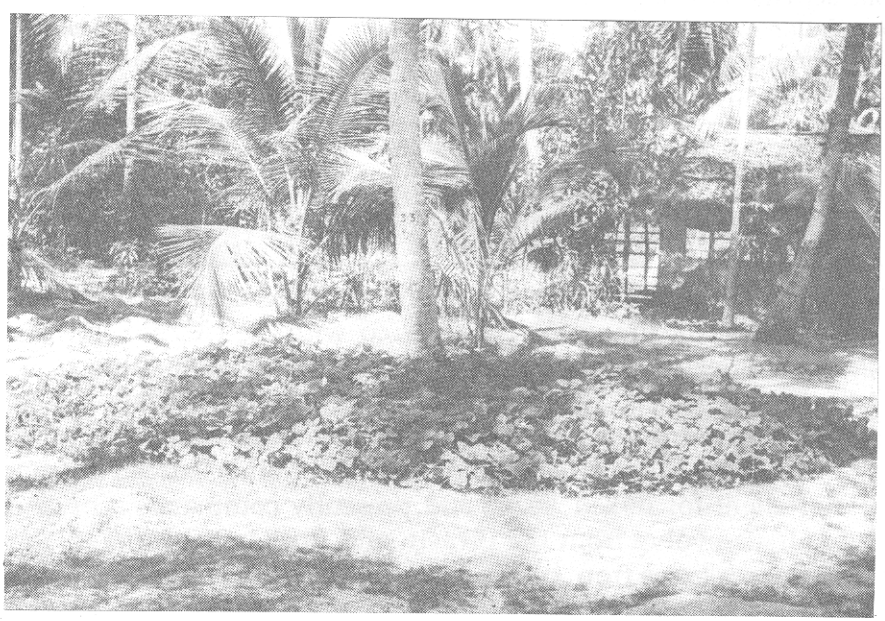
ROOT (wilt) disease of coconut spread over eight districts of southern Kerala is causing an yield loss of 968 million nuts. Since the disease is debilitating and the crop being perennial, the scope to live with the disease is high especially when the involvement of mycoplasma-like organisms is established and control measures are not economically feasible. Earlier attempts to manage the disease under mixed farming system with irrigation have yielded rich dividends. Admittedly, coconut is grown as a neglected crop by majority of farmers.

The recommendation for planting coconut is at a spacing of 7.5 m. either way. In practice, by virtue of the limited area available in a small holding, coconut is planted haphazardly with the interspaces grown with crops like banana, pepper, tuber crops and sometimes even tree crops like mango, jack ,etc. The population pressure on the land and the resultant fragmentation of the holdings leaves hardly any area unutilized. With this background in view, an attempt has been made to utilize the basin area comprising 1.8 m radius around the palm for raising green manure crops to generate organic manure without hampering the existing land utilisation pattern. Field experiments conducted in farmers' gardens at three locations namely Vayanakam, Memana and Vallikunnam around the CPCRI, Regional Station, Kayamkulam revealed the feasibility of this proposition. While the soil type of Vayanakam and Memana is sandy loam Vallikunnam soil is lateritic.

The coconut basins were opened during June with the onset of pre-monsoon showers for fertilizer application. After the incorpopration of one third of fertilizers as usual 20-25 g seeds of green manure legumes were sown in the basin in three concentric circles in 5 cm deep furrows and covered with a layer of soil. When the legumes were at the maximum vegetative growth after a period of four months the green matter was harvested and incorporated in the basins along with the rest two-third dose of fertilizers. Promising legumes yielded an average of 15-30 kg of green matter per basin.

In an initial attempt to select efficient green manure crops 10 different legumes were tested in coconut basins in sandy loam and laterite soil types for two seasons. While *Pueraria phaseoloides, Mimosa invisa*



Growth of *Pueraria* phaseoloides in coconut basin

and *Calopogonium mucunoides* proved their superiority over others by way of green matter production and nitrogen yield, the performance of *Macroptilium atropurpureum* (siratro) and *Crotalaria juncea* (sunhemp) remained next to the above mentioned three legumes. The addition of nitrogen from the plant tops was found to be 150-200 g per basin. These legumes have the capacity to fix nitrogen biologically with the help of the bacterium, *Rhizobium* present in root nodules. The nitrogen fixed by the legume-Rhizobium association becomes available to the coconut palm by the decomposition of the nodules and plant materials after incorporation. If the nodulation by the native rhizobia is poor in a particular locality, seed inoculation with efficient strains of rhizobia is necessary.

In addition to the contribution of organic manure and nitrogen, green manuring treatment was also effective in enhancing soil fertility parameters. The overall microbial activity as evidenced by the population of major groups of soil micro-organisms and soil enzyme activities was more in green manured basins as compared to control. There was three fold increase in microbial population over control in *Pueraria* treatment whereas the increase was two fold in case of *Calopogonium* and *Mimosa* treatments after incorporation of green matter. Dehydrogenoise activity also doubled in Pueraria treatment and the increase was slightly less for other two legumes. There was also more mineralisation of carbon and mycorrhizal colonisation in roots of coconut under the green manuring treatment. *In situ* green manuring in basins also resulted in an increase in the level of major nutrients, viz. nitrogen, phosphorus and potassium in coconut basin soils.

The influence of basin management on root(wilt) disease and yield of coconut palms was studied in a field experiment conducted at Vallikunnam with 64 palms of uniform age and varying disease intensities. The changes in disease index and nut yield of the palms were monitored for a period of five years in treatment with the three green manure legumes, *Pueraria, Mimosa* and *Calopogonium* and control. The basin cultivation and incorporation of *Mimosa* and *Pueraria* were found to be effective in enhancing the yield of root(wilt) diseased coconut palms. The increase in nut yield was 21.6% and 14.7% over control in *Mimosa* and *Pueraria* treatments, respectively. There was no significant change in the disease condition of the palms due to this treatment over a period of five years. But the control palms showed deterioration in symptoms.

This study has once again showed the feasibility of adopting suitable management practices to enhance the yield of root (wilt) diseased coconut palms in the early and middle categories of the disease. This agrotechnique which is effective in increasing the yield without causing further deterioration in disease condition can form a component in the mangagement programme for root (wilt) affected coconut gardens. This is an easily adoptable and less expensive technique which can be practised even by small and medium group of farmers with an added advantage of furnishing organic manure and nutrients at the site of need itself.

ADDING VALUE TO COCONUT

Representatives of Protein Technologies International (PTI) Mr. David J. Moss, Mr. Yih-Joung Chiu and Mr. Jimmy Ang conferred with the UCAP Secretariat last January 24, 1990, on the possibilities of developing and marketing of high value protein and fibre ingredients from coconut products. This could not only maximize utilization of copra meal as feed ingredient, but also improve prices by exploring new avenues of use for human consumption.

Copra meal, a residue derived after oil is extracted from copra, is sold primarily as an ingredient for mixed feeds and presently commands a price of P 3.00/kilo. Should new products evolve from the protein and fiber in copra meal, the Philippines would be able to increase returns from copra.

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