

Investigations on the Bud rot disease of coconut caused by *Phytophthora palmivora* Butl. in Northern Kerala

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1. Survey

Survey on bud rot incidence in Kasaragod, Kannur, Calicut, Thrissur, Malappuram, Palakkad, Ernakulam, Wynad districts of Kerala revealed that there is a significant variation in bud rot incidence. Bud rot incidence was high in Kasaragod, Kannur, Calicut and Wynad districts as compared to other districts surveyed (Table-1). Observation recorded on the bud rot incidence in the hilly tracts and plain areas of the Kasaragod, Calicut and Kannur districts revealed that, the proportion of the diseased palms is high in the hilly tracts (300-1350 M above MSL) compared to that of the plains (150-300 M above MSL). In hilly areas of Kasaragod, Kannur and Calicut districts, more than 50% of the gardens in certain pockets face heavy losses due to bud rot disease. In a few gardens in these areas, more than 60% of the palms were found to be destroyed by bud rot and the disease was found to be spreading to neighboring gardens in successive years.

2. Environmental factors and disease occurrence

Bud rot of coconut was found to occur during the monsoon season when there is high humidity and low

temperature in the atmosphere. But in the hilly areas of Kasaragod, Kannur and Calicut districts it was noted that the disease incidence continued up to the month of January. In the plains, disease incidence was recorded only up to September. In the literature it is described that tall varieties are relatively more tolerant to *Phytophthora* attack. However, in the present survey it was noted that West Coast Tall (WCT), which is mostly cultivated in the hilly areas, does not show any tolerance to bud rot even though it was pointed out by many workers that indigenous tall varieties are more resistant to bud rot than the dwarf varieties. In the present survey a comparable situation was not observed where an equal number of dwarf and tall varieties were grown in a location. However, from the present survey West Coast Tall (WCT) which is mostly cultivated in endemic tracts have not shown any tolerance to bud rot disease. This shows that the environment-genotype interaction plays an important role in determining the disease tolerance of a variety and this should be taken as an important factor when we are thinking about breeding for disease

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Table 1. Bud rot incidence in certain districts of Kerala state recorded during the year 1999-2000

Districts	No. of plots surveyed	Total number of palms observed	Number of palms with bud rot	% of disease incidence
Kasaragod	258	10136	438	4.32
Kannur	215	13857	496	3.57
Calicut	160	12125	428	3.52
Wynad	98	1315	115	3.94
Thrissur	138	2158	12	0.55
Malappuram	129	1928	15	0.77
Palakkad	132	2015	8	0.39
Ernakulam	120	1156	6	0.51

resistance with reference to bud rot disease.

It was also observed that the disease incidence was high in the hilly tracts where cooler temperatures coupled with very high relative humidity prevails for extended periods in the coconut crown because of the high altitude of the place. The cooler post - monsoon weather also favours the formation of dew for extended periods and this conducive factor favours the development of fresh disease incidence in the hilly tracts compared to the planes. However, in the plains disease incidence was recorded only up to September. Initial incidence of bud rot disease is always dependant upon the monsoon showers. However, the occurrence of bud rot in subsequent months i.e. from October- January could be attributed to the favorable microclimatic conditions inside the

crown with consistent high humidity, low night temperature and the presence of water droplets from dew drops. Bambawale *et al.*, (1991) reported that occurrence of late blight of potato, even in the absence of rain, where dew appeared to be the alternative source of moisture.

3. Disease incidence and age group of palms

Bud rot incidence was found to be high in palms below the age of 20 years. Percentage of palm mortality was high in the case of palms belonging to the age group of 15 - 20 years in all districts surveyed. Table -2 shows the per cent palm mortality under various age groups. It could be observed that the crowns of the palms belonging to this age group are fully developed and this will intercept the sunlight falling on the ground to great extent, leading to the build up of high relative humidity in the crown, as

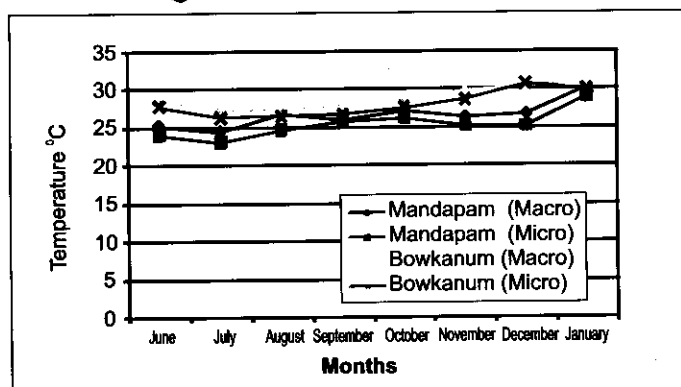
Table 2. Age group of palms in relation to disease incidence

	Districts % of disease incidence in age group (years) of				
	<5	5-10	10-15	15-20	>20
Kasaragod	7.99	6.39	10.5	75.14	-
Kannur	4.43	3.02	6.85	85.68	-
Calicut	0.93	3.73	4.43	90.19	1.40
Thrissur	16.66	-	-	83.33	-
Malappuram	13.33	-	20.0	66.66	-
Palakad	12.5	-	-	62.5	25.0
Wyanad	1.73	8.69	30.43	59.13	-
Ernakulam	16.6	-	33.33	50.0	-

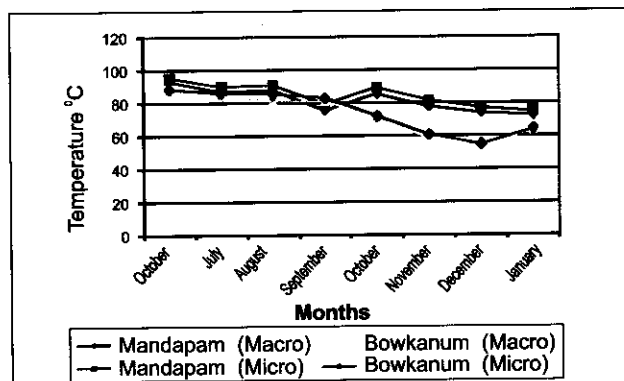
well as in the plantations. In addition the inoculum present in the soil may also reach the central spindle through soil splash easily, since the crown is still at a closer distance near to the reach of soil splashes. Radha and Joseph (1976) observed that temperature range of 20-24° C and relative humidity of 98-100% were found to be optimum for the development of the bud rot disease. Contiguous occurrence of such "favourable days" determines the development of the disease. The "favorable days" occurred more frequently in young palms (below 20 years) compared to that of older palms.

4. Inter relationship among bud rot incidence and macro and micro climate

Phytophthora infection on coconut occurs when the relative humidity is higher than 94 per cent and the temperature lower than 24°C. In open spaces it is hard to find humidity higher than 94 percent (Darwis,1992). Usually the agroclimate data are recorded at open air stations. However, we have to study the air humidity in the crown for the better understanding of the agroclimatic conditions which favours the disease development. With a very limited solar radiation under the canopy, large amounts of evaporation from broad leaf cover crops can create ideal conditions for fungal development. So in the present study macro and micro humidity and temperature of three plots (Mandapam, Josegiri and Bowkanum) were recorded for two years. This study revealed that, the micro climate in the crown is influenced by the macro climate in the field. In all the fields studied, the micro humidity was high and



a) Temperature



b) Relative humidity

Fig.1. Macro and micro humidity and temperature recorded in bud rot affected coconut gardens

temperature was low when it was compared with that of the ambient. The mean macro and micro humidity and temperature recorded in the two endemic plots (Mandapam, Josegiri) showed variation compared with that of Bowkanum, with sparse disease incidence. The macro and micro humidity were high and macro and micro temperature were low in the endemic plots compared with that of Bowkanum in almost all months (Fig.-1).

The study of the relationship between temperature and macro, micro humidity and disease incidence in Mandapam, Josegiri and Bowkanum revealed that, there is a high correlation between disease incidence and micro and macro-humidity in Mandapam and Josegiri,

However, in the case of Bowkanam the correlation was not significant. Disease incidence was highly correlated with the macro and micro - humidity of same month and also that of the previous two months. Out of the various models studied the one using both micro and macro humidity of the previous month and previous two months gave the prediction equation with high R^2 . This suggests that *Phytophthora* inoculum development was intense during this wet period and the incubation period was the time taken for fungus penetration followed by its development inside the coconut crown up to reaching the bud and the appearance of the first external symptom. Rillo and Paloma (1989) found that in Philippines higher incidence of *Phytophthora* was

always preceded by high rainfall during the previous months.

References

- Babawale, O. M., Bhattacharyya, S.K and Ravindran, C.D.1991. Factors affecting potato late blight in Punjab. *Indian Phytopathology* **44** (3): 319-324.
- Darwis, S.N.1992. *Phytophthora* in relation to climate and coconut cultivar. Coconut *Phytophthora* Workshop Proc. 26-30.Oct.1992. Manado, Indonesia. pp.17-20.
- Radha, K. and Joseph, T. 1976. A reappraisal of associated factors. (Paper presented at *International Symp. Cocon. Res. Dev.* Dec. 27-31, 1976, Kasaragod) In: N.M. Nayer (Ed.) *Coconut Research and Development* pp:333-340. Wiley Eastern Limited, New Delhi.
- Rillo, E.P. and Paloma, M.B.F. 1989. Reaction of some coconut populations and hybrids to *Phytophthora* disease in Bicol region. *Philippine Journal of Coconut Studies*. June 2-6.

Philippine's coconut oil exports rise five-fold in January 2010

Philippine coconut oil exports jumped more than five-fold in January from last year's levels on improved demand, preliminary industry data showed. Shipments by the world's biggest coconut oil exporter jumped to 130,000 tons from 24,579 tons for all of January 2009, the United Coconut Associations of the Philippines (UCAP) said in a report. The sharp rise is linked to better demand and low shipments in the previous year, said Yvonne Agustin, Executive Director of UCAP. The industry group said that it expects coconut oil exports this year to rise more than 21% to 980,000 tons with demand seen recovering step with the global economy. The United States and Europe together buy four-fifths of the Philippines' coconut oil shipments, while the rest go to Asia. (<http://www.abs-cbnnews.com/business>)

Source : The Cocomunity