Appraisal of the Distribution of Coconut Root Wilt and Heavy Incidence of the Disease in Cumbum Valley of Tamil Nadu

N. Srinivasan, P. K. Koshy, P. G. Kamalakshy Amma, M. Sasikala M. Gunasekaran and J. J. Solomon

Central Plantation Crops Research Institute - Regional Station, Kayangulam, Krishnapurm - 690 533,Kerala

Introduction

Root wilt disease (RWD) is a century old problem of coconut in Kerala State. The disease was reported initially around 1880's in three independent locations in the former princely State of Travancore. It slowly spread into other areas over the years and established endemically in eight southern districts of the State (Jacob Mathew *et. al.,* 1998). Sparse-sporadic incidence of the disease in northern districts of Kerala and certain locations in the border districts of Tamil Nadu also came to light. The visual diagnostic symptom of RWD is flaccidity (abnormal bending - ribbing) of middle whorl leaves. In later stages, yellowing of outer leaves and marginal necrosis of older leaves are also observed. In seedlings - young palms, flaccidity usually is the only symptom. Softening, whitening and weakening of spindle leaves; yellowing of only the middle whorl leaves; root rotting; occasional inflorescence necrosis; poor nut set, shedding of immature nuts, poor quality of the nuts, etc. are the other accompanied symptomatological features of the disease. Root wilt is an infectious disease and the affected palms are systemically deranged. The cause of the disease is due to phytoplasma - a phloem limited submicroscopic organism (Solomon *et. al.,* 1998). Root wilt is a debilitating disease (slow decline) and is transmitted by insect vectors - lace wing bug (*Stephanitis typica*) and plant hopper (*Proutista moesta*). In root wilt affected palms, incidence of leaf rot is common that brings about rapid decline of the palms; the leaf rot is due to a complex of fungal pathogens (Srinivasan, 1991; Srinivasan and Gunasekaran, 1996).

A heavily root wilt infected coconut garden at Gudalur, Cumbum Valley (Tamil Nadu). Scientists from CPCRI Regional Station, Kayangulam - Dr. N. Srinivasan and Dr. P. K. Koshy - along with the Officers of Tamil Nadu State Agriculture Department and local farmers

While only sparse occurrence of RWD in Tamil Nadu was reported earlier, recently heavy incidence of the disease in coconut plantations of Cumbum Valley in the State has been observed. As the disease has struck the Cumbum Valley to an alarming level, the details are described in this paper with a brief review of current distribution pattern of RWD in Kerala State along with the past records of its incidence in Tamil Nadu.

Distribution of Root Wilt in Kerala

Periodical surveys were conducted to assess the distribution of RWD in Kerala and estimation of production loss due to the disease. The disease has been prevalent in all the major types of soil in the State; also it occurs in a wide range of situations - from coastal region to hilly terrain. The survey of 1984 - 85 (CPCRI, 1985) brought out the prevalence of the disease almost contiguously (endemic state) in 4,10,000 hectares in eight southern districts (1.52-75.63%) in the following order :

Thiruvananthapuram - 1.52%, Kollam - 28.55%, Pathanamthitta - 38.22%, Alappuzha - 70.69%, Kottayam - 75.63%, Idukki - 34.18%, Ernakulam - 34.52% and Thrissur - 2.60%. The annual loss due to the disease was estimated to be about 968 million nuts

A close view of root wilt infected palms in the affected garden

(monetary loss in the order of about Rs. 3000 million per year); overall disease incidence was 26.44%, out of 91.5 million palms in the endemic region.

Although RWD is endemic to the fore-mentioned districts, its sparse occurrence in the northern districts of the State (Palghat, Malappuram, Wayanad, Kozhikode, Kannur and Kasaragod) at isolated pockets has been also brought out. The root wilt survey of 1996 (Department of Agriculture, Government of Kerala, 1997) showed 24.05% out of 102 million palms in the disease endemic region as diseased, with intensity ranging from 2.04% to 48.03% among the districts. Periodical survey of the northern districts of the state for detection of any fresh RWD incidences followed by eradication of all infected palms has been *in vogue* so as to contain the disease within the southern districts.

Incidence and Spread of Root Wilt in Tamil Nadu

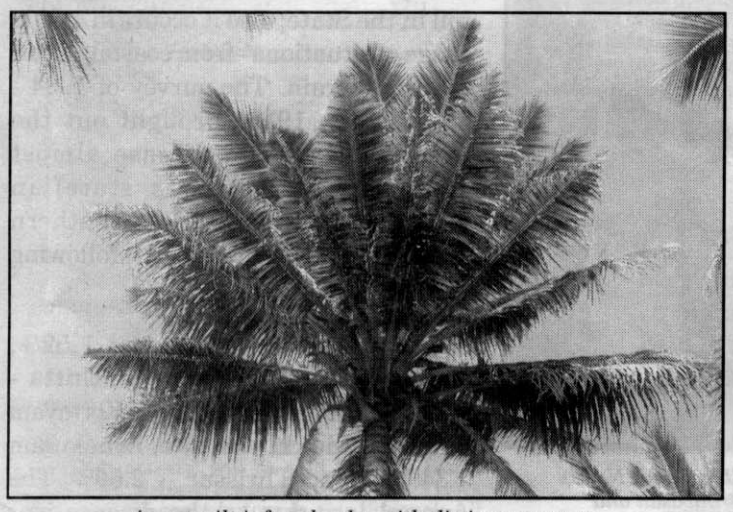
(a) Past reports on root wilt in Tamil Nadu

During 1971 young coconut palms (aged 5-6 years) in Sengottai area of Tirunelveli district was suspected to be affected by RWD. The disease was observed again during 1973 in palms in the age group of 25-30 years. Root wilt was also observed in a few palms in Thirunodikarai village (near Kulasekaram) in Kanyakumari district during (December) 1972 on 25 to 30 year old palms in the region of Ealakara to Kothukadam, situated in a hill slope and surrounded by paddy fields (Subbaraja and Jaleel Ahamed, 1975).

Later, one palm with RWD symptoms in Coimbatore city and further about 13 affected young palms in a field near Pollachi (Coimbatore district) were also identified (Rethinam, 1983). CPCRI records showed sporadic incidence of the disease also in Vallam (Tirunelveli district) and Ponmanai (Kanyakumari district) villages (Jacob Mathew *et. al.*, 1998). All these reports show that the districts of Tamil Nadu bordering Kerala were in the threshold of the spread of RWD. However, only sporadic incidences of the disease had happened. Eradication programme was implemented in a limited scale and regular monitoring was felt necessary with the basic principle of keeping Tamil Nadu State free from RWD.

(b) Incidence / spread of root wilt in Cumbum valley of Tamil Nadu

During December 1998, a few scientists from this Regional Station of CPCRI visited coconut plantations at Cumbum Valley (Gudalur and adjoining places) in Theni district of Tamil Nadu. Heavy incidence of RWD in a number of gardens was found during the visit. Typical symptoms of the disease - flaccidity, yellowing and marginal necrosis were observed among the affected palms. In contrast to RWD palms in Kerala, yellowing of



A root wilt infected palm with distinct symptom of the disease in the affected garden

Leaf rot superinfection in root wilt affected palm of Gudalur, yet another evidence of interrelation of leaf rot with root wilt

leaves was more pronounced in these palms. Incidence of leaf rot with typical features of the disease syndromes, in RWD affected palms was also recorded. Scattered incidence of RWD in certain parts of individual-affected gardens (indicating the disease spread), early to advanced stages of disease development and disease incidence in juvenile palms (as young as three years old) to older palms were the other relevant features of root wilt in plantations of the region. Leaf rot superimposition was also seen in young to older palms. Poor nut set in affected palms and over-all declining trend in yield of the disease affected gardens were evident. Observations of gardens in and around Lower Camp, Gudalur and Cumbum show widespread occurrence of the disease and thus root wilt firmly established in the Valley.

Spindle leaf samples were collected from infected palms at Gudalur, transported to this Station and subjected to examination. The samples from six out of eight palms reacted positively against the root wilt antiserum. All the seven spindles, with leaf rot symptoms sampled showed association of (various) fungal pathogens upon isolations. *Colletotrichum gloeosporioids, Exserohilum rostratum, Gliocladium vermoeseni, Fusarium solani and Thielaviopsis paradoxa* were the fungi found at this instance from among these (Gudalur) samples that falls within the list of fungi documented for leaf rot in Kerala (Srinivasan *et al.*, 1998). Hence these laboratory tests confirmed in certainity that the coconut malady in the region is root wilt and also co-occurrence of root wilt-leaf rot as a complex.

Spot observations of coconut palms at Kumuli, Vandiperiyar, etc. of Idukki district of Kerala State (hilly terrain bordering Tamil Nadu) show common occurrence of RWD there. It is pertinent to note that the latest root wilt survey of 1996 in Kerala (Department of Agriculture, Government of Kerala, 1997) shows incidence of the disease in the Idukki district which borders Cumbum Valley to the tune of 33.56%; also Idukki district falls within the root wilt endemic region of Kerala. Since gardens at Lower camp itself (southern-most part of Cumbum Valley and down the Kumuli hills) in Tamil Nadu side express RWD symptoms that draws relevance on disease spread. The perception through discussions with local farmers is that RWD would have appeared in the region initially at Lower Camp years back (about a decade) and now the disease is spreading widely in the region.

As the RWD is infectious and the pathogen of the disease - phytoplasma - is transmitted by insect vectors, it is possible that the disease had spread from Kerala into Cumbum Valley of Tamil Nadu. This is the first report of occurrence - spread of RWD in Theni district of Tamil Nadu; further, an addition into the root wilt map and another evidence for infectious nature of the problem. Root wilt has now engulfed several gardens in this region of Tamil Nadu. Hence the disease might be a serious problem for coconut plantations of Cumbum valley and adjoining places in Tamil Nadu in due course, if unchecked.

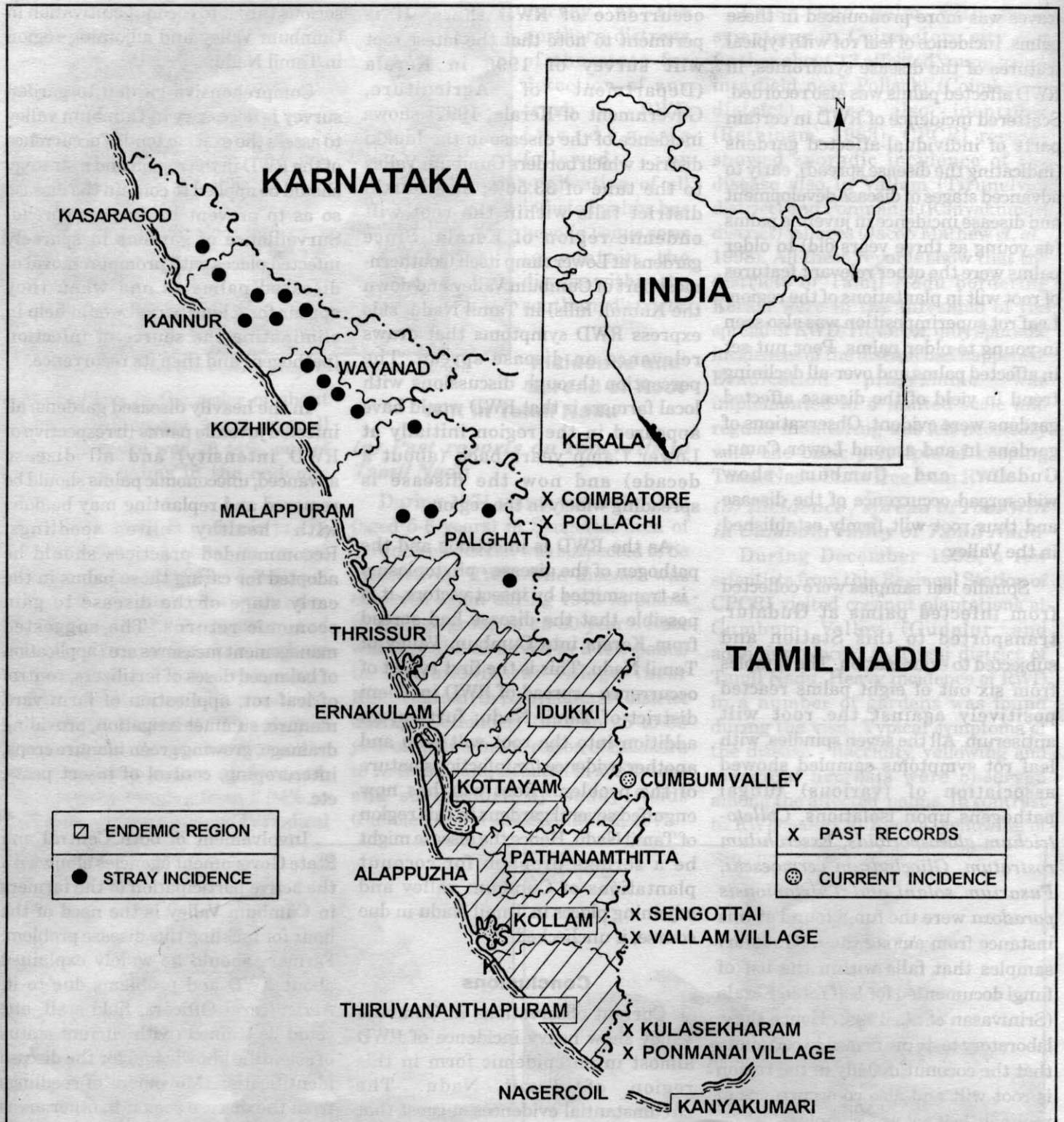
Conclusions

Current observations in Cumbum Valley show heavy incidence of RWD almost in an epidemic form in this region of Tamil Nadu. The circumstantial evidences suggest that the disease could have spread from Kerala into this region. The root wilt-leaf rot (phytoplasma-fungi) combinations also observed. Since the disease is infectious, it is likely to be a serious threat to coconut cultivation in Cumbum Valley and adjoining region in Tamil Nadu.

Comprehensive garden to garden survey is necessary in Cumbum valley to assess the exact extend of occurrence of the RWD in the region and a strategy should be applied to contain the disease so as to prevent its further spread. Surveillance of gardens in sparsely infected places with prompt removal of diseased palms as and when they appear for a long period would help in eliminating the source of infection (pathogen) and then its recurrence.

In the heavily diseased gardens, all infected juvenile palms (irrespective of RWD intensity) and all disease advanced, uneconomic palms should be removed and replanting may be done with healthy elite seedlings. Recommended practices should be adopted for caring those palms in the early stage of the disease to gain economic returns. The suggested management measures are : application of balanced doses of fertilizers, control of leaf rot, application of farm yard manure, summer irrigation, providing drainage, growing green manure crops, intercroping, control of insect pests, etc.

Involvement of both Central and State Government agencies along with the active participation of the farmers in Cumbum Valley is the need of the hour for tackling this disease problem. Farmers should be widely explained about RWD and problems due to it. Agricultural Officers, field staff, etc. could be trained (with current status of scientific knowledge) for the disease identification. Movement of seedlings from the disease region to other areas in the State should be arrested to avoid the disease spread. The circumstances further call for more effective and constant surveillance-monitoring of all the districts of Tamil Nadu bordering



Distribution of coconut root wilt disease in Kerala and past-current incidence of the disease in Tamil Nadu

Kerala to check the spread of root wilt.

References

CPCRI, 1985. *Coconut root wilt disease - Intensity, production loss and future strategy - A survey report.* CPCRI, Kasaragod, 45 pp.

Department of Agriculture, Government of Kerala, 1997. *Coconut root (wilt) survey - 1996.* Department of Agriculture, Government of Kerala, 55 pp.

Jacob Mathew, Rawther, T.S.S. and Pillai, N. G. 1998. *Origin, distribution and production loss,* pp. 1-7. **In** : Coconut root (wilt) disease (Eds. Nampoothiri, KUK and Koshy, P. K.). CPCRI, Kasaragod, 124 pp.

Rethinam, P. 1983. Problems of root (wilt) disease of coconut in Tamil Nadu. *Indian Coconut Journal* **13** (9) : 21-23.

Solomon, J.J., Nair, C.P.R., Rajan, P., Srinivasan, N., Govindankutty, M. P., Mathen, K. and Pillai, N. G. 1998. *Etiology - Phytoplasma,* pp. 33-44. **In** : Coconut root (wilt) disease (Eds. Nampoothiri, K.U.K. and Koshy, P. K.), CPCRI, Kasaragod, 124 pp.

Srinivasan, N. 1991. Occurrence of coconut leaf rot in relation to root (wilt) disease. *Indian Coconut Journal* **21** (10) : 14-18

Srinivasan, N. and Gunasekaran, M. 1996. Incidence of fungal species associated with leaf rot disease of coconut palms in relation to weather and stage of lesion development. *Annals of Applied Biology* **129** : 433-449.

Srinivasan, N., Gunasekaran, M., Joseph, T. and Rawther, T.S.S. 1998. *Leaf rot disease,* pp. 83-95. **In** : Coconut root (wilt) disease (Eds. Nampoothiri, K.U.K. and Koshy, P.K.). CPCRI, Kasaragod, 124 pp.

Subba Raja, K.T. and Jaleel Ahamed, N. 1975. A preliminary report on the occurrence of Kerala root (wilt) disease of coconut in Tamil Nadu. *Madras Agricultural Journal* **62** : 83-84.

A CUTE BOAT FROM FIBRE WASTE

The versatility of coir fibre has once again been established when boat made out of coir fibre waste and gum has been floated out in Kerala, the home of coir industry. The Poothotta Coir Vyavasaya Co-operative Society, who has been famous in mechanised coir spinning in coir sector, is the expounder behind this absolutely new endeavour.

The boat has been manufactured using coir fibre waste, coir rope and coir mat and also a natural gum, which makes it very hard. This boat need not be oiled as other boats. It also moves very fast in water.

The boat was floated out on the occasion of the visit of Shri. Christy Fernandez, Chairman, Coir Board to the Society recently. It has been given the name of Col. Viswanathan, the valiant martyr of Kargil War.

The Boat is nine feet long and four feet wide and have two steps which can be used as seats, and six people can travel at a time. They are planning to manufacture the boat in different sizes on need based in various industries like fishing, tourism, etc. Their idea is to make available the boat in the market at an affordable price after achieving further technical perfection on certain aspects.

The Poothotta Coir Vyavasaya Co-op. Society which was started in a humble way in 1961 in Poothotta, a small village in the southern tip of Ernakulam District in Kerala has a success story to tell. The man behind the enviable progress of the society has been Shri. M. P. Narayana Das, the President of the Society for the last 20 years. About 320 workers are now working in the mechanised coir spinning unit of the society. In fact, this is one among the very few successful ICDP (Integrated Coir Development Project) units in the co-operative sector. The present production of the unit is 700 kgs. of coir yarn per day. Society has a unit manufacturing organic manure from coir pith which is marketed in the trade name 'Jeevan Sarovar". A mats and matting unit, the first project in co-operative sector with the support of NCDC will also start functioning in the society within a few months.

In coir producing centres accumulation of coir fibre waste has been a serious menace causing environmental pollution. The success in manufacturing a boat from waste coir fibre adds one more feather to the cap of the Poothotta Coir Vyavasaya Co-op. Society in that the new venture helps in making economic utilisation of the waste of coir fibre, which otherwise is a pollutant.

- Coir News