Large scale production of antiserum for the identification of disease free elite parental palms of coconut and certification of quality seedlings

Root (wilt) pathogen was detected in *Physalis minima, Synedrella nodiflora, Abutilon indicum, Phaseolus* sp. *and Oldanlandia corymbosa,* the common weeds seen in coconut gardens. Removal and destroying of these weeds from the mildly disease affected and new areas may reduce the inoculum potential and arrest the further spread of the disease to some extent.

With an objective of producing root (wilt) phytoplasma specific antiserum in large quantities for screening coconut samples, CPCRI had undertaken a project under Technology Mission on Coconut. The serological relationship of phytoplasmal diseases of other palms seen in Kerala with coconut root (wilt) disease was also studied. Screening of weed flora of coconut garden to locate collateral hosts that may act as potential reservoir of root (wilt) pathogen was done and ELISA was refined to a simple, highly sensitive and more rapid diagnostic test.

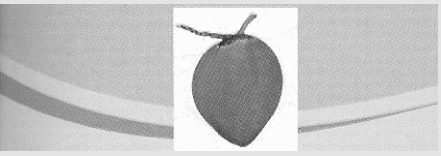
Significant Achievements

Root (wilt) phytoplasma was purified from the spear leaves collected from 50 coconut palms having early to middle stage of disease infection. The organism was purified by percoll discontinuous density gradient' centrifugation method and the purified organism was used as antigen for the production of antiserum.

Phytoplasma specific polyclonal antiserum was raised in 14 rabbits. Eventhough a total of 1200 ml antiserum could be collected from various bleeds, in specificity studies, only 300ml antiserum showed high titre.

The high titre antiserum was used for screening samples. For the selection of disease free parental palms, elite coconut palms identified from the farmers plots of disease endemic areas of Kollam, Alappuzha, Pathanamthitta and Ernakulam districts were serologically analyzed with root (wilt) phytoplasma specific antiserum. During the course of the study, a total of 815 palms, were tested out of which 359 reacted negatively to the test designated as healthy and can be used as parental palms for producing quality seedlings, either by crossing programmes or open pollinated nuts. Results of the study brought out that 56 per cent of elite apparently healthy palms in the disease endemic areas are under latent stage of infection.

Using ELISA, it was observed that 54 per cent of apparently healthy palms which are negative to the test can retain their healthy nature for a longer period (30 months after testing) than positively reacted palms, whereas 96 per cent of positively reacted palms expressed root (wilt) symptoms during the



same period. However, 92 per cent of the positively reacted palms expressed symptoms within a period of 6-14 months itself.

With a view to study the incipient infection in nursery seedlings by root (wilt) pathogen, spear leaf samples drawn from 531 coconut seedlings grown in CPCRI nursery were subjected to serological tests. These seedlings were under different age groups (5-6 months and 9-10 months old). Out of 531 seedlings tested positive reaction was recorded in 132 samples. The results indicated that 25 per cent of the seedlings showed phytoplasmal infection at nursery level. But very low percentage of infection was noticed in seedlings under the age group of 5 to 6 months old (5.8 – 6 per cent). However, monitoring of these seedlings under field condition is invariably needed to see the symptom expression.

Incidence of root (wilt) disease in Sullia taluk of Dakshina Kannada district of Karnataka State, hitherto a disease-free area was confirmed by ELISA. The result was intimated to Karnataka Government to take appropriate action for removing the infected palms to prevent further spread of the disease.

ELISA is a well-documented technique for the detection of plant diseases and extremely useful for large scale screening of samples. ELISA standardized earlier for the mass screening of coconut samples using pathogen related protein as primary antibody was not so rapid but required 44 h. for the completion of the test. In the present investigation, it has been refined and modified. The modified procedure is highly sensitive, rapid and the results could be obtained within 24 h. with very high sensitivity of 98.4 per cent.

ELISA has been simplified further by using leaf bits as test antigen. Due to the fibrous nature of coconut leaf tissues, extraction of antigen from leaf samples is laborious and time consuming. Hence efforts were made to use leaf bits as test antigen. In the modified procedure, costly chemicals and equipment for extraction of antigen could be avoided. The test is very economic also. Using 1ml of primary antibody, 1200 samples could be analyzed. Similarly, with 1ml of enzyme conjugate 4000 samples could be screened. The modified ELISA technique is being used for screening samples.

Yellow leaf disease (YLD) of arecanut and spear rot disease (SRD) of oil palm are the two phytoplasmal disease of palms seen in Kerala other than root (wilt) disease of coconut. To study the inter relationship of phytoplasmal diseases of these three palm species, spear leaf samples drawn from YLD, SRD and RWD were serologically analyzed with root (wilt) phytoplasmal antiserum and intense positive reaction was observed against RWD, YLD and SRD samples. The results clearly indicated that all the three diseases caused by phytoplasma are serologically related.

With a view to locate weeds acting as potential reservoir of root (wilt) pathogen, weed flora in coconut gardens of disease endemic areas were observed. Weeds showing yellowing, phyllody and little leaf symptoms were sampled and screened by ELISA using root (wilt) phytoplasma specific antiserum. Out of 22 species screened, *Synedrella nodiflora, Phaseolus sp.,Physalis minima, Abutilon indicum and Oldenlandia corymbosa* recorded high absorbance values, which indicated the presence of root (wilt)pathogen.

Practical Utility of the Results

Root (wilt) phytoplasma specific polyclonal antiserum has been prepared for the early detection of root (wilt) disease. The modified procedure of ELISA being extensively used for identifying disease free elite parental palms from the disease endemic areas of Kollam, Alappuzha, Pathanamthitta and Ernakulam districts. The modified ELISA technique is highly sensitive, very rapid and economic also. During the course of the study 359 healthy parental palms were identified using serological test. These palms are being used as parental palms for producing quality seedlings. The results indicated that 56 per cent of the apparently healthy palms in the disease endemic areas are in the stage of latent infection. The result necessitates the selection of disease free mother palms using serological test especially for the studies on developing root (wilt) disease resistant/tolerant varieties.

Root (wilt) pathogen was detected in 25 per cent nursery seedlings grown in CPCRI nursery. However, field monitoring of these seedlings are invariably needed to see the symptom expression.

Root (wilt) pathogen was detected in *Physalis minima, Synedrella nodiflora, Abutilon indicum, Phaseolus* sp. *and Oldanlandia corymbosa* the common weeds seen in coconut gardens. Removal and destroying of these weeds from the mildly disease affected and new areas may reduce the inoculum potential and arrest the further spread of the disease to some extent.

2nd International Coconut Summit

The Second International Coconut Summit organized by the Swadeshi Nalikera Mission and the Peekay Tree Crops Development Foundation was held from 7th to 11 May 2007 Kochi, Kerala. Shri.R L Bhatia, Governor Kerala inaugurated the summit and Dr. Thomas Isaac, Minister for Finance, Kerala presided. Shri. Surendra Nath Naik, Agriculture Minister, Orissa; Smt. Minnie Mathew IAS, Chairman, CDB and Shri. A C Jose Chairman, Coir Board were also addressed.

The theme of the Summit was a "Global Agenda for a Prosperous Coconut Sector." The emphasis of the seminar were on global coconut situation, farming systems and agroforestry, organic coconut production, value-addition in coconut, coir products and emerging end uses, research and development and coconut in health and medicine. Smt. Minnie Mathew IAS Chairman CDB inaugurated the session on Global Coconut Scenario and General Issues and Shri. A C Jose, Chairman, Coir inaugurated the session on Coir Products and Emerging Technologies.

There were seven sessions in the summit. Resource speakers participated in the Summit included Dr. K L Chadha, former Dy. Director General, ICAR, New Delhi; Dr. V. Rajagopal, Dr. M K Nair, Dr. K V A Bavappa and Dr. N M Nayar, former Directors, CPCRI, Shri. Romulo N Arancon, Director, APCC, Dr. P G Punchihewa and Dr. P Rethinam, former Executive Directors, APCC, Dr. Magat Severino S, Career Scientist IV, Philippines Coconut Authority, Dr. H A J Gunathilake, Chairman, Coconut Cultivation Board, Sri Lanka, dr. George V Thomas, Director, CPCRI, Dr. C P R Nair, Head, CRPCRI, and Shri. M Thomas Mathew, CCDO, CDB.

Smt. Minnie Mathew IAS, Chairman, CDB delivering inaugural address in the Technical Session on Global Coconut Scenario and General Issues

The 2nd International Coconut Summit has released its 20-point "Kochi Declaration" pointing towards a "Global Agenda for a Prosperous Coconut Sector." The organizers led by Dr. K.I. Vasu and Shri. P.K. Thampan have identified the key points contained in the "Kochi Declaration" from the presentations and interactions during the Summit. The Declaration also contained specific recommendations for action by the local and national governments of coconut producing countries and by the APCC, COGENT and other coconut related organizations.

There were 5 days Techno Expo and Trade Fair as part of the Coconut Summit. Coconut Development Board, Khadi and Vilalge Industries Commission, Coir Board, Coirfed, Marico Industries, Sri Ram Coconut Products and the Central Institute of Fisheries Technology were the main

A view of the CDB stall in the Summit

participants in the Techno Expo. The expo was inaugurated by Shri. C K Mani Shankar, Deputy Mayor, Kochi. With the support of Kudumbasree Mission, 3 days training programme were organized on coconut based foods. 63 lady entrepreneurs participated in the training.

On the occasion of the 2nd International Coconut Summit at Kochi, India 'Kalpavriksha' awards were given to eminent persons who have made significant contributions in the research and development disciplines of coconut sector. The award winners were Dr. Severino S. Magat of the Philippine Coconut Authority for his contribution to the development of coconut-based farming systems and Dr. P. Rethinam, former Executive Director of APCC for his contribution to coconut research and development in his capacity as the Project Coordinator (Palms) and Assistant Director General, Indian Council of Agricultural Research. The awards carried a certificate and citation. Other recipients included Shri. P M K Rajendran for entrepreneurship, Shri. Joseph P Alappat for ideal farmer, Shri. R Hali for communication and Shri. C Mohan for Agro forestry.

CDB participates in Horti Food Expo 2007

Coconut Development Board State centre, Guwahati Participated in Horti Food Expo 2007 held at ICAR Complex, Meghalaya from 18th to 21st April 2007. The fair was organized by the Centre for Agriculture and Rural Development (CARD), Ministry of Agriculture and Co operation, Government of India. Shri. S M Deshalphine, Additional Secretary, Agriculture inaugurated the Horti Food Expo 2007. Dr. M L Choudhary, Horticulture Commissioner, Government of India, Smt. L H Thangi Menenn, Secretary, Horticulture, Government of Nagaland and Dr. P Rethinam, former Executive Director, APCC visited the CDB stall. Different coconut products and byproducts were exhibited in the CDB stall.

Shri. S M Deshalphine, Additional Secretary, Agriculture; Dr. M. L. Choudhary, Horticulture Commissioner and Miss L. H. Thangi Mennen, Secretary, Horticulture in the CDB Stall in Horti Food Expo - 2007

Coconut oil

The Scientists from Harvard Medical School had testified before US Senate Committee that there is simply no scientific basis for describing coconut oil as a health risk. Saturated fats composed principally of medium chain triglycerides do not elevate serum cholesterol level when taken as a part of the normal diet. When you study coconut oil as a part of the diet that does contain linoleic acid you discover that coconut oil does not affect the process of artherosclerosis any differently than any other vegetable oils. Neither in the Philippines nor in the US there is proven relationship, either statistically and or as a matter of cause and effect, between coconut consumption and heart diseases. Coconut oil may be the preferred fuel for individuals sustaining serious illness including burns, sepsis, malnutrition and immunological problems including AIDS. In fact, the fairest interpretation of the scientific literature is a neutral effect, even if in situations where coconut oil is the sole source of fat.

Awareness programme on TMOC

The Coconut Development Board, Regional Office, Bangalore conducted an awareness programme on Technology Mission on Coconut at Hosadurga on 26th March 2007 in association with the Veda Coconut Growers, Marketing and Processing Co operative Society. Shri. Elkal Vijayakumar, Ex MLA Hosadurga inaugurated the programme and called upon the farmers to adopt the latest package of practices for increasing productivity and for getting better returns. He requested the entrepreneurs to come forward to establish coconut based industries. Shri. Vijayakumar Hallikeri, Deputy Director, CDB Bangalore presided over the function.