

# FOUR AREAS OF FOCUS ON THE INTEGRATED MANAGEMENT OF WELIGAMA COCONUT LEAF WILT DISEASE IN SRI LANKA: RECOMMENDATIONS OF CONSULTATIVE MEETING

*Romulo N. Arancon Jr.*

With the endorsement of the 47<sup>th</sup> Asian and Pacific Coconut Community (APCC) Session/Ministerial Meeting, the APCC Secretariat in collaboration with the Ministry of Coconut Development and Janatha Estate Development (MCD & JED) and the Coconut Research Institute (CRI), Government of Sri Lanka held a Consultative Meeting on Phytoplasma/Wilt Diseases in Coconut at the Coconut Research Institute in Lunuwila, Sri Lanka on 15–17 June 2011.

The meeting was attended by 43 participants from 10 countries, namely India, Indonesia, Malaysia, Philippines, Papua New Guinea, Sri Lanka, Australia, France, United Kingdom and Mozambique. Scientists from the French Agricultural Research

Centre for International Development (CIRAD), France; University of Adelaide, Australia; University of Nottingham, United Kingdom, and Food and Agriculture Organization, Regional Office for Asia and the Pacific (FAO-RAP), Thailand also participated in the expert consultation to share the knowledge and experiences.

At the outset, a Technical Working Group was formed to provide for a mechanism for constant dialogue (electronically) and exchange of technical information, and possibly formulate a multi-country project proposal to address the research and development gaps and needs on phytoplasma/wilt diseases in coconut for submission to international donor agencies for funding support. The Technical Working Group is composed of the

following:

**Prof. H. Gunasena**, Chairman, CRI, Lunuwila, Sri Lanka appointed as Chairman of the Technical Working Group and **Mr. Romulo N. Arancon, Jr.** Executive Director, APCC, Jakarta, Indonesia as Co-Chairman.

The Technical Working Group members are:

**Dr. George V. Thomas**, Director, CPCRI, Kerala, India

**Mr. Tore Ovasuru**, Managing Director, KIK, Port Moresby, Papua New Guinea

**Mr. Carlos B. Carpio**, Deputy Administrator, Research, Development and Extension Branch, PCA, Quezon City, Philippines



**Dr. Johannes W. Ketelaar**, CTA/Team Leader, FAO Asia Regional IPM/Pesticide Risk Reduction Programme, FAO-RAP, Bangkok, Thailand

**Dr. Michel Dollet**, Head of Research Unit Coconut Lethal Yellowing and Citrus Greening, CIRAD, Montpellier, France

**Prof John W. Randles**, Plant Pathology and Virology, School of Agriculture Food and Wine, Faculty of Sciences, University of Adelaide, Australia

**Prof. Matthew Dickinson**, Professor of Plant Pathology, School of Biosciences, University of Nottingham, United Kingdom

**Dr. L. C. Priyanthie Fernando**, Head of Crop Protection Division, CRI, Lunuwila, Sri Lanka

**Dr. R. Manimekhalai**, Sr. Scientist (Plants Biotechnology), CPCRI, Kerala, India

**Dr. Eric E. Omuru**, Acting Chief Executive Officer, PNG CCI, Rabaul, Papua New Guinea

**Dr. Maria Judith Rodriguez**, Division Chief III, Virology-Biochemistry Division, PCA-ARC, Albay, Philippines

**Mr. Ari A. Lolong, Msc.**, Phytopathologist, ICOPRI, Manado, Indonesia

**Mr. W.K.N. Shantichandra**, Assistant Director, APCC, Jakarta, Indonesia

The participants took note of the fact that the FAO-RAP in coordination with the Ministry of Coconut Development & Janatha Estate Development and the Coconut Research Institute of Sri Lanka will be implementing a Technical Cooperation Project (TCP/SRL/3202), entitled "Development of Capacities for Early Diagnosis, Surveillance and Management of the Weligama Coconut Leaf Wilt Disease". This TCP is expected to be operational in the second half of 2011. In this context, the participants discussed specific recommendations under the four areas of the **TCP Focus** as follows:

#### **Focus I. Spread, Prevention including Capacity Building for**

#### **Early Diagnosis, Surveillance and Vector Identification**

1. It is recommended that a standard diagnostic protocol be established. A defined and properly validated set of primers for the coconut phytoplasma is required along with clear guidelines on which tissues are best to sample and how DNA should be prepared from the samples.
2. Realizing the complex nature of phytoplasma organisms, diagnostic tools and approaches have to be refined. In the area of capacity building for early diagnosis and surveillance, genome mapping is recommended to be essential. Sequencing of all variants and genome analysis are extremely important.
3. To promote greater efficiency in early diagnosis, it is recommended that a real time PCR machine be included in any proposal. This removes the need to run gels, reducing risk of contamination of samples, which is a major problem with standard nested PCR methods. A real time PCR machine can be justified as a resource not just for Weligama wilt but as a capacity building expense. It can be used for detection of other pathogens of coconut and other plants and could also be marketable as a diagnostic service throughout the region.
4. Further to PCR diagnosis, it is recommended that Oxy Tetra Cycline (OTC) and other appropriate antibiotic treatments be evaluated to see the effect on remission of disease symptoms.
5. Effectiveness of antibody based detection need to be revisited. It is possible to enrich infected material for phytoplasma but not remove plant proteins completely. So any polyclonal antibodies will always contain antibodies to plant proteins. It may be noted that antibody detection systems are less sensitive to real time PCR while there are some good uses of antibodies.

6. Electron microscopic studies may also be pursued for further identification of phytoplasma bodies and their reaction in the disease tissues.
7. To further develop capacity, collaborative studies and exchange of scientists including short-term training will be extremely useful especially between CRI-Sri Lanka and CPCRI-India as well as with other international research institutions and universities. Specifically, it is recommended that a CRI scientist undergo training in UK in modern PCR diagnostic techniques of phytoplasma disease and another CRI Technical Officer to be trained in India on vector taxonomic studies.
8. Insect transmission studies and identification of vectors including biocontrol agents are very important for future research strategies. Moreover, it is important in any transmission studies to show that the phytoplasma is transmittable from coconut to coconut. At the moment, because the phytoplasma appears similar if not identical to that found on rice/sugarcane in Sri Lanka, it is always possible that any insects found positive are actually carrying the phytoplasma or have acquired it from sugarcane/rice and not coconut.

#### **Focus II. Development of Tolerant/Disease Resistant Varieties**

1. It is recommended that breeding for resistance and/or selection of tolerant coconut varieties be vigorously pursued. This strategy is probably the best long-term solution to the problem.
2. It is further recommended that any replanting strategy need to use multiple genotypes or coconut varieties and not only a single genotype.
3. Evaluation of germplasm which are conserved in the five multi-site International Coconut Genebanks hosted by Indonesia

for South East Asia, India for South Asia, Papua New Guinea for South Pacific, Cote d'Ivoire for Africa and the Indian Ocean, and Brazil for Latin America and the Caribbean for possible use in multi-location phytoplasma resistance trials may be explored and pursued. Exchange of germplasm from countries with probable tolerant coconut varieties may be pursued.

**Focus III. Development and Application of Integrated Management of Weligama Coconut Wilt**

1. To improve palm vigor, especially in disease affected areas, it is recommended to integrate the development and application of integrated management of WCLWD. It is suggested to integrate green manuring, vermi-composting, intercropping and other Good Agricultural Practices (GAP).

2. To prevent the spread of the disease, quarantine measures should be strictly enforced. A buffer zone should be established and monitored regularly. Surveillance for any new infection should be done and diseased coconut trees in the buffer zone and hot spots must be removed as soon as possible to minimize the pathogen and reduce the possibility of spread of the disease.

**Focus IV. Field Demonstration and Community Awareness Raising**

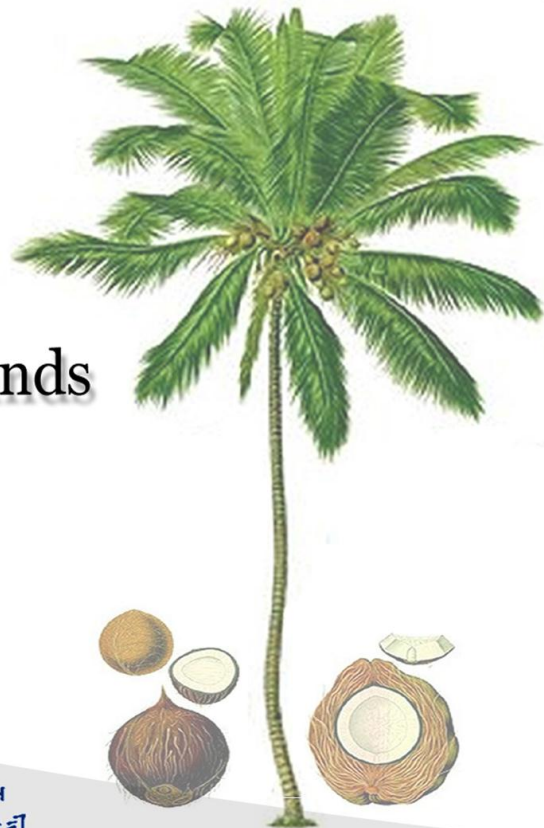
1. To promote farmers participation and empowerment as well as enhance community awareness on the integrated management strategies of the WCLWD, it is recommended that community based organizations of coconut farmers be formed in the buffer zone, borders and within the infected areas. Farmer Field Schools in these areas may

be established to enable the coconut farmers to develop their own capacity to manage and contain the disease. Income generating projects should also be developed including access to appropriate technologies with maximum involvement of the farmers. Socio-economic surveys may also be conducted to identify the impact of WCLWD on the farmers and identify their needs. It will also be beneficial to seek the help of the Department of Education to increase awareness among the students and the youth about the disease.

2. In the case of the Bogia Wilt Syndrome in Papua New Guinea and the Kalimantan Wilt in Indonesia, it is recommended that a similar national R & D project (with the same focus as above) be formulated/implemented. A bilateral Technical Cooperation Project with support from the FAO-RAP and/or ACIAR or CABI-UK may be pursued.

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