IMPACT OF WELIGAMA COCONUT LEAF WILT DISEASE (WCLWD) ON MORPHOLOGICAL, PHYSIOLOGICAL AND YIELD ASPECTS OF AFFECTED COCONUT PALMS

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Weligama Coconut Leaf Wilt Disease (WCLWD), a disease believed to be caused by a phytoplasma, is one of the most devastating disease conditions affecting coconut (*Cocos nucifera*) in Southern Sri Lanka with over 300,000 affected palms had already been identified. As coconut is one of the major economic crops in Sri Lanka, WCLWD is becoming a major threat to Sri Lankan coconut cultivation and related industries.

The present study was conducted to investigate and quantify the impact of the disease on the performance of affected adult palms with respect to their physiological, anatomical, biochemical and yield aspects. The experiment consisted of 4 experimental sites (blocks) of which two were in regularly fertilized estates while the other two were in estates unfertilized at least more than last five years. Palms were grouped into 5 categories based on the disease severity index (Apparently healthy, Mild, Moderate, Severe and Leaf rot). Morphological characters like total number of leaves and the total canopy area, physiological characteristics such as the rate of photosynthesis, stomatal conductance and the rate of transpiration along with some biochemical parameters such as leaf chlorophyll content were monitored for a period of one year starting from January 2009. Anatomical aspects on stomata (stomatal index, stomata opening percentage and epidermal cell area etc.) were monitored once during the period while female flowers per each inflorescence and their settings as mature nuts were monitored on quarterly basis.

Effective canopy area reduced with the advancement of the disease showing a more than 40% reduction in leaf rot affected palms. Early stomatal closure and lowered stomatal conductance exhibited by diseased palms indicated an unimpaired stomatal regulation. Reduced stomatal conductance and leaf chlorophyll contents caused a 45% to 60% reduction of canopy photosynthesis in advanced stages of the disease. Reduced canopy area and the reduced photosynthetic capacity of remaining leaf area caused the low canopy production in affected palms. Growth of inflorescence, number of female flowers per inflorescence and the nut setting were reduced significantly with the progress of the disease. It caused a 40% to 60% reduction of coconut yield in advanced stages of the disease.