B-120 Effect of soil physical properties on ATPase activity, proline and carbohydrate levels of coconut *(Cocos nucifera* L.) seedlings

L P Vidhana Arachchi[1], P A J Yapa[2], R B Mapa[3], H Somapala[4]
[1]*Coconut Research Institute, Lunuwila* [2] *University of Sri Jayewardenapura*
[3] *University of Peradeniya* [4] *Dept of Agriculture*

The aim of the study was to examine the accumulation of proline, ATPase activity in root cells, strach and glucose levels in leaf tissues of coconut seedlings and their interrelationships with respect to soil physical and moisture stress.

Coconut seedlings (3-m old, just after root initiation) were exposed to different layers of Andigama and Madampe soil series at given water potentials in the root zone. ATPase activity, starch, glucose and proline activity of absorption zone cells, leaves and respiratory organs with respect to soil physical conditions such as soil compaction, aeration and available water were measured using standard methods.

Results of preliminary studies showed that the third leaf, absorption zone of primary and fine roots and respiratory organs of coconut seedling has a greater degree of response with respect to carbohydrate levels (i.e. starch and glucose), proline accumulation and ATPase activity compared to other parts of coconut seedlings. The highest ATPase activity and carbohydrate levels were observed when the moisture content was at field capacity with soil compaction lower than 250 N/cm^2, while the lowest was observed in the higher stress level (1 bar to 15 bar moisture content) when the compaction was higher than 250 N/cm^2 and activity was negatively correlated with soil physical stress and moisture stress. Proline content in coconut seedlings was negatively correlated with soil stress. It was more sensitive to soil physical stress than to water stress. Overall results showed that such stress conditions naturally would tend to retard the growth and development of coconut seedlings.

Financial assistance by the Council for Agricultural Research Policy (Research grant 12/175/149) is acknowledged.