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## **ABSTRACTS**

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## ROOT-SHOOT RATIOS OF SOYBEAN (*Glycine max*) PLANTS AS AFFECTED BY ORGANIC MANURE AND ROCK PHOSPHATE

S. Piraveena, T.H. Seran and S. Viharnaa

<sup>1</sup>Department of Crop Science, Faculty of Agriculture, Eastern University, Chenkalady (E.P.) 30350, Sri Lanka.

Root-shoot ratio helps to assess the overall health of plant at each growth stage. Thus a field experiment was conducted at the Eastern region of Sri Lanka to study the root-shoot ratios of soybean (*Glycine max*) plants fertilized with locally available organic manure and rock phosphate. The experiment was laid out in a randomized complete block design and treatments included a basal application of cattle manure (10 t/ha) with Rock Phosphate (RP) (0 - 100 kg/ha) and also the recommended chemical fertilizers as a control. There were remarkable variations in root lengths at the 6<sup>th</sup> and 8<sup>th</sup> weeks after planting (WAP). Root length was increased with increased rates of Rock Phosphate at the 10<sup>th</sup> and 12<sup>th</sup> weeks. At initial stages, plants grown only with cattle manure had the lowest length of roots, but at later stages, the plants in the control treatment had the lowest values. The root-shoot ratios ranged from 1.2 at the early stages of vegetative growth to 1.4 at the flowering stage i.e. the shoot weight was 2 to 4 times more than the root weight because of the rapid growth of leaves and stems. The ratio was 1:6 at the stage of pod formation and shoot weight increased continuously than the root weights due to the weights of pods. The effect of phosphate application influenced pod formation and it resulted in a remarkable variation ( $P < 0.05$ ) after 8<sup>th</sup> week. As a result, root-shoot ratios were affected and the plants treated with inorganic fertilizer had a high ratio (1:17) while a comparatively lower ratio was noted in plants grown with cattle manure and rock phosphate (0 - 100 kg/ha), which were 1:12 to 1:15 at the maturity stage (12 WAP) and the lowest ratio (1:12) was observed when cattle manure was added alone. The results reveal that application of cattle manure alone or in combination with RP to soil could be used to provide favourable soil conditions and plant nutrition for better root and shoot growth. Thus the application of locally available organic manure with rock phosphate would improve the economic part of the soybean with lower adverse environmental impacts on the sandy regosols found in the Eastern regions of Sri Lanka.

**Keywords:** *Glycine max*, Organic Manure, Rock Phosphate, Root Shoot Ratio