COMPARATIVE ANALYSIS OF ROOT SYSTEM CHANGES IN SELECTED SWEET POTATO VARIETIES IN SRI LANKA

B.G.U.K. Kularathna[1], D.P. Karunanda[2] and D.A.U.D. Devasinghe[1]

[1]Department of Plant Sciences, Faculty of Agriculture, Rajarata University of Sri Lanka, Puliyankulama, Anuradhapura, Sri Lanka.
[2]Horticultural Crop Research and Development Institute, Gannoruwa, Peradeniya, Sri Lanka.

Sweet potato (*Ipomoea batatas*) is a high potential energy source for the human diet. Three types of roots: fibrous, pencil, and tuberous, have been recognized in sweet potatoes. The anatomical and morphological studies of root types in sweet potatoes are less in Sri Lanka. Therefore, the production and anatomy of root types in three sweet potato varieties; *Wariyapola red*, *Gannoruwa white*, and *Ama* were studied in field and in hydroponics conditions. Stem cuttings of sweet potato were planted in field plots arranged on a RCBD. The cross-sections of root types were observed under a light microscope every week up to 14 weeks after planting (WAP). In all varieties, thin and thick roots shown up to two weeks were differentiated into fibrous, pencil, and tuberous roots from four WAP onwards. Vascular arrangements in the root anatomy differed according to the root types. Tetrarch arrangement in thin roots and pentarch and hexarch arrangement in thick roots were observed at two WAP. After root differentiation, tetrarch in fibrous roots and pentarch/hexarch in pencil roots were identified. Although morphologically different roots were not observed in hydroponics culture, root anatomy showed the tetrarch, pentarch, and hexarch vascular arrangements. The weight of thick roots in *Wariyapola red* was significantly ($p<0.05$) higher than the other varieties. In all varieties, fibrous roots declined after eight WAP, and tuberous roots increased from six WAP onwards. At harvesting, significantly higher ($p<0.05$) tuberous roots were produced in *Wariyapola red* (452.08±87.65 g plant^{-1}) and *Gannoruwa white* (463.67±29.25 g plant^{-1}) varieties than in the variety *Ama* (278.67±29.25 g plant^{-1}). In conclusion, microscopic observation of roots at the initial growth stages of sweet potatoes can effectively be used for predicting the tuber-forming capacity.

Keywords: Hydroponics, Root anatomy, Root behaviour, Sweet potato varieties, Vascular arrangement