Root morphological characteristics in relation to growth of four tropical fruit seedlings

ABSTRACT

Root morphological characteristics and their relationships with growth habits of four tropical fruit seedlings, namely mangosteen (Garcinia mangostana L.), rambutan (Nephelium lappaceum L.), cempedak (Artocarpus champeden L.) and durian (Durio zibethinus Murr.), were studied. Seeds of selected fruit species were sown in black polyethylene bags (30 cm x 36 cm) each filled with 10 kg of potting mixture (3 soil: 2 sand: 1 cow dung). All seedlings were grown under 50% shade for 15 months during which growth measurements were taken every 3 months. Results showed large differences in growth and root characteristics among fruit types. Slow growing mangosteen had poorly developed root system compared to other fruit species. Root length density (RLD) of mangosteen at 15 months was 66, 73 and 78% less than durian, cempedak and respectively. Similarly, root branching capacity (RBD) at 15 months was 21, 27 and 45% less than durian, cempedak and rambutan respectively. Strong and positive correlations between RLD (r2 = 0.72) and RBD (r2 = 0.96) with net assimilation rate indicate that shorter root length and poor root branching strongly contributed to lower dry matter production in mangosteen seedlings. In contrast, relatively ófastô growing fruit species such as rambutan, cempedak and durian have significantly longer root length and better root branching. In the context of this study, attempts to enhance growth of slow growing fruit seedlings such as mangosteen should be directed towards improving the morphological characteristics and function of roots.

Keyword: Root length; Root branching; Plant growth; Tropical fruits