Analysis of translocatory balance in durian (Durio zibethinus) fruit

ABSTRACT

We estimated translocatory balance in fruit of the tropical tree Durio zibethinus Murray on the basis of a compartment model. Rates of fruit respiration, dry weight growth and translocation increased with time. Over the 8.2 weeks of fruit development, the relative distribution of translocation was 80% to dry weight growth and 20% to respiration. The ratio of respiration rate to translocation rate, which ranged from 14 to 32%, tended to decrease with time, whereas the ratio of dry weight growth rate to translocation rate, which ranged from 68 to 86%, tended to increase with time. The relationship between dry weight growth rate and translocation rate was fitted by a power function, where dry weight growth rate was statistically proportional to translocation rate. The relationship between respiration rate and translocation rate was formulated by a smooth curve, where respiration rate increased as translocation rate increased. Examination of these ratios with respect to the translocation rate indicated that the dry weight growth rate/translocation rate ratio increased slightly with increasing translocation rate, whereas the respiration rate/translocation rate ratio decreased with increasing translocation rate. A comparative analysis of these results with those obtained for Cinnamomum camphora (L.) J. Presl revealed a lower ratio of translocation to dry weight growth in D. zibethinus than in C. camphora, indicating that D. zibethinus fruits have a low translocatory efficiency.

Keyword: Compartment model; Dry weight growth; Fruit respiration; Translocation; Translocatory efficiency