

ESTIMATION OF TOTAL DRY MATTER REQUIREMENT OF DEVELOPING FRUITS OF IMPROVED COCONUT CULTIVARS

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Coconut (*Cocos nucifera* L.) produces fruits continuously from four to about seventy years of age. Prediction of monthly variations in yield, one year before harvest is a major challenge in the coconut industry. The total dry matter requirement of all the developing fruit bunches and actual supply in a given month is a significant factor that influences the variation in monthly coconut yield. Hence, this study assessed the total dry matter requirement of developing fruits of new improved coconut cultivars *i.e.* CRIC 65, CRISL 98 and Kapruwana. Two experiments were conducted at the established experimental field at Daisy Valley Estate in Kurunegala. Six palms from each cultivar were selected for data collection. In the first experiment, fruits were collected from each developing bunch and sub models were developed to obtain the relation between total dry matter (DM) content and the vertical circumference (V) of a fruit by using fitted regression analysis. In the second experiment, total dry matter requirement (TDMR) for potential growth and total respiration *i.e.* growth and maintenance respiration of a single nut of each developing stage was estimated. TDMR of palm (reproductive sink strength) was estimated using the secondary data on fruit numbers of each bunch, collected in two significant months *i.e.* August and December, before and after the severe drought in 2012. The fitted equations for CRIC

$$\begin{aligned} \text{65, CRISL98 and Kapruwana were } \ln \text{ DM} &= 2.416 + 1.445 \ln V + 0.5748 (\ln V)^2, \ln \text{ DM} \\ &= 3.795 + 2.366 \ln V + 0.7236 (\ln V)^2 \text{ and } \ln \text{ DM} = 4.008 + 2.147 \ln V + 0.6497 (\ln V)^2 \end{aligned}$$

with R^2 of 98.8%, 98.1% and 97.3% respectively. TDMR of developing nuts increased with age from button nut (development stage 1) up to sixth or seventh stage of all three cultivars and then decreased with the maturity. TDMR for potential growth and total respiration of a single nut was highest at seventh development stage in CRIC 65 (160 g/nut/month) and CRISL 98 (235 g/nut/month) and sixth stage in Kapruwana (246 g/nut/month). TDMR of a palm was higher in August compared to December in all three cultivars.

Key words: *Cocos nucifera* L., Potential growth, Respiration, Total dry matter requirement