

SHORT SCIENTIFIC NOTES

Certain Leaf Anatomical Characteristics of Two Coconut Cultivars and Hybrids*

Besides leaf area and photosynthetic efficiency, leaf anatomy has also been recognised as an important component of photosynthetic productivity. Laetsch (1974) has reported the distinct anatomical features of C_4 plants which have high photosynthetic efficiency as compared to those of C_3 plants. The present study relates to leaf thickness and tissue density in the leaves of the coconut palms.

For this, 24 young palms, 6 each of a Tall cultivar (West Coast Tall, WCT), a Dwarf cultivar (Chowghat Dwarf Green, CDG) and hybrids between them, viz., Tall \times Dwarf (WCT \times CDG and WCT \times G) and Dwarf \times Tall (CDG \times WCT), growing under identical conditions in the Institute farm were studied. The cultivars WCT and CDG belong to west coast of India and Gangabondam (G) is a semi-Tall cultivar from Andhra Pradesh, India. Thickness and general configuration of cells were studied in thin cross sections of middle leaflets of the youngest fully unfolded fronds. The infiltration method (cf., Unger, 1854; Byott, 1976) were used to determine the air space volume which indicates the tissue density. Air space volume was determined in five segments of 1 cm² each cut from the middle portion of each leaflet. After the determination of initial weight, the final weight, following infiltration in water, the air space volume was calculated assuming that 1 g of water occupied 1 cm³ space in the leaf. The data are presented in Table 1.

Table I. Mean leaf thickness and leaf air space volume in coconut cultivars and hybrids

Variety/ hybrid	Mean leaf thickness (μ)	Mean air space volume (% of unit leaf volume)
WCT	342.48	26.78
CDG	300.50	23.83
WCT \times CDG	316.72	23.50
CDG \times WCT	332.22	23.77
WCT \times G	296.65	23.06
CD (P = 0.05)	24.87	1.28

The WCT palm leaves showed more air space volume and leaf thickness than the leaves of CDG and hybrids. Since higher air space volume indicates less tissue density, the WCT in spite of having higher leaf thickness has less tissue density per unit leaf volume than the hybrids or CDG. Leaves of CDG and hybrids contain increased concentration of chlorophyll than those of WCT palms (Mathew and Ramadasan, 1973).

In a survey on the distribution of air space system in C_3 and C_4 plant species, Byott (1976) observed significantly higher leaf air space volume in C_3 species than in C_4 species. This implies relatively less photosynthetic efficiency in coconut leaf as is seen in C_3 species. Besides possessing poorly developed bundle sheaths with little or no chloroplasts, the coconut leaves show less photosynthetic efficiency, as in other

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slow growing trees when compared to C₄ species (Mathew and Ramadasan, 1975; Ramadasan, 1978, unpublished).

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REFERENCES

- *BYOTT, G.S. 1976. Leaf air space systems in C₃ and C₄ species. *New Phytol.* 76: 295-299.
- LAETSCH, W. M. 1974. The C₄ syndrome: A structural analysis. *Ann. Rev. Pl. Physiol.* 25: 27-52.
- MATHEW, C. AND RAMADASAN, A. 1973. Chlorophyll content in certain cultivars and hybrids of coconuts. *J. Plant. Crops* 1 (Suppl.): 96-98.
- MATHEW, C. AND RAMADASAN, A. 1975. Photosynthetic efficiency in relation to annual yield and chlorophyll content in coconut palm. *J. Plant. Crops* 3: 26-28.
- UNGER, F. 1854. Beitrage zur physiologie der Pflanzen. *Kon. Acad. Wiss. Wien.* (cited from Byott, 1976).