

## **EFFECT OF APPLIED NITROGEN AND VARIETY ON LIGHT INTERCEPTION AND YIELD OF SUGARCANE (*S. officinarum*)**

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Effect of nitrogen and variety on physiological processes associated with yield determination of sugarcane has been given little attention under Sri Lankan growing conditions. This study examined how nitrogen and variety interactive effects influenced physiological parameters and yield components of sugarcane under irrigated conditions in the low country dry zone of Sri Lanka. Three levels of N (0, 100 and 200 kg/ha) and three varieties (CO775, SL7130 and SL8306) were tested as nine treatment combinations in a split plot design with four replicates. Leaf angle, radiation use efficiency, rate of photosynthesis, partitioning of biomass to millable cane stalk, and commercial cane sugar content were studied.

The interactive effects of nitrogen and variety were not significant on the physiological parameters measured. However, the main effects of N and variety were significant for most of the parameters throughout the growing period. No significant difference of leaf angle could be observed among different nitrogen treatments. Application of nitrogen positively influenced radiation use efficiency and rate of photosynthesis. Lack of N application caused 18% and 42% reduction in rate of photosynthesis and radiation use efficiency, respectively, from that of 200kg of N treated plants at their peak. The highest rate of photosynthesis was observed in 200 kg of N treated plants which was  $30 \mu\text{mol m}^{-2}\text{s}^{-1}$  at 150 days after planting. Luxury consumption of N negatively influenced partitioning of biomass to millable cane stalk and commercial cane sugar content of all three varieties. Treatment with 200 kg of N caused 16% reduction of commercial cane sugar content than that of control (no N) at 390 days after planting.

When considering the varietal effects on parameters measured, SL 8306 gave the lowest leaf angle ( $10^0$ ) and it was a 27 % and 30% increment than that of SL7130 and CO775 respectively at 210 days after planting. There was no significant difference of rate of photosynthesis among the tested varieties. However, variety SL8306 showed higher radiation use efficiency (3,35g/MJ), partitioning of biomass to millable cane stalks (73%) and commercial cane sugar content (13%) compared to SL7130 and CO775 at their peaks. Therefore SL8306 is a better variety for the tested conditions than SL7130 and CO775.

This study showed that the excessive supply of N increased the rate of photosynthesis and the radiation use efficiency. However high N caused a severe reduction of partitioning of biomass to millable cane stalks and commercial cane sugar content in all three varieties of sugarcane. Therefore the best application of N is 100kg of N / ha, under irrigated condition in low country dry zone of Sri Lanka. The best physiological performance and yield component was given by SL8306 among the tested varieties. Therefore variety SL8306 is more suitable than the other two varieties for the cultivation in low country dry zone of Sri Lanka.