

POSTER SUMMARY

MODELLING SUGARCANE YIELDS AND REDUCED GROWTH PHENOMENON UNDER HIGH INPUT CONDITIONS IN TROPICAL BRAZILDIAS HB¹, INMAN-BAMBER NG², BERMEJO R^{3,4}, SENTELHAS PC¹

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Abstract

The sugarcane industry in Brazil is based largely in the south (>18°S) but has recently extended closer to the equator (<10°S), where there is a dearth of published information on the growth and yield of sugarcane. Long rain-free periods may permit long harvest seasons and so allow many options to optimise cane and sucrose yield through choice of variety, planting and harvest dates.

A replicated experiment with six varieties, six planting dates, and three harvest ages was carried out at the Agro-Industrial Complex of Terracal, Guadalupe, Piauí State (6.6°S), aiming to inform such an optimisation process. Non-limiting water and nutrients were provided through subsurface fertigation. Photosynthetically active radiation interception (PARi), stalk dry mass (SDMy) and cane yield (CY) were measured. Mean yields at 8, 11.5 and 15 months were 40.1, 49.9 and 69.2 t/ha for SDMy and 172.0, 200.5, 235.7 t/ha for CY respectively.

The high yield at eight months was explained using the APSIM-Sugar model after making substantial adjustments to account for the rapid increase in PARi after planting. Radiation use efficiency (RUE) in the model was the same as for worldwide varieties at this stage, however RUE had to be reduced after eight months to account for yields at 11.5 and 15 months. The adjustments to the model, including reduced RUE, were validated through an independent series of experiments providing confirmation that changes to APSIM-Sugar to account for rapid canopy development and growth slowdown, are widely applicable. The high yields were explained by high but not excessive temperatures, resulting in the efficient capture of PAR. PARi and yields were increased further by planting earlier rather than later in the year.

Keywords: *Saccharum* spp., APSIM-Sugar, crop models, modelling, photosynthetically active radiation interception