

CHANGES IN THE COMPONENTS OF CANE AND SUCROSE YIELD IN RESPONSE TO DRYING-OFF BEFORE HARVEST

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Water deficit from drying-off is expected to reduce cane yields relative to well-watered cane and raise the sucrose content. In South Africa the optimum degree of severity of drying-off will be determined by the additional sucrose yield gained while in Australia a premium is paid for sucrose content. A literature search and data extracted from the South African Sugar Industry Agronomists' Association reports produced 35 experiments and 154 treatments on drying-off. These data were analysed for changes in sucrose yield and components thereof, and were related to reductions in cane yield by expressing yield relative to that obtained under well-watered conditions. An analysis which reveals the changes in the components that contribute to sucrose and cane yields is needed if crop models are to simulate the effects of drying-off. The analysis showed that in situations when there were increases from drying-off, sucrose yield and sucrose fresh weight (FW) concentration were increased on average by 8% and that increases greater than 15% are unlikely.

Biomass reductions of up to 10% from drying-off were associated with increases in sucrose dry weight (DW) concentration, which means that sucrose yields are either increased or unchanged. Sucrose yields were reduced when biomass reductions were greater than 10%. Cane yield reductions of up to 10% can be attributed equally to loss of moisture (seen as an increase in cane dry weight content) and reduced biomass. More severe cane yield reductions were dominated by loss of biomass. Cane sucrose FW concentration increased because dry matter content increased with drying-off and was also to a greater extent due to increases in sucrose DW concentration. The major component of sucrose DW concentration that increased under drying-off was brix DW concentration rather than purity. Under severe water deficit both sucrose DW concentration and dry matter content decreased.

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