STRATEGIES TO IMPROVE YIELD AND QUALITY OF SWEET SORGHUM AS A
CASH CROP FOR SMALL SCALE FARMERS IN BOTSWANA

by

Thabsile Virginia Balole

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Department of Plant Production and Soil Science
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Supervisor: Prof. P.S. Hammes
Co-supervisor: Prof. H.A. van de Venter
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BY

THABSILE VIRGINIA BALOLE

SUPERVISOR: PROF P S HAMMES
Department of Plant Production and Soil Science

CO-SUPERVISOR: PROF H A van de VENTER
Department of Botany

ABSTRACT

Strategies to improve stem yield and juice quality in sweet sorghum were investigated in this study. Seed quality of sixty five accessions (landraces) from Botswana was investigated. Standard germination tests revealed that only 66% of the accessions had germination percentages in excess of 85%. The Accelerated Ageing test showed that only 50% of the 26 accessions had germination percentages above 80%. The results indicated that Botswana sweet sorghum seed quality is generally poor. Seed development and maturity observations demonstrated that maximum seed quality occurred 14 to 17 days after mass maturity (physiological maturity) and this coincided with maximum seed germination. These results suggest that harvesting sweet sorghum seed prior to mass maturity can lower seed quality. Farmers should, therefore be advised to select plants intended for seed harvesting and allow them to mature properly before the seeds are harvested.

Differences in seed colour, shape and compactness of the inflorescences were observed amongst the 65 landraces collected from farmers in Botswana. Ten landraces were characterised and from the results it was evident that there was a range of genetic diversity which can be utilized in the improvement of the crop. Large panicles were characteristic of most sweet sorghum landraces, the effect of tiller, panicle and floret removal on juice quality
was consequently studied. Removal of panicles and florets significantly improved juice quality whilst removal of tillers did not. Selection and breeding of genotypes with small panicles and male sterile varieties may improve juice quality and should be investigated.

Effect of planting date, spacing and nitrogen were investigated. Early planting (October) resulted in increased stem yields but reduced juice quality. A 30 cm intra-row spacing resulted in high stem yields per plant and good juice quality. Nitrogen fertilisation increased stem yield and improved juice quality. On the bases of the results obtained from this study, early planting (October), application of 60 kg N ha⁻¹, and 30 cm intra-row spacing could be recommended for sweet sorghum production in pure stands.

In pure stands yields of more than 37 000 stems (per hectare) of good quality can be attained. These could be sold at an estimated price of P2.00 (R2.25) per stem indicating the potential of sweet sorghum as a cash crop. However, its economic viability depends on the price elasticity in the supply - demand function.

Keywords: Sweet sorghum, small -scale farmers, stem yield, juice quality, seed quality, standard germination test, Accelerated Ageing test, seed development and maturation, mass maturity, landraces, characterisation, panicle removal, floret removal, tiller removal, planting date, spacing, nitrogen.