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Seed Coating with Hydro-absorbent Properties as Possible Mitigation Strategy for Unreliable Rainfall Patterns in Early-sown Sorghum

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Abstract

Sorghum is staple food for a majority of people in Sub-Saharan Africa and is traditionally sown directly after the first rains as a rainfed crop. Its strong photoperiodism allows for a homogenized flowering date so that after the crop is established crop failure is unlikely to occur due to biotic constraints as long as there is sufficient water and nutrients. However, in recent years, farmers have lost substantial shares of their potential yield due to intra-seasonal dry spells and early drought spells, rendering germination of seeds difficult and increasing the loss of young seedlings. Seeds coated with different hydro-absorbing materials may overcome this problem through providing residual moisture to the grain sufficient to sustain early seedling growth during an early drought spell. Germination rates, efficiency of grain reserve mobilisation, and carbohydrate partitioning between roots and shoots were determined for sorghum seeds uncoated or coated with different hydro-absorbers (Stockosorb® and Geohumus®) and a combination of humic acid and biplantol under non-stressed conditions in growth chambers. The most promising combinations were tested under conditions of different drought stress intensities and durations in mist chambers in a greenhouse. Preliminary results show that total germination rate differed with coating material and coat combination. Carbohydrate mobilisation from the grain differed with the percentage share of coating material in the total grain size. Depending on the combination of substances in the coat, the share of coat produced different effects. Drought stress experiments with two sorghum cultivars are still ongoing, however, first results show effects of coat size and coat type on drought stress tolerance. Final results will be shown and discussed in relation to possible technologies rendering early sowing of sorghum more reliable.

Keywords: Batros, climate resilience, seed coating, sorghum, super absorber

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