



Deutscher Tropentag, October 8-10, 2003, Göttingen

“Technological and Institutional Innovations
for Sustainable Rural Development”

Drought Tolerance of *Grewia tenax* — A Potential New Small Fruit for the Sudan

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Abstract

Grewia tenax, a fruit-producing shrub, is considered a prime candidate for domestication and commercialisation as a new crop for the semi-arid regions of the Sudan. It occurs on a large area, regenerates well, and is traditionally protected during clearing and favored by farmers. Ecologically, it can withstand environmental stress more easily than annual crops and thus make an important contribution to sustainable production without needing expensive inputs of water or fertiliser. The fruit is an important economic commodity, both locally, where it is used as food and folk medicine, and internationally, where it has great export potential for use in food and pharmaceutical industries. However, most of fruit production results from gathering activities. Shrub populations are wild and annual fruit yields are erratic and variable due to increased pressure from agriculture, drought, and predation.

Drought is a major abiotic stress that severely limits crop production in arid and semi-arid areas. The characterisation of water relations and growth is a prerequisite for subsequent selection and genetic manipulation of drought tolerance. In this project, we examined different provenances of *G. tenax* with the objective of identifying the specific mechanisms at the whole-plant and cellular levels responsible for drought tolerance. The material under study covers a wide range of climatic and edaphic conditions. Results show a range of responses to different drought intensities suggesting a high degree of plasticity in response to water deficits. Drought-tolerant provenance is characterised by low stomatal conductance, high osmotic adjustment, extensive root growth and small reduction in leaf growth under water stress conditions.

Keywords: Drought tolerance, *Grewia tenax*, growth, leaf gas exchange, underutilized fruit, water relations