



Tropentag, September 19-21, 2012, Göttingen -
Kassel/Witzenhausen

“Resilience of agricultural systems against crises”

Effect of Marker-Assisted Backcrossing to Introgress Resistance to *Striga hermonthica* into African Sorghum Varieties

PETER MUTH¹, OSAMA ELHASSAN², ABDALLAH MOHAMMED³, H. FREDERICK W. RATTUNDE⁴,
ABOCAR TOURE⁵, BETTINA I.G. HAUSSMANN¹

¹University of Hohenheim, Institute of Plant Breeding, Seed Science and Population Genetics, Germany

²Agricultural Research Corporation (ARC), Damazin Research Station, Sudan

³Agricultural Research Corporation (ARC), Wad Medani Research Station, Sudan

⁴ICRISAT Mali, Mali

⁵Institut d'Economie Rurale (IER), Sorghum Breeding, Mali

Abstract

The parasitic weed *Striga hermonthica* causes substantial yield losses in the production of sorghum and other cereals in large parts of sub-Saharan Africa. The additional loss of water to the root parasite compounds the effect of drought on the parasitized crop, aggravating the susceptibility of rural household food security to climate variability. Improved cereal cultivars with quantitative *striga* resistance are expected to stabilise yields in infested areas, and seeds of such improved cultivars can be easily regrown by farmers and distributed along traditional seed exchange channels. However, conventional resistance breeding is hampered by the labour intensity and difficulties of field trials to reliably identify stable host-plant resistance. Marker-assisted backcrossing (MAB) to transfer previously identified resistance quantitative trait loci (QTL) from an exotic, resistant sorghum variety into locally well-adapted sorghum cultivars is expected to speed up the development of farmer-accepted, high-yielding and *striga*-resistant varieties. To validate the MAB-approach, breeding lines of five farmer-preferred sorghum cultivars from Eritrea, Kenya, Mali and Sudan were introgressed with up to five *striga*-resistance QTL from the exotic sorghum line N13 using MAB techniques. Selected backcross-2 lines carrying zero to five introgressed QTL, along with their parental lines, were field-tested under *striga* infestation in multiple locations in Mali and Sudan from 2009 to 2011. *Striga* count data showed resistance levels of the best performing introgression lines similar to that of the donor parent N13, and lines combining high resistance and grain yield levels were identified. Elevated *striga* resistance levels were weakly correlated to the total number of introgressed QTL, while considerable variation also occurred between lines carrying the same QTL-combinations as well as between test environments. Under mild *striga* pressure, grain yield of the introgression lines was on average superior over that of the donor line N13, but still below that of the original African sorghum variety. Nevertheless, farmer-participatory evaluation of the introgression lines revealed high preference scores for high-yielding and *striga* resistant breeding lines. In general, the marker-assisted introgression of *striga* resistance into adapted, farmer-preferred sorghum varieties was considered a very useful breeding strategy.

Keywords: Marker-assisted selection, resistance breeding