GK 09/09 : BREEDING AND DEVELOPMENT OF TWO ROWED BREWING BARLEY
PROGRESS REPORT: APRIL 2010 - MARCH 2011

Summary

Number: GK 09/09
Title: Breeding and development of two rowed brewing barley.
Duration: Ongoing
Status: Continuation of existing project
Project leader: Dr A F Malan

ARC-SGI mandated the barley breeding programme to develop well adapted malting and brewing barley cultivars for the cooler irrigation and Southern Cape dryland production areas of South Africa. To accomplish this goal, the breeding team needs to combine good agronomic characteristics (lodging resistance, high yield potential), disease resistance and good malting and brewing quality characteristics.

To lower production risks and costs for barley producers in the Southern Cape production area, the cultivars need resistance against diseases of which *Rhyncosporium*, *Pyrenophora* and leaf rust are the most common. To stay ahead of the continuous genetic change in the pathogens that overcome existing resistance, the combination of different resistance genes are very important.

In the cooler irrigation area, the disease resistance focus is on *Fusarium* head blight, a problematic disease in this production area. *Fusarium* has the ability to produce DON, which influence brewing quality.

This programme continuously incorporates new genetic variation into the program, to improve the above-mentioned traits. This was accomplished by annual screening of international barley nurseries received from CIMMYT for specific traits (*Fusarium* resistance, leaf rust and yield) under local cultivation conditions.

The programme delivered on all major objectives set for the programme. There is a continuous refining of the early generation screening methodology to enhance the breeding effort at a very early stage to be able to capture all the desired traits in a specific background.

From the micro malting results it is evident that the quality compares very well with the three local checks (Erica, Nemesia and SSG 564). In comparison with the high fermentable ideotype Harrington there is still much work to do. Unfortunately Harrington possesses genetics that negatively influenced kernel plumpness and probably with our early generation selection methodology we discriminate against the quality of Haringtон.

Line evaluation trials
One advanced ARC-SGI line (B06/05) is included in the 2011 Line Evaluation trial under irrigation, to be tested for agronomical performance against all candidate material for a possible release as a local malt barley cultivar.

Commercial production of barley
Currently Puma is a leading commercial barley cultivar for the irrigation area. Unfortunately SAB determine the annual production of the cultivar. Currently the production of Puma is capped at 30 000 tons per annum.

Disease resistance evaluation
During the 2010 season, international nurseries were evaluated at Douglas for SCAB resistance but, unfortunately the disease pressure was too low due to crop rotation change made by the co-worker.

Future of the Project (2011/2012)
- To exploit the high fermentable malt gene pool of Harrington to its full potential.
- To continue with the early generation screening methodology to increase the possibility of releasing an excellent malting cultivar for the irrigation production area.
- To release a well-adapted malt variety for the dryland and irrigation production areas.

- To develop disease resistant/tolerant barley varieties (*Pyrenophora*, *Rhyncosporium*, Rust resistance and *Fusarium* resistance).
- To utilise the HPLC to do more focused selections for malting and brewing quality characteristics in early generations of the breeding programme.