DETAILS

PROJECT NUMBER	M101/11
PROJECT TITLE	Evaluation of short- and ultra-short-season maize hybrids under irrigation
PROJECT MANAGER	MA Prinsloo
PROJECT STATUS	**Extension**
DURATION	01/04/2011 to 31/03/2015 **(request for project to be extended for five more years, until 2020)**

EXTENSION MOTIVATION

Newly introduced, short and ultra-short maize cultivars planted under irrigation are entering the market more frequently and independent information regarding their adaptability, stability and yield potential are essential. There is an acute awareness among producers that insufficient, independent information on the performance of these short- season growers do exist and that performance information should be made available, especially under irrigation conditions. Many producers make use of on-farm strip trials, which are not recommended for sound statistical evidence but it however, is a convenient means for obtaining information.

The short and ultra-short hybrids provide top yield results, when accurate and best management practices including irrigation scheduling, fertilizer application, plant population, uniform seed spacing and uniform emergence are applied, therefore the accurate replicated National Cultivar Trials conducted by ARC-CGI it will serve as guideline for the farmers. Using the AMMI model as statistical method to analyse the yield data of this trials, allow producers to select suitable cultivars for their environments. It has been decided and implemented that the statistical analysis for short seasonal growers be conducted separately according to the growing condition, i.e. hot and cool to temperate environments; this will increase the results accuracy and more precise cultivar recommendations for each specific environment will be obtained. Grain SA, in consultation with producers has expressed their need for such independent trials that could aid producers to do appropriate selections.

To achieve optimum yield, plant population of short and ultra-short hybrids should be increased by at least 20% more than that of the typical medium growers (Pannar, 2013). With continuously increases in seed prices, cultivar evaluation with the objective of developing cultivar recommendations represents a cost effective means for maintaining and/or improving yields, quality and profitability.

The National Cultivar Trials conducted by ARC-GCI as the only independent organisation could serve as a reference for other trials and could be used as a guide for cultivar recommendations by maize producers, advisors, agribusinesses and industry.

Characteristics such as adaptability, lodging, stability and higher yields are very important for every farmer. The National Cultivar Trials are the only independent evaluation system for maize cultivars and supply valuable information to commercial and developing farmers, industry and advisory services. In addition to information published in the Maize Information Guide (MIG), reports and other means of information dissemination assist farmers in selection of appropriate cultivars that will give optimum yields in their respective areas and reduce the risk for crop failure, drought, pests and diseases. Grain SA advising the farmers to consult the ARC-GCI Maize Information Guide and make sure that these cultivars has been tested and proven performance by ARC-GCI.

It is therefore, of national importance that the evaluation of short and ultra- short maize hybrid performance under irrigation for different production systems be continued.

PROGRESS REPORT

Twenty three trials have been planted under irrigation in the eastern and western areas and comprise of 24 different hybrids. In addition, seven trials were evaluated for disease incidence. Results of nineteen trials were received and statistically analysed. An annual meeting was held with seed companies and other role players and at an additional meeting on 3 October 2013 where results were discussed and approved before being published.

It has been decided and implemented that the statistical analysis for short seasonal growers be conducted separately according to the growing condition, i.e. hot and cool to temperate environments. Final results under hot environments resulted in a mean grain yield of 14.71 t ha^{-1} (minimum 11.90 t ha^{-1} at Jacobsdal (Monsanto) and maximum 16.35t ha^{-1} at Vaalharts (GCI)). DKC 62-80BRGEN, DKC 61-94BR, DKC 62-84R and BG 3768BR were the best four performing hybrids and yielded 15.97, 15.95, 15.62 and 15.31 t ha^{-1} respectively. Based on AMMI analysis, the hybrid P 1184R is considered the most stable hybrid followed by BG 3292, and PAN 3D-736BR under different yield potential conditions. Mean grain yield under cool to temperate environments resulted in 11.92 t ha^{-1} (minimum 10.21 t ha^{-1} at Ventersdorp (K2) and maximum 14.84 t ha^{-1} at Winterton (Pannar)). BG 3492B, DKC 61-90, BG 3292 and PAN 3P-502R were the best four performing hybrids under irrigation and yielded 12.68, 12.54, 12.45 and 12.42 t ha^{-1}, respectively. Based on AMMI analysis, the hybrid PAN 3Q-240 is considered the most stable hybrid followed by BG 3492B, and IMP 50-10R. Results of multi-seasonal analysis over the last three seasons (2010/11-2012/2013) were completed and results indicated that of the nine short seasonal cultivars being evaluated at 11 hot environments, mean yield varied from 11.30 t ha^{-1} at Orania12 (Monsanto) to 17.75 t ha^{-1} at Hopetown12 (Pannar). The cultivar PAN 3D-736BR (14.66 t ha^{-1}) produced the highest mean yield over the years and locations followed by DKC 62-84R (14.59 t ha^{-1}). Under cool to temperate environments results indicated that of the nine short maize cultivars being evaluated at 22 environments, mean yield varied from 9.69 t ha^{-1} at Rysmierbult (Agricol) to17.39 t ha^{-1} at Grooptpan (Pannar). The cultivar PAN 3Q-740BR (13.61 t ha^{-1}) produced the highest mean yield over the years and locations followed by Phb 32D96B (13.31 t ha^{-1}). Other agronomical characteristic that have been recorded and analysed include lodging %, tillers %, moisture % and number of cobs per plant.

P**UBLICATIONS**

NEL, A.A., 2011. Vinnige basters behaal hoë opbrengste. *Landbouweekblad*, 12 August 2011.

NEL, A.A., 2012. Kultivars met kort groeityd beindruk. *Landbouweekblad*. Vol 1760. Pg 32 - 33. 29 June 2012.

MA'ALI, S.H. & BRUWER, D., 2013. Mieliekultivarproewe saamgevat: Kort groeiseisoen-kultivars onder besproeiing verbou. Kultivars vir die oostelike produksiegebiede & Kultivars vir die westelike produksiegebiede. *SA Graan/Grain SA*.

PRINSLOO, M.A., 2013. Vinnig groeiende kultivars haal 14 ton/ha. *Landbouweekblad*. Vol 1815. Pg 30 - 31. 2 August 2013.

MEETINGS WITH INTEREST GROUPS

MA'ALI, S.H., 2008. Presented cultivar evaluation research for the Maize Research Evaluation meeting. 13 August 2008. ARC-GCI Potchefstroom.

MA'ALI, S.H., 2009. Presented cultivar evaluation research for the Maize Research Evaluation meeting. 18 August 2009. ARC-GCI Potchefstroom.

MA'ALI, S.H., 2010. Presented cultivar evaluation research for the Maize Research Evaluation meeting. 4 August 2010. ARC-GCI Potchefstroom.

MA'ALI, S.H., 2010. Attended the role of bio-fertilizers in crop production and conservation agriculture. ARC-GCI Potchefstroom. 25 of August 2010.

MA'ALI, S.H., 2010. Attended workshop on Multivariate Analysis of Ecological Data. Held in University of North West Potchefstroom. 8 & 9 of November 2010.

MA'ALI, S.H & D. BRUWER, 2010. Presented and managed the annual meeting with the seed companies and other stakeholders. 11 August 2010. ARC-GCI, different issues regard maize cultivar evaluation projects had been discussed.

MA'ALI, S.H & D. BRUWER, 2011. Presented and managed the annual meeting with the seed companies and other stakeholders. 11 August 2011. ARC-GCI, different issues regard maize cultivar evaluation projects had been discussed.

MA'ALI, S.H & D. BRUWER, 2012. Presented and managed the annual meeting with the seed companies and other stakeholders. 14 August 2012. ARC-GCI, different issues regard maize cultivar evaluation projects had been discussed.

BRUWER, D., 2013. Presented and managed the annual meeting with the seed companies and other stakeholders. 12 August 2013. ARC-GCI, different issues regard maize cultivar evaluation projects had been discussed.