Preliminary report

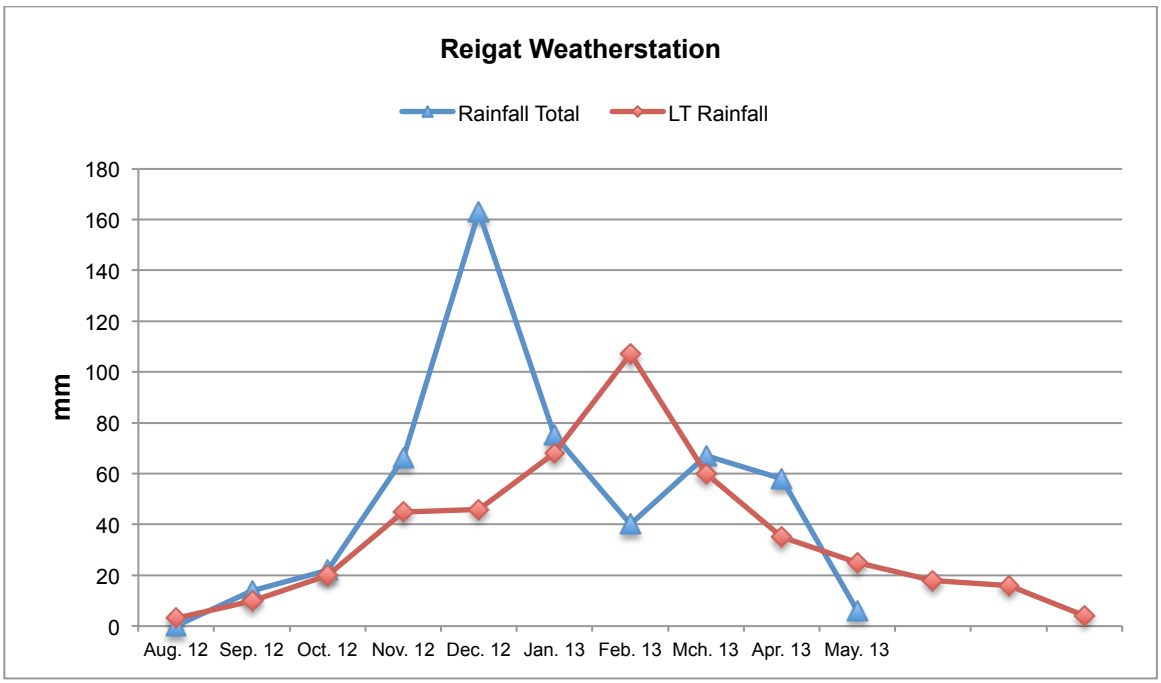
RESULT OF RAINFED MAIZE TRIAL TESTING THE RESPONSE OF THE NOVELGRO (TERRA) PRODUCT IN THE NORTHWEST PROVINCE

Introduction

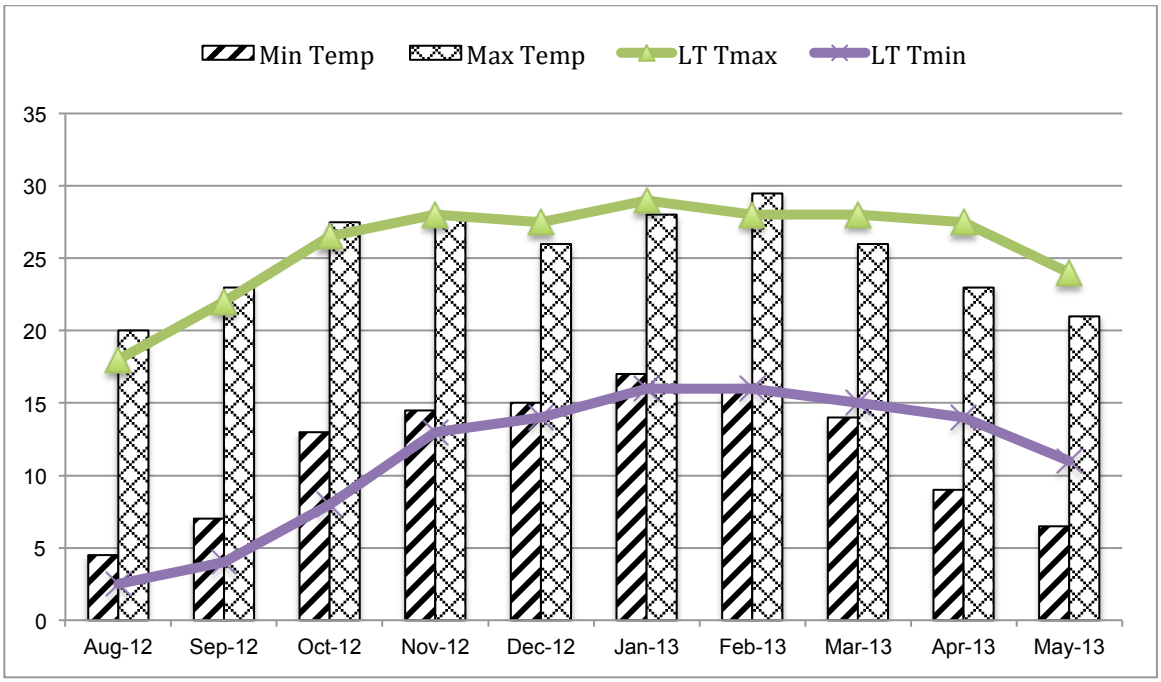
The Research division was contracted to test the Novelgro (Terra) fulvic acid product on maize planted under rainfed conditions in the Northwest province.

Growing conditions

A summary of the rainfall measured and the average monthly temperatures at the ARC automatic weather station in close vicinity of the trial site is shown in Graphs 1 and 2. total rainfall measured was 511mm, althought distribution during the growing season was erratic and not ideal. High daily maximum temperatures of above 30°C also occurred during January, February and the early period of March, and heat as well as waterstress days were encountered.



Graph 1: Total rainfall (mm) measured as compared to long-term average rainfall.



Graph 2: Minimum and maximum average temperatures (°C) as compared to long-term average values.

Material and methods

The trial was planted at the Reigat research farm in the Lichtenburg area on 2 January 2013. Fertilizer application of 200/kg of 3:2:1 (25) was broadcasted prior to final seedbed preparation. The cultivar PHB 31D46BR was planted at a plant population of 22000 seeds per hectare into a 1.52m row spacing. Pre-emergence herbicides were sprayed after planting. Maize was planted with 150 kg/ha 20:7:3 (30) banded to side of the seeding rows. emergence was recorded as 11 January. Additional nitrogen application (3:2:1 (25) at 150 kg/ha) was applied at six leaf stage of development of maize combined with a shallow cultivation for weed control. Total nutrient application (kg/ha) was as follow:

Time applied	Fertilizer	N	P	K
Pre seeding	200 kg/ha 3:2:1 (25) + Zn	25	16.7	8.3
Planting	150 kg/ha 20:7:3 (30) + Zn	30	10.5	4.5
Topdressing	150 kg/ha 3:2:1 (25) + Zn	18	12.5	6.3
Total (kg/ha)		73	39.7	19.1

Treatments:

The trial was laid out as a randomized block design with four replicates. Plots consisted of 2 rows of 10m lengths with a row width of 1.52m, yielding a net plot size of 30.4 m^2. Border plots was included to limit outside interferences.

The Novelgro (Terra) product was applied as a directed spray on the seeding row at two/three leaf stage (15 january) by a calibrated knapsack sprayer applying 400ℓ water per hectare. Three application rates were tested against a control: 400 ml/ha, 800 ml/ha and 1000 ml/ha applied single applications.

At the 10-leaf stage plants from each of the plots were taken and the total weights determined. At maturity (6 June 2013) the plants and ears per plot were counted, ears collected from the respective treatment plots, and after threshing the grain weight and grain mointure content (Dickey John moisture meter) was determined. The data of all the treatment plots were converted to plant and ear counts and yields per hectare (ton per hectare at 12.5% moisture content). Data were analysed with Genstat Discovery (Edition 3) utilizing Randomized block design routines, and ANOVAS, treatment means, standard errors, least significant differences (LSD's) and the coefficient of variation calculated. These results are summerized in the following tables (Tables 1 and 2).

Result and discussion

The biomass development at the 10-leaf stage was measured as total weight of plant. The relative growth of the maize plants from the different treatment is also shown in Photo 1.

Photo 1: Biomass development of maize platns: from left to tight: control, 400 mℓ/ha, 800 mℓ/ha and 1000 mℓ/ha.

Photo 2: Differences in root development of maize plants.

From the above photos the difference between the treatments can be noted. There were marginal increases in plant height with the higher application of Novelgro (Terra) and also an increases in measured biomass values (Table 1). There were also similar in root development as is evident from Photo 2.

Table 1: Biomass results from treatment plots taken at 10-leaf stage

Application ml/ha	Biomass (gram/plant)	Biomass (ton per hectare)	Increase above control
0	321	6.045	0
400	488	9.030	49.4%
800	545	10.667	76.5%
1000	619	12.370	104.6%
Average	493	9.528	

Table 2: Results from treatments measured at physiological maturity

Application ml/ha	Plants (ha)	Ear (%)	Grain Yield (ton/ha)	Increase above control
0	18832	160.2	2.762	0.0%
400	18503	163.9	2.964	7.3%
800	19572	166.1	3.105	12.4%
1000	19984	162.1	2.969	7.5%
Average	19223	163.1	2.950	

LSD (0.05) for application	2801 (ns.)	20.9 (ns)	0.381 (ns)
Coefficient of variation	9.10%	8.00%	8.10%

The counted plant polpulation at harvest dod not show significant differences between treatments. Ear counts indicated as a percentage (ear count/ plants * 100) showed marginal increases in values

although this was not statistically significantly different. A similar threnddd was observed in the grain yields measured at the treatment sprays. There were increases in grain yields up to the 800 mℓ/ha spray treatment that marginally decreased at high application rate. The lack of significant differences between threatments at 5% level of probability can be in part attributed to the climatic effects that limited yield potential and expressing of grain yields due to the high temperatures as well as distribution of rainfall that was measured. The trend was however, still evident that the growth and grain yields responded to the application of products (Graph 3), and it can be speculated that in a different rainfall scenario the significant effects meassured in enhanced growth with product application would have been converted in an increase in grain yield.