



THE SUMMER 2018-2019 MAIZE SMALL PLOT CULTIVAR TRIAL

RESULTS

Summary

This series of trials which compares the performance of new maize varieties against standard ones was conducted at 39 sites ranging in altitudes from 950 to 1 500 metres above sea level. The growing season was characterised by below average rainfall. The rains arrived late in the season with effective falls occurring in late December and ending in mid-February. Commercial farming sites recorded average falls of 547 mm while communal area sites received 504 mm which was far below the long-term averages of high and middle veld areas of Zimbabwe. Sherwood received the lowest rainfall of 157 mm and Guruve received the highest of 1317 mm. The grain yield ranged from 4.79 t/ha to 12.05 t/ha under large scale farming environments reducing to a range of 3.25 t/ha to 7.06 t/ha in communal areas.

Introduction

The current economic and financial situation is causing producers to look for opportunities to control production costs. One effective way of reducing direct costs without lowering grain yields is through choosing the right varieties/hybrids to grow. But with more than 60 varieties/hybrids from over six seed houses now commercially available on the market, choosing the best one for an area can be tricky. The main objective of this programme is to provide, to both maize producers and seed houses,

unbiased data on cultivar performance on which rational decisions on hybrid selection can be made. A close look at the hybrid performance data presented in this report will help the farmer narrow down the range of cultivars to choose from. The following letters before variety numbers indicate the respective seed house, SC for Seed Co, PAN and PEX for PANNAR, PHB, P and X for Pioneer H-Bred, ZAP, Agriseeds, MRI for Maize Research Institute Zambia, PGS and PGEX for Progene Seeds, NTS for National Tested Seeds, SY, SEE, SY and SZ for Syngenta Seeds, MH for Mukushi seeds.

Methods and management

Trial sites comprised of ten irrigated commercial area sites with 77 entries, seventeen dryland commercial area sites with 55 entries and eleven communal area sites with 55 entries. The entries were supplied by seven Seed houses as follows, Seed Co, 6 hybrids and 16 pre released entries, Pioneer, 7 hybrids and 14 pre released entries, Klein Karoo, 13 hybrids and 3 pre released entries, Syngenta, 12 experimental entries, NTS, 3 hybrids, Mukushi 1 experimental entry and SIRDC 1 experimental entry. Pioneer hybrids were sown on 10 irrigated sites. The trials were carried out at the following sites: Arcturus - Ivordale Farm (A Pascoe); Kadoma -The Cotton Training Centre (G. Ratcliff); Harare - Agricultural Research Trust Farm, with an early planting (ART 1) and a late planting (ART 2); Lions' Den - Ramsey Farm (Doug Taylor Freeme); Beatrice; Nengwa Farm (Mr Mangena); Chegutu Central Mudavanhu Farm (M. Shoko); Chinhoyi- Avalon Farm (Mr Swanepoel); Chiweshe- Chirimuta

Farm (Mr Chirimuta); Enterprise- Rattray Arnold Research Station (Mr. Soko); Gutu- Chingwe/Musasa (Mr Nyengera); Headlands (Mr Sakutukwa); Madziva – Chinyani Farm (Mr Chirume); Mt Darwin- Mupindu Farm (Mr Chundu); Mutare- Africa University Farm (Mr Kies); Selous – Sambro Farm (Mr Kajese); Musana- Shaire Farm (Mr Tichagwa); Zvimba- Muhalazi; Chirau- Gwaze Farm (Mr G. Muchetu); Murewa – Matongorere Farm; Mutorashanga- Northwood Farm (Mr Mutonga); Chitomborwizi- Nharire Farm (Mr E. Mutemeri); Mvuma- Maketo Farm (Dr Maketo); Chakari- Gura Farm (Mr C Gura); Chegutu South- Chiedza Farm (Mr W. Chabikwa); Masvingo- Chitekete (Mr. Mazetese); Raffingora- Karimawanga Farm (Mr. Madzingo); Guruve- Taiko Farm (Mr Gwande); Shamva- Hopedell Farm (Hon. P Shiri); Mhangura- Victory Farm (Mr Cakana); Wedza- Gorejena Farm (Mr Nyakonda); Marondera- Sambok Farm (Mr JM Campbell) and Mvurwi- Forrester B (Mr Brooker).

At ART Farm each hybrid was planted on two dates. The first planting was on 25 October 2018 with irrigation and the second planting was on 15 December 2018 under rainfed conditions. The planting dates at the other sites depended mainly on the farmer's planting time, which was dictated by the arrival of first effective planting rains (**Table 3.1**).

The trials were all hand planted by the ART staff at a target population of 55 556 plants/ha. Four kernels were planted per station and then subsequently thinned to two plants per station at the 2 to 3 leaf growth stage. Gaucho® 70 WS was applied on the seed at a rate of 250g/50kg seed. Land preparation weed, and pest control and all other cultural

practices were carried out by the farmer to the standard farm practice and in line with recommendations for maize. The data for cultural practices, rainfall and irrigation at each site are presented in **Tables 3.1.and3.1.1**

The varieties were combined in a randomised complete block design replicated three times. Treatments were randomised separately for each site. The gross plot was 4 rows of 0.9 m by 12 plant stations at 0.40 m in-row. A net plot 7.2 m² (2 centre rows by 10 plant stations) was hand harvested for yield assessment. Unshelled cobs were weighed and then one replicate was shelled and weighed to give an estimate of shelling percentage. Grain moisture content was determined on these samples and yields were adjusted to 12.5 percent moisture.

Results and discussion

To avoid big losses, harvesting had to start much earlier than usual (**Table 3.1and3.1.1**). The rainfall figures are presented in **Table 3.1**.

The summary of mean grain yield of the hybrids is presented in **Tables 3.2 and 3.2.1**. Averaged across sites SC 657 was the highest yielding hybrid at a yield level of 9.54 t/ha and 8.53 t/ha under irrigated and rain fed conditions. Hybrids SC 727 and SC 719 produced similar yields of over 8.0 t/ha. The highest yielding site was Marondera which topped 12.05 t/ha followed by ART Farm at a yield level of 11.43 t/ha. Other sites which attained average yields of over nine tons per hectare were Enterprise, ART Farm December planting and Wedza. Poor yields of below 5.0 t/ha were recorded at Chegutu Central, Chegutu South and Gweru. NTS 51 produced the lowest yield of 6.62 t/ha across all sites.

Under communal area sites, Musana gave the highest yield of 7.06 t/ha followed by Mahusekwa (6.23 t/ha), Chitomborwizi (6.00 t/ha) and Chirau (5.96/ha). The lowest yields were recorded at Mt Darwin (3.25 t/ha). Averaged across sites SC727 gave the highest yield of 6.16 t/ha. Another hybrid that yielded above 6.0 t/ha was SC 719. The least yielding variety was NTS 51 at a yield level of 4.42 t/ha. The average yields attained were lower than last season because the weather conditions were unfavorable. The viability of seed was generally good and acceptable plant stands were achieved at most sites (**Tables 3.1 and 3.13**). All hybrids took significantly different times to pollinate ($P < 0.001$) and to form silks ($P < 0.001$) (Tables 3.2 and 3.3) SC 301 generally took the least time for both traits, and SC 719 and SC 727 the longest time. Low levels of root and stalk lodging were recorded at all sites (Tables 3.5 and 3.6), but significant differences between the hybrids occurred only at some sites. Significant ($P < 0.01$) differences in grain yield were recorded at all sites both in commercial and communal area sites.

Practical applications

Seed houses are now producing high yielding stable hybrids that can be selected to suit the current diverse environments. Some of which are the ultra early three months maturing with outstanding heat and drought stress tolerance.

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