

SCREENING OF MAIZE VARIETIES FOR GRAIN YIELD AT DERA ISMAIL KHAN

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ASBTRACT

In order to evaluate the performance of advanced lines from different research institutions across the country and commercially cultivated varieties, an experiment was conducted at the Agricultural Research Institute, Dera Ismail Khan, Pakistan, during spring 2008. The data were recorded on days to pollen shedding, days to silking, plant height and grain yield. All varieties showed significant differences with each other for all the traits studied. Variety “Ev-5098” had the highest grain yield of 7.35 t ha⁻¹. Variety “Islamabad White” took more days to pollen shedding and silking while variety Soan-3 was found early maturing, which took 69 days to 50% silking. The highest plant height of 205 cm was noted in variety Sahiwal-2002. These varieties had a wide genetic background, thus showing grain yield ranges from 5.26 to 7.35 t ha⁻¹. Maize varieties EV-5098 and Sahiwal-2002 were found most promising, which have the potential to increase the average yield of maize in Dera Ismail Khan and are therefore recommended for general cultivation.

Key words: Maize, varieties, growth, grain yield, adaptation.

INTRODUCTION

Maize (*Zea mays* L.) is the third most important cereal crop after wheat and rice in Pakistan. It is consumed as human and animal food and provides a major raw material for starch industry. It is short duration and quick growing crop and is potentially capable of producing very high quantity of grain per unit area.

Grain yield is the combined out come of genetic potential and environment interaction. Variability in genetic potential among varieties is a major component of variable yield. Average maize yield in Pakistan is low on account of suboptimal plant density, inadequate fertilizer use, inadequate water supply, weed infestation, insect pest attack and the selection of unsuitable cultivars under a given set of environments (Tahir *et al.*, 2008). Olakajo and Iken (2001) reported that maize varieties produce significantly different yields at different locations. Olaoye (2009) emphasized the need to evaluate maize varieties in various agro-ecological zones for their adaptation, yield potential and disease reactions so as to release suitable varieties for cultivation on farmers' fields. It is, therefore, imperative to understand the relationship among yield testing locations for better adaptation of germplasm to different production environments (Trethowan *et al.*, 2001).

Keeping this in view, the present study was conducted to compare the performance of advanced lines and commercial varieties for their adaptability and stability and to recommend a suitable one for the local maize growers of Dera Ismail Khan.

MATERIALS AND METHODS

Fourteen Maize varieties (BS-01, Islamabad Gold, Agaiti-2002, Margala, EV-1097, Rakaposhi, Sahiwal-2002, EV-5098, Soan-3, EV-1098, Islamabad White, Sadaf, EV-7004 and EV-6098) were evaluated for various yield parameters. The experiment was conducted at the Agricultural Research Institute, Dera Ismail Khan, during spring 2008. It was laid out in a randomized complete block design (RCBD) with 3 replications. Sowing was done on a well prepared soil on 3rd week of February. The net plot size was 5mx1.5m with rows 5 m long and 75 cm apart. Nitrogen and Phosphorous were applied @ 150:110 kg ha⁻¹ as Urea and Diammonium Phosphate. All P and half of N were applied at planting time, whereas the other half N was side dressed one month after sowing. All agronomic practices were provided at par to all treatments. Data were recorded on days to 50% pollen shedding, days to 50% silking, plant height (cm) and grain yield (t ha⁻¹). Grain yield was adjusted to 15% grain moisture using the formula prescribed by Taran *et al.* (1998). Plant height was measured 3 weeks after flowering from the base (ground) to the point where the flag-leaf blade extends from the stalk. The data were subjected to the analysis of variance techniques wherein means were compared using Least Significant Difference (LSD) procedure as laid down by Steel *et al.*, (1997).

RESULTS AND DISCUSSION

A perusal through the means given in Table I indicated that the maize varieties significantly differed in

days to 50% pollen shedding. The highest (81) days taken to 50% pollen shedding were recorded in maize variety Islamabad White and the lowest (67) in Soan-3. Other varieties, except for EV-1097, EV-1098, Soan-3 and Agaiti 2002, showed statistically similar days to pollen shedding. Previous work of Younas *et al.* (2002) also showed significant difference among maize varieties for days to pollen shedding. This might be due to the difference in genetic makeup of the germplasm.

Genotype effect on days to mid silking was significant. Variety Islamabad White was late in maturity and took 84 days to 50% silking (Table I). Variety Soan-3 was earlier taking 69 days to silking half. In the present study, days to 50% silking ranged between 69 to 84 days among varieties. Days to anthesis reveal differences in maturity among genotypes due to reflection of weather pattern i.e. temperature, available soil moisture etc (Olaoye, 2009). Ahmad *et al.* (2000) evaluated maize genotypes at different locations and found an inconsistent behaviour of female flowering and grain yield. Early maturing varieties required fewer corn heat units to reach flowering, while late maturing cultivars exhibited extended vegetative period (Kumar, 1999).

Table I. Days to pollen shedding, days to silking, plant height (cm) and grain yield (t ha⁻¹) of maize varieties during spring 2008.

Variety	Days to pollen shedding	Days to silking	Plant height (cm)	Grain yield (t ha ⁻¹)
BS-01	77 a	79 a	175 bcd	6.056 bc
Islamabad Gold	76 a	79 a	185 abc	5.967 bc
Agaiti-2002	68 b	70 b	145 f	5.793 bc
Margala	76 a	79 a	185 abc	6.139 bc
EV-1097	69 b	72 b	173 b-f	5.467 bc
Rakaposhi	78 a	81 a	175 b-e	6.033 bc
Sahiwal-2002	77 a	79 a	205 a	6.320 b
EV-5098	80 a	82 a	200 ab	7.353 a
Soan-3	67 b	69 b	150 ef	5.340 c
EV-1098	69 b	69 b	155 def	6.073 bc
Islamabad White	81 a	84 a	170 c-f	5.253 c
Sadaf	77 a	79 a	180 a-d	5.260 c
EV-7004	77 a	81 a	165 c-f	5.533 bc
EV-6098	80 a	82 a	190 abc	5.656 bc
LSD _{0.05}	6.077	5.454	27.53	0.914
CV%	3.75	3.28	7.28	7.21

Means followed by different letter(s) in a column are significant (P<0.05)

All genotypes showed significant difference for plant height. Variety Sahiwal-2002 had the highest plant height (205 cm) while short statured plants of 145 cm were recorded in variety Agaiti-2002. As mentioned earlier, maize germplasm used in the present study had diverse genetic composition and as a consequence produced varying plant height ranging from 145 to 205 cm. Tahir *et al.* (2008) reported that plant height is a

genetically as well as environmental controlled factor, however the selection of proper crop cultivar manages the influence of environment. Revilla *et al.* (2000) also reported differential pattern of maize varieties for plant height due to genotype and environment interaction. However, plant height has no correlation with grain yield. Olakajo and Iken (2001) reported maize genotypes differed in plant height but had statistically similar grain yield.

Statistical analysis showed significant differences for grain yield among the genotypes. Variety EV-5098 produced highest grain yield of 7.35 t ha⁻¹. The lowest yield of 5.26 t ha⁻¹ was noted in maize variety Sadaf. The grain yield in the test varieties ranged between 5.26 to 7.35 t ha⁻¹. Similar results were reported by Ahmed *et al.* (2000) and Souza *et al.* (2002) who evaluated and identified high yielding maize varieties among different genotypes tested. McCutcheon *et al.* (2001) and Akbar *et al.* (2009) also reported significant differences among maize cultivars for grain yield.

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