

## COMPARATIVE STUDY OF AGRONOMIC PARAMETERS IN SYNTHETIC MAIZE VARIETIES

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### ABSTRACT

Yield and yield components of five synthetic maize cultivars (EV-3001, Jalal, Kisan, Azam and Pahari) were studied at Chilas Agriculture Farm, district Diamer, Northern Areas, Pakistan during 2005. Cultivars differed significantly for all parameters. Cultivars Jalal, EV-3001 and Kisan produced the tallest plants (278.6, 270.5 and 265.7 cm) whereas, check variety Pahari produced the shortest plants (168.8 cm). The highest yield (1.803 t/ha) was harvested in maize cultivar EV-3001 which was at par with cultivars Jalal and Azam. Check variety produced the lowest yield (1.15 t/ha). The effect of cultivars on stalk yield also significantly differed and check variety produced the lowest stalk yield (1.320 t/ha). Other cultivars were at par for stalk yield. On the basis of this study cultivars Jalal and Azam are recommended for general cultivation in double cropping zones in district Diamer.

**KEYWORDS:** *Zea mays*; cultivars, performance; agronomic characters; Pakistan.

### INTRODUCTION

Maize is the third major crop of the world after wheat and rice (9) with average yield of 4436 kg per hectare (2). It is an important cereal crop of Pakistan and is grown on an area of one million hectares with an average grain yield of 1720 kg per hectare (4). Average yield in Pakistan is very low as compared to some developed countries. It can be improved if superior genotypes combined with appropriate production technology are developed and adopted by farmers (2).

Maize in Northern areas of Pakistan is the second most important crop after wheat. It is grown mostly as summer crop in double cropping zones of the region for grain and fodder purpose. Grains are used by human beings and fodder is consumed by livestock. Its cultivation in Northern areas starts from

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May to first week of July. Seed of improved varieties is obtained from Peshawar whereas farmers mostly plant local land races having very low yield potential. Farmers of the area require high yielding and early maturing varieties with enhanced cold and disease resistance (3, 8).

This study was conducted to evaluate yield and other agronomic parameters of maize cultivars under climatic conditions of Chilas city.

## MATERIALS AND METHODS

Performance of maize varieties was evaluated at Chilas Agriculture Farm, district Diamer, Northern Areas of Pakistan during the year 2005. Five maize synthetic cultivars (EV-2001, Jalal, Azam, Kisan and Pahari as local check) were used. The experiment was laid out in RCBD with three replications. Row to row and plant to plant distance was kept as 75 and 20 cm, respectively. Fertilizer was applied @ 150 kg N and 100 kg P<sub>2</sub>O<sub>5</sub> per hectare. All P<sub>2</sub>O<sub>5</sub> and half N was applied at the time of land preparation and remaining N was applied at knee high stage of crop. All cultural practices were applied uniformly.

Data were recorded on plant height, number of cobs per plant, average cob weight per plant, 100 grain weight, grain yield and stalk yield. Data were subjected to analysis of variance (ANOVA) technique by using MSTATC and means were compared by applying least significant difference test (11).

## RESULTS AND DISCUSSION

Maize cultivars differed significantly ( $P < 0.01$ ) for all parameters studied. Check cultivar Pahari produced the shortest plants (168.8 cm). Plants with maximum height were observed in Jalal (278.6 cm) which were statistically at par with those of EV-3001 (270.5 cm) and Kisan (265.7 cm) (Table 1). These results are in accordance with earlier findings (1, 5, 6) where significant effect of maize genotypes was observed on plant height. Association between plant height and grain yield ( $r = 0.496$ ) expressed in Pearson's correlation coefficient was significant (Table 2). Spanner *et al.* (10) reported a positive correlation between plant height and grain yield. Qamar *et al.* (7) also observed similar response under particular climatic conditions of Northern areas.

Number of cobs per plant varied among the cultivars (Table 1). The cultivar Jalal produced maximum number of cobs per plant (2.00) followed by Azam (1.93) whereas check cultivar Pahari produced minimum (1.00). A highly

significant positive correlation ( $r = 0.6173$ ) was observed between number of cobs per plant and grain yield (Table 2). These results are in line with earlier study (7) in case of maize.

Average cobs weight per plant ranged from 120.7 to 206.7 g (Table 1). Maize cultivars Jalal and EV-3001 were at par with maximum weight of cobs per plant (206.7 and 200.7g). Similarly, check cultivar Pahari (synthetic) and Kisan were also at par with each other. Khan *et al.* (6) producing minimum cobs also found significant differences among maize cultivars for cob weight per plant. Maximum 100 grain weight was observed in cultivars Jalal (43.00 g) and Azam (39.33 g) against minimum by cultivar Kisan (25 g) (Table 1) which did not differ significantly from that of check Pahari.

**Table 1. Yield and yield components of maize cultivars under Northern areas conditions.**

Cultivars	Plant height (cm)	No. of cobs/plant	Cobs weight/plant (g)	100 grain weight (g)	Grain yield (t/ha)	Stalk yield (t/ha)
EV3001	270.5a	1.52Bc	200.7a	34.00b	1.803a	2.277a
Jalal	278.6a	2.00a	206.7a	43.00a	1.677ab	2.120a
Pahari	168.8c	1.00d	117.7c	26.33c	1.150c	1.320a
Kisan	265.7a	1.37cd	120.7c	25.00c	1.343bc	2.060a
Azam	218.3b	1.93ab	190.0b	39.33a	1.623ab	2.393a
LSD (0.05)	37.19	0.4294	8.157	4.060	0.3420	0.5156

Values within columns followed by same letter(s) do not differ significantly from each other (LSD  $p \leq 0.05$ ).

Cobs weight per plant ( $r = 0.8176$ ) and 100 grain weight ( $r = 0.5945$ ) were also highly significantly associated with grain yield (Table 2). A higher weight of cobs per plant and 100 grain weight is correlated with increased grain yield. Similarly, correlation between stalk yield and grain yield was highly positively significant ( $r = 0.6573$ ).

Grain yield is a complex character, correlated with a number of individual components. These components are considered to be influenced by genetic as well as environmental factors. In present study yield per hectare ranged from 1.150 to 1.803 tons per hectare (Table 1). The highest yield was harvested in maize cultivar EV-3001 (1.803 t/ha) which was at par with Jalal (1.677 t) and Azam (1.623 t). Check cultivar Pahari produced the lowest yield (1.15 t/ha). Qamar *et al.* (7) also observed similar response in particular conditions of Northern areas and stated that the genotypic variation affected grain yield of maize. They also found that cultivar EV-1098 was at par with

high yielding hybrid Bemisal-2000 under double cropping zone of Northern areas.

The effect of cultivars on stalk yield of maize was also highly significant. The check cultivar Pahari produced minimum stalk weight (1.320 t/ha) whereas remaining four cultivars were at par (Table 1).

**Table 2. Correlation between different parameters of maize.**

	Plant height (cm)	No. of cobs/plant	Cobs weight/plant (g)	100 grain weight (g)	Grain yield (t/ha)	Stalk yield (t/ha)
Plant height	1					
No. of cobs/plant	0.4828 (0.067)	1				
Cobs weight/plant	0.4876 (0.064)	0.7663 (0.001)	1			
100 grain weight	0.4047 (0.133)	0.8867 (0.000)	0.8791 (0.000)	1		
Grain yield	0.4964 (0.054)	0.6173 (0.013)	0.8176 (0.000)	0.5945 (0.019)	1	
Stalk yield	0.4325 (0.106)	0.4313 (0.107)	0.5429 (0.035)	0.3400 (0.213)	0.6573 (0.007)	1

It is concluded that check cultivar Pahari produced the shortest plant, which caused slow wine growth and small leaf area resulting in low light interception and affecting both photosynthesis and stalk yield. Remaining synthetic cultivars produced taller plants with large leaf area, more photosynthesis and higher stalk yield. Synthetic cultivars EV-3001, Azam and Kisan yielded better than local check, so these are recommended for cultivation in double cropping zones of district Diامر.

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