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## Performance of Maize Cultivars Underlate Sowing Conditions

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**Abstract:** Sowing dates had significant effect on emergence/m<sup>2</sup>, plant height, cobs/plant, grain yield. Early sowing of 15th July gave maximum emergence/m<sup>2</sup> (12.11), plant height (152 cm), cobs/plant (1.300), grain yield (4419 kg ha<sup>-1</sup>). Delayed sowing of 15th August decreased all the above mentioned parameters. Among the cultivars, Sarhad white had the highest emergence of seedlings/m<sup>2</sup> (10.44), days to tasseling (61.00), days to maturity (124.1) grain yield (3354 kg ha<sup>-1</sup>), while cultivar PS EV showed poor performance. Generally cultivar Sarhad White sowing on 15th July produced the best results among all others respectively.

**Key words:** Maize (*Zea mays* L.), cultivars, sowing, dates, emergence, tasseling, cobs, maturity, yield, (NWFP), Pakistan

### Introduction

Maize (*Zea mays* L.) belongs to family Poaceae is the third most important cereal crops in Pakistan after wheat and rice. The total production of Pakistan during 1997-98 was 1251,000 tones. In Pakistan the average yield during 1997-98 was 1481 kg ha<sup>-1</sup> with the total area was 868,000 ha while in NWFP was 533,000 ha and average yield was 1525 kg ha<sup>-1</sup> (Anonymous, 1998). Relwani (1962) reported that, timely planting of maize on 1st July gave the highest yield of 1561.04 kg ha<sup>-1</sup> and increase of 197 kg ha<sup>-1</sup> and 335 kg ha<sup>-1</sup> over plots sown on 15th June and 15th July respectively.

The NWFP has unique agriculture environment where raising of two maize crops in a year are possible by adopting appropriate cultural practices. Many varieties classified on the basis of early and late maturing nature of the crop are available in the market. Cardoso and Mundstock (1982) concluded that no. of days between sowing and emergence was decreased as the sowing delayed. Mohamed and Shams (1991) reported that delay sowing until 29th July decreased grain yields, as compared with sowing on 5th May by an average of 72%. They further stated that delayed sowing decreased most of the yield components in all respect. Lilly *et al.* (1993) reported cultivars viz. Pioneer CV. and Pioneer CV. 3320, produced higher grain (12.9 Vs 9.1 tons/ha) sown in March, where as Grain yield of May were (7.66 and 17 tons/ha) respectively in both the cultivars, while August sowing gave yields of (5.24 and 8.5 tons/ha); at both of these later sowing dates.

The aim of this project is to screen out an optimum type of cultivar that can mature in shortest period with or without effect on yield.

### Materials and Methods

The experiment was conducted at Malakandher Res. Farm, NWFP, Agri. University, Peshawar during 1997. The experiment consisted of the following treatments:

A. Sowing Dates	B. Maize Cultivars
O1 = 15th July	V1 = Azam
O2 = 30th July	V2 = Kissan
D3 = 15th August	V3 = Shaheen
	V4 = Sarhad white
	V5 = Pahari
	V6 = PS EV

The subplot size was 4.5 m × 4 m (18 m<sup>2</sup>) in three replications. The seed rate was maintained as 40 kg ha<sup>-1</sup> for

each cultivar. Row to row distance was 75 cm apart. Nitrogen and Phosphorus fertilizers at of 120 and 60 kg ha<sup>-1</sup>, respectively, were used as a basal dose. Full dose of P and half of N was applied at the time of seedbed preparation, while remaining half of the N was applied at knee height. All other cultural practices were practiced uniformly as recommended for maize crop. The data were recorded for Emergence of seedlings/sq. m, Days to tasseling, Plant height (cm), Number of cobs/plant, Days to maturity and Grain yield (kg ha<sup>-1</sup>) and were analyzed statistically. LSD was used as a test of significance for comparing means of sowing dates and cultivars.

### Results and Discussion

**Emergence of seedlings per square meter:** Data regarding emergence of seedlings/m<sup>2</sup> are presented in the Table 1. Statistical analyses of the data revealed that emergence of seedlings/m<sup>2</sup> were highly significantly affected by sowing dates and cultivars. The interactions of both the variables were non-significant. The mean values of sowing dates showed that maximum emergence of seedlings/m<sup>2</sup> (12.11) were recorded when crop was sown on 15th July while minimum emergence of seedlings/m<sup>2</sup> (8.05) were recorded, when crop was sown on 15th August. Among the cultivars yet maximum emergence of seedling/m<sup>2</sup> (10.44) were recorded by the cultivar Sarhad white followed by Pahari (10.33) while minimum emergence of seedling/m<sup>2</sup> (8.77) were recorded by the cultivar Shaheen. The poor germinability of Shaheen show physiological disorder the seed, which might have occurred in handling of seed.

**Days to tasseling:** Data regarding days to tasseling are presented in Table 1. Statistical analysis of the data revealed that days to tasseling were highly significantly affected by dates of sowing, while high significant differences for days to tasseling were too recorded among the cultivars. Interaction of both the factor i.e., planting dates and cultivars were non-significant. The mean values of sowing dates on average basis, maximum number (55) days were recorded on 15th August planted crop while minimum number of (49.331) days were noted in crop planted on 15th July. Among the cultivars, maximum no. of days were recorded in cultivar Sarhad white i.e. 61 days, followed by cultivar Azam (55.11) days, while cultivar Pahari took the least (44,11) days, followed by cultivar Shaheen 46 days of sowing dates showed that the maximum

Table 1.: Effect on different parameters of different maize cultivars under late sowing condition:

Cultivars	Sowing dates										15 <sup>o</sup> August																		
	15 <sup>o</sup> July					30 <sup>o</sup> July					15 <sup>o</sup> August		13		14		15		16		17		18						
EM	Tess	Pl.Ht	Cobs	DM	GY/kgp	EM	Tass	Pl.141	Cobs	DM	GY/lig)	EM	Pl.Ht	Cobs	DM	GY/kg1	EM	Pl.Ht	Cobs	DM	GY/kg1	EM	Pl.Ht	Cobs	DM	GY/kg1			
Azarn	12.33	55.00	151.30	1.100	103.66	4779ab	8.66	53.66	124.60	0.767	117.00	2629sf	8.00	56.66	118.43	0.433	120.00	1184g											
Kissan	12.00	49.66	143.20	1.300	104.33	4683.b	9.00	51.00	117.76	0.833	114.66	2818def	8.00	60.33	108.70	0.467	118.66	1293g											
Shaheen	10.33	43.66	161.16	1.400	90.66	3820bc	8.33	45.33	140.73	1.067	101.33	2697def	7.66	50.33	125.03	0.567	107.33	12539											
Serhad White	14.00	60.00	158.20	1.400	114.33	5747a	9.00	60.33	132.30	0.833	128.66	2799def	8.33	62.66	113.93	0.400	129.33	1517g											
Pirhari	12.33	41.00	157.76	1.267	98.33	3620cd	9.66	43.66	132.53	0.677	102.33	3478cde	9.00	47.66	125.76	0.500	105.66	1323g											
PS EV	11.66	49.33	140.56	1.333	111.33	3867bc	6.00	51.33	117.16	0.967	115.33	2090fg	7.33	54.33	107.76	0.567	120.66	1266g											
Sowing dates mean:	12.11a	49.22c	162.00a	1.300e	103.86	4419a	6.77b	50.890	127.500	0.8906	113.26	2752b	8.05c	55.33e	116.60c	0.488c	116.9a	1306c											

Mean of different objectives and LSD for sowing dates and for cultivars at 5% values

Cultivars	15 <sup>th</sup> July + 30 <sup>th</sup> July + 15 <sup>th</sup> August (Cultivars mean)										15 <sup>th</sup> July + 30 <sup>th</sup> July + 15 <sup>th</sup> August LSD Value at 5% for cultivars														
	EM	Tess	Pl.Ht	Cobs	DM	GY (kg)	EM	Tass	Pl.Ht	Cobs	DM	GY (kg)	EM	Toss	Pl.Ht	Cobs	DM	GY (kg)	EM	Toss	Pl.Ht	Cobs	DM	GY (kg)	
Azarn	9.64ab	55.11b	131.4bc	0.8798d	113.4b	21184ab	1.201	1.031	5.553	0.05255	3.837	1107	1.030	2.051	8.759	0.08611	5.789	564.6							
Kissan	9.65ab	53.67bc	132.2e4	0.8867c	112.8b	2931ab																			
Shawn	8.77b	46.44d	142.3c	1.011a	98.7c	2590b																			
UMW Wbita	10.44a	61.00a	134.8ab	0.8778bc	124.1b	3354a																			
Pahari	16.33a	44.11a	139.7ab	0.8778bc	102.1c	2807ab																			
PS EV	9.00b	51.67c	121d	0.9543ab	115.8b	2408b																			

LSD value for interaction = 977.9\* means of the same category followed by different Millers from one another using LSD test at 5% levels of probability in the parameters.

1. EM stand for Emergence of designs m2 of maize  
 2. Tass stand for days to tassleing  
 3. Pl.Ht stand for plant Height for (cm)  
 4. Cobs stand for no. cobs/plant  
 5. DM stand for days to maturity  
 6. GY (kg) stand for grain yield (kg/ha<sup>-1</sup>)

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number of 61 days were noted in the cultivars sown on 15th August while minimum number of 54.56 days were taken by cultivars sown on 15th July respectively. The possible reasons was genetic constitution of cultivars that effect days to tassling.

**Plant height (cm):** Data regarding plant height is presented in Table 1. Statistical analysis revealed that plant height was significantly affected by planting dates and cultivars. The interaction of planting dates and cultivars were non-significantly affected. The mean values of sowing dates showed that plant height were maximum noted in the cultivars sown on 15th July i.e., 152.03 cm while minimum plant height were noted in the cultivars sown on 15th August i.e. 116.6 cm. Among the cultivars, maximum plant height of (142.3 cm) was recorded for cultivar Shaheen followed by cultivar Pahari (138.7 cm) while minimum plant height of (121.8 cm) was recorded for cultivar PS EV. Similar results were reported by Sharlway *et al.* (1978), who stated that plant height was reduced by delayed sowing.

**Number of cobs/plant:** Data regarding cobs/plant is presented in Table 1. Statistical analysis of the data revealed that no. of cobs/plant were significantly affected by sowing dates and cultivars. The interaction of sowing dates and cultivars were non-significant. The mean values of sowing dates showed that maximum number of 1.30 cobs/plant were noted in the cultivars sown on 30th July while minimum number of 0.48 cobs/plant were noted when crop was sown on 15th August. Differences among the cultivars showed that maximum number of cobs/plant was (1.01) of cultivar Shaheen followed by cultivar PS EV i.e. (0.95) cobs/plant while the minimum number (0.76) cobs/plant were recorded in the cultivar Azam. It could be argued that shaheen might be a mid seasons cultivar of maize and thus less affected by early or late sowing and therefore developed more no. cobs/plant.

**Days to maturity:** The data collected for days to maturity are presented in Table 1. Statistical analysis of the data revealed that days to maturity were significantly affected by sowing dates, similarly significant differences were noted among the cultivars. The interaction of both the variables was nonsignificant. The mean values of sowing dates showed that the maximum number of 116.9 days to maturity were recorded in the cultivars sown on 15th August while minimum number of 103.8 days were taken by cultivars sown on 15th July. Among the cultivars showed that the cultivar Sarhad white took maximum (124.1) days for maturity, followed by cultivar PS EV (115.8) days to maturity, while minimum number of (99.7) days to maturity were recorded in the cultivar Shaheen. Similar results were taken Grogan *et al.* (1959) who reported that days to maturity with delayed sown crop. The difference between days to maturity could be attributed to their hereditary character and environment effect of Peshawar.

**Grain yield (kg ha<sup>-1</sup>):** Data regarding grain yield (kg ha<sup>-1</sup>) are presented in Table 1. Statistical analysis revealed that both factors i.e., sowing dates and cultivars were significantly affected. The interactions of both the variables were observed significant. The mean values of sowing dates showed that maximum grain yield (4419 kg ha<sup>-1</sup>) was obtained from the plots sown on 15th July, while minimum yield (1306 kg ha<sup>-1</sup>) was obtained from the plot sown on 15th August. Gill and Mian (1964) also obtained similar results that late sowing decreased grain yield. Among the cultivars showed that maximum grain yield (3354 kg ha<sup>-1</sup>) was obtained of the cultivar Sarhad white, followed by cultivars Kissan and Azam (2931) and (2864 kg ha<sup>-1</sup>) respectively while minimum grain yield (2408 kg ha<sup>-1</sup>) was obtained of the cultivar PS EV. It is concluded from this study that the most suitable time of cultivation of late sown maize crop is 15th July. Cultivars Sarhad White produced maximum grain yield (3354 kg ha<sup>-1</sup>). Thus sowing date 15th July and cultivar Sarhad White are recommended for farmers.

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