Asian Journal of Plant Sciences

ISSN 1682-3974

science alert

ANSInet
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http://ansinet.com

Asian Journal of Plant Sciences
Volume 1 Number 2: 146-147, 2002

Effect of Sowing Dates on Yield of Maize Under Agroclimatic Condition of Kaghan Valley

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Abstract: A field experiment was carried out at Himalayan Agricultural Research Station (PARC),Kaghan during kharif season 2001 to study the effect of various sowing dates on maize. The crop was sown on 2nd, 9th, 16th, 23rd, 30th May, 6th and 13th June. Days to 50% silking, days to maturity, number of grains row^{-1},100 grain weight (gm) and grain yield (kg ha^{-1}) was significantly affected by various sowing dates while the effect on number of rows ear^{-1} was non significant. Delay in sowing substantially reduced days to 50% silking, days to maturity, number of grains row^{-1}, 100 grain weight (gm) and grain yield (kg ha^{-1}).Maximum grain yield (2988.89 kg ha^{-1}) was record in crops sown on 2nd May while minimum grain yield (780.44 kg ha^{-1}) was observed in crops sown on 13th June. Early sowing produced highest yield as compared to delay sowing.

Key words: Maize, *Zea mays*, sowing dates, yield components, grain yield, Kaghan valley, Pakistan

Introduction

Maize (*Zea mays*) is the third ranking most important crop of Pakistan. It is used as a staple food as well as a feed for live stock (Aziz *et al.*, 1992). It has got a valuable place as cattle fodder and poultry feed (Chaudry, 1983). Maize crop covers about 0 .944 mha area in Pakistan and gives grain production of 1.56m tonne (Agric. Stat. Pakistan, 2000). Majority of the farmers in Pakistan experiencing low maize yield (Tareen *et al.*, 1991). The unachieved yield potential of maize over 1980-1982 was 76.7% in Punjab and 77.81% in NWFP (Ali and Iqbal, 1984). Many factors are responsible for low yield of maize crop in Pakistan. One of the most important factor contributing to yield gap is sowing of maize on inappropriate sowing dates. For optimum production seed must be sown on proper time. Considerable reduction can occur in yield if the crop sown to early or too late (Chaudry, 1994). Ismail (1996) reported that early sowing of maize lead to an increased maize yield. Shafshak *et al.* (1995) concluded that a delay in sowing reduced a wide variety of plant and ear growth parameters and early sowing (1st May) gave the highest yield. Rizzardi *et al.* (1994) observed that delay in sowing decreased grain yield by 58.2% and also resulted in lower grain weight and number of grains ear^{-1}. Otequi *et al.* (1995) found that early and intermediate sowing tended to best utilize solar radiation and thus resulted high grain yield. Kim *et al.* (1999) reported that delay in sowing decreased days to silking. Hassan (1998) observed that delay in sowing decreased number of rows ear^{-1} ,number of grains row^{-1} ,number of grain ear^{-1} ,grain weight and grain yield of maize. Cantarero (2000) found that late sowing reduced number of ears plant^{-1} ,number of grains ear^{-1} and grain yield. Cha and Chol (1995) reported that delay in sowing reduced 1000 grain weight and grain yield by 94.6 and 87.1% respectively. Mascagni and Boquet (1996) studied the effect of sowing dates on performance of maize and concluded that delay in sowing reduced yield of maize.

Keeping in view the importance of sowing dates, this study was under taken to find out appropriate sowing date for higher yield of maize.

Materials and Methods

The experiment was conducted at Himalayan Agricultural Research Station (PARC), Kaghan during Kharif season 2001. Maize was sown on seven dates at weekly intervals i.e., 2nd, 9th, 16th, 23rd, 30th May, 6th and 13th June. The experiment was laid out in Randomized Complete Block Design (RCBD). Plot size was 5x4.5 m^2 with plant and row spacing of 20 and 75 cm respectively. The plots were thoroughly prepared and all agronomic practices were uniformly applied to each plot. The data regarding days to 50% silking, days to maturity, number of grain rows ear^{-1} ,number of grains row^{-1}, 100 grain weight (gm) and grain yield (kg ha^{-1}) were recorded and subjected to pooled analysis according to analysis of variance technique (Steel and Torrie, 1980).

Results and Discussion

Days to 50% silking: The results (Table 1) revealed that sowing dates had significantly affected days to 50% silking. Days to 50% silking decreased as the planting was delayed. Plots sown on 2nd May, recorded maximum days to 50% silking followed by plots seeded on 9th May while minimum days to 50% silking was observed in plots sown on 13th June. These results are quite in conformity with the findings of Kim *et al.* (1999) who reported that days to silking decreased with delay in planting.

Number of days to maturity: The data (Table 1) showed that sowing dates had a significant effect on number of days to maturity. Decreasing trend was observed in number of days to maturity with delay in sowing dates. Crop sown on 2nd May took maximum number of days to maturity followed by crops sown on 9th May while minimum days to maturity was observed in crops sown on 13th June. Early maturity of late sown crop might be due to short vegetative and reproductive period of late sown crop.

Number of rows ear^{-1}: Number of rows ear^{-1} was not significantly affected by sowing dates (Table 1), reflecting genetic stability of this parameter. However, early sowing produced maximum rows ear^{-1} and delayed sowing produced minimum rows ear^{-1}. These results are not in agreement with findings of Hassan (1998) who observed significant effect of sowing dates on number of rows ear^{-1}.

Number of grains row^{-1}: The results (Table 1) indicated that sowing dates had a significant effect on number of grains row^{-1}. Number of grains row^{-1} decreased with delay in sowing. Maximum number of grains row^{-1} was recorded in crops sown on 2nd May followed by crops sown on 9th May while minimum number of grains row^{-1} was observed in crops sown on 13th June. The maximum number of grains row^{-1} of earlier planting might be due to prolonged vegetative and reproductive period which enabled the plants to produce more dry matter which was efficiently utilized by prolonged grain filling period, resulting in higher number of grains row^{-1}. These results are in agreement with findings of Hassan (1998) who found that number of grains row^{-1} and other yield component of maize decreased with delay in sowing date.

100 grain weight (gm): The results (Table 1) showed that sowing dates had significantly affected 100 grain weight (gm). Decreasing trend was observed in 100 grain weight (gm) with delay in sowing date. Crops sown on 2nd May registered maximum 100 grain weight followed by crops sown on 9th May while minimum 100 grain weight was recorded in crops sown on last date 13th June. The heavier grains with earlier planting might be due to prolonged growing and grain filling period which enabled the plants to produce bold and plump grains. These results are in conformity with findings of Rizzardi *et al.* (1994), cha and chol (1995) who reported reduction in 1000 grain weight with delay in sowing date.

Grain yield (kg ha^{-1}): Grain yield (kg ha^{-1}) was significantly affected by sowing dates (Table 1). Grain yield reduction was noted with delay in sowing

Table 1: Days to 50% silking, days to maturity, number of row ear^{-1}, number of grains row^{-1} , 100 grain weight and grain yield as affected by sowing dates under agroclimatic condition of Kaghan valley

Sowing dates	Days to 50% silking	Days to maturity	Number of rows ear^{-1}	Number of grains row^{-1}	100 Grain Weight(gm)	Grain yield(kg ha^{-1})
2nd May	94.00a	132.70a	16.06	36.92a	24.00a	2988.89a
9th May	91.00ab	131.30a	14.64	35.67a	21.67ab	2466.67ab
16th May	87.00b	127.00b	14.6	35.51a	19.33bc	1991.67abc
23rd May	80.66c	120.70c	13.77	32.07ab	18.67bc	1883.33bcd
30th May	80.33c	114.70d	14.10	30.40b	17.67cd	1219.67cde
6th June	77.33c	112.30d	13.98	28.64b	15.00de	955.56de
13th June	71.66d	105.00e	13.51	27.53b	12.00e	780.44e

Means followed by different letters are significantly different at 5% level of probability.

dates. Crops sown on 2nd May recorded maximum grain yield followed by crops sown on 9th May while minimum grain yield was observed in crops sown on 13th June. Maximum grain yield with early sowing might be due to prolonged growing period, more number of grains row^{-1} and high grain weight with early planting. These results are in agreement with results of Chaudry *et al*. (1994), Ismail (1996), Shafshak *et al*. (1995), Otequi *et al*. (1995), Kim *et al*. (1999), Cantarero (2000) and Mascagni and Boquet (1996) who reported that grain yield of maize decreased with delay in sowing dates. It could be concluded from the research conducted that early sowing in May produced highest yield under agroclimatic condition of Kaghan valley.

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