EFFECT OF SOWING DATES ON GRAIN YIELD AND OTHER AGRONOMIC TRAITS OF DIFFERENT MAIZE INBRED LINES.

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ABSTRACT

Maize is the second important cereal crop of Nepal in terms of area, production and productivity. Delayed sowing of maize has resulted in lower than optimum yield, the experiment was aimed to determine the optimum sowing date for better production of maize. The experiment was conducted at National Maize Research Program, Rampur, Chitwan, Nepal to evaluate the effect of sowing dates on yield and other agronomic traits on maize inbred lines. Three maize inbred lines (RML 95, RML96 and RML86) were planted on five different dates (August 21, August 31, September 10, September 19 and September 29, 2016) using randomized complete block design with three replications. The results of the experiment showed that the days to fifty percent tasseling, days to fifty percent silking, plant height and yield were significantly affected by various planting dates. However the ear height, number of cob and the days to maturity were found to be insignificant. The inbred line RML 96 was found to yield highest grain yield whereas RML 95 was found lowest yielding line. The highest yield was obtained when inbred lines were planted on August 31 and the lowest yield on September 29. The delay in planting i.e. September 29 decreased grain yield. Therefore August 31 planting was suitable for inbred lines to maximize grain yield production.

Keywords: planting dates, maize inbred lines and yield.

INTRODUCTION

Maize-an important cereal crop, cultivated throughout the world. It is an important staple food crops and provide bulk of raw materials for the livestock and many agro-allied industries in the world. After rice, maize ranks second position in term of area and production. At present, the Maize cultivated area in Nepal is 891,583 ha with a total production of 2,231,517 metric tons and productivity of 2,503 kg/ha [1]. Seed yield of corn consist of different proportional contribution of the effective factor in all growth stage from emergence to maturity. In order to minimize negative effect of some abiotic and biotic stress on plant, sowing date can play a major role in determining the seed yield, quality ,seed germination and understanding whole phonological

stage in many region. Early and intermediate sowing date tend to utilize solar radiation for grain production.

Planting date is a cost less tool to improve the grain yield of maize. Each hybrid has an optimum sowing date, and the greater the deviation from this optimum (early or late sowing), the greater the yield loss [2] and [3]. Either early planting or late planting can result in lower yield because the probability exists that unfavorable climatic conditions can occur after planting or during the growing season. In order to minimize negative effect of some abiotic and biotic stress on plant, sowing date can play a major role in determining the seed yield, quality, seed germination and understanding whole phenological stages in many regions. Some researchers pointed out that specially, the effect on sowing date and plant density on corn expressed that delay in sowing reduces the number of kernels in corn [4].Hence an attempt was carried out to find the optimum planting date of winter maize gives highest yield potential along with other desirable character.

MATERIALS AND METHODOLGY

Two factorial (Factor A consist of 3 genotypes RML95, RML 96 and RML 85 and Factor B consist of five different planting date starting from August 21 in ten days interval). RCBD design was laid out at research block of National Maize Research Program, Rampur , Chitwan during Aug-Sep 2016.The station is situated at an altitude of 1740 meters above mean sea level in the south facing slopes at 27°37′ north and 84°25′ east coordinates. The experiment was planted by using crop geometry of 60 cm X 20 cm (RR X PP). Each genotype was planted in 4 rows in each plot of 7.2m X 4m area. Each treatment was replicated thrice for this experiment. Initially two seeds per hill were sown and later on one plant was thinned to maintain single plant per hill. Two border rows were also planted to avoid the border effect. Fertilizer was applied at the rate of 120:60:40 NPK kg/ha. Nitrogen was applied in two splits at knee-high and pre-tasseling/silking stages. Earthing up was done at knee high stage. All the data were obtained from central two row i.e. sample row from five randomly selected plant except for 50% tasseling, 50% silking and days to physiological maturity. Data were entered and analyzed by using GEN Stat v15.0.

RESULT AND DISCUSSION

Effect of planting dates and genotypes on days to 50% tasseling, days to 50% silking, and days to maturity.

Planting dates were found to have highly significant effects on days to 50% tasseling and the days to 50% silking. Maize sown on Sept 29 was observed to take longer duration for the 50% tasseling and 50 % silking to occur. Planting dates Sept 10 and Sept 19 were found to be significantly different in terms of days to 50% tasseling and 50% silking, with the later date requiring more days for 50% tassel and 50% silk to occur than the former one. Maize sown on Aug 21 and Aug 31 were found to be at par considering the days required for 50 % tasseling and 50% silking. The days to maturity were not found to be significant in terms of planting dates or maize inbred line.

Table 1: Effect of planting dates and genotypes on days to 50% tasseling, days to 50% silking, and days to maturity.

Treatment	Tasseling 50%	Silking 50%	Days To Maturity
A: Genotypes			
RML 95	61.93	65.33	129.8
RML 96	61.40	64.93	129.8
RML 86	63.07	66.13	196.5
F test	0.051 (NS)	0.201 (NS)	0.381 (NS)
$LSD_{(0.05)}$	1.354	1.358	111.5
B: Planting dates			
Aug 21	55.11 d	57.89 d	134.0
Aug 31	55.56 d	58.89 d	152.0
Sep 10	59.56 c	62.44 c	105.0
Sep 19	65.22 b	67.56 b	139.0
Sep 29	75.22 a	80.56 a	

			148.0
F test	<0.001 (**)	<0.001 (**)	0.446 (NS)
$LSD_{(0.05)}$	1.748	1.753	143.9
Interaction of A x B	NS	NS	NS
CV%	2.9	2.8	32.4

Effect of planting dates and genotypes on ear height, plant height, no. of cobs and grain yield

Significant differences were observed for plant height for different inbred lines and plant dates. RML 96 was found to attain highest plant height followed by RML95 and RML 86 respectively. Maize sown on Aug 31 was found to have more plant height which is statistically at par with the maize sown on Sept 19. Other planting dates, Aug 21, Sept 10, Sept 19 and Sept 29 were found to be at par in terms of plant height.

Highly significant differences were observed for ear height considering the genotypes. However, no significant differences were found for ear height for planting dates. RML 96 was found to have more ear height followed by RML 95 and RML 86 respectively. Planting dates didn't show the significant effects considering the ear height. Planting date Sept 10 was found to have more ear heights compared to other dates of planting. Planting dates and genotypes had insignificant effect on the number of cob.

Highly significant differences were found for grain yield considering the planting dates. Maize sown on Aug 31 were found to highest yielding whereas planting date Sept 29 was found to yield lower grain yields. Applying the optimum sowing date for maize cultivars has a positive effect on a grain yield and physiological index in maize. Delayed planting decreases the GDD requirements of corn, shortening the effective growing season and increasing the risk of exposure to lethal cold temperatures late in the season before grain maturation. Consequently, growers often must decide whether to switch to early maturity hybrids to minimize this risk [5]. The study revealed that both sowing date and cultivar had significant effect on grain yield in used maize cultivars under the field conditions. Similar results have been obtained where seeding dates and varieties significantly influenced 1000-kwt [5] and [6]).The interaction between sowing date and genotypes significantly affected grain yield. This result agree with finding by [7]that optimum planting date resulted in higher grain yield than early and late planting dates because of higher cob numbers and greater kernel numbers per plant. Highly significant difference was found in grain yield between the genotypes. RML 96 was found to be highest grain yielding genotype and RML 95 appeared to be the least yielding genotype.

Table no.2: Effect of planting dates and genotypes on ear height, plant height, no. of cobs and grain yield

Treatment	Plant Height	Ear Height	No. Of Cob	Grain Yield
A: Genotypes				
RML 95	133.8 b	63.07 b	41.60	2.421 b
RML 96	167.8 a	72.40 a	42.93	2.635 a
RML 86	125.9 c	56.80 c	44.40	2.565 ab
F test	<0.001 (**)	<0.001 (**)	0.445(NS)	0.035 (*)
$LSD_{(0.05)}$	5.87	2.231	4.445	0.1623
B: Planting dates				
Aug 21	138.2 b	61.67	42.89	2.340 c
Aug 31	149.2 a	64.22	41.11	3.228 a
Sep 10	140.4 b	66.11	44.44	2.534 bc
Sep 19	144.6 ab	64.44	45.67	2.577 b
Sep 29	140.0 b	64.00	40.78	2.024 d
F test	0.042 (*)	0.061 (NS)	0.363 (NS)	<0.001 (**)
$LSD_{(0.05)}$	7.58	2.880	5.738	0.2096
Interaction of A x B	NS	NS	NS	*
CV%	5.5	4.7	13.8	8.5

CONCLUSIONS

There was variation in yield and agro-morphological traits of maize inbred lines due to different planting dates. The inbred line RML 96 was found superior in term of grain yield. The highest

yield was obtained when inbred lines were planted on A ugust 31 a nd the lowest yield was obtained on September 29. Therefore, it can be concluded that the suitable sowing time was around late August whereas **the delay in planting i.e. late September decreased grain yield**.

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