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RESEARCH PAPER

Effects of sowing date on the growth and yield of maize cultivars (*Zea mays* L.) in spring season

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Abstract: A field experiment was conducted to study the effect of date of sowing on grain yield of spring maize at CCS Haryana Agricultural University, Regional Research station, Karnal during the year 2015, 2016 and 2017. Seven maize hybrids (HQPM 1, HQPM 4, HQPM 5, HM 9, HM 10, HM 11 and HM 12) were tested with combination of five sowing dates (last week of January, first week of February, second week of February, third week of February and fourth week of February). The delayed planting led to decreased days to 50 per cent silking and maturity in maize. The highest grain yield, returns over variable cost and B: C ratio were obtained when the crop sown in the first week of February followed by the last week of January, second week of February, third week of February and fourth week of February. The crop duration reduced to 114.3 from 126.4 days when crop planted in fourth week of February compared to planting in last week of January. The hybrid HM 10 gave the highest grain yield, returns over variable cost and B: C ratio followed by HM 11, HQPM 4 and HQPM 1. Thus, growing of HM 10 and planting in First week of February is the best option for higher yield and profit from spring maize in Haryana.

Keywords: Grain yield · Sowing date · Spring maize

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Introduction

Maize is one of the most important cereal crops next to wheat and rice in the world. Globally, it is known as queen of cereals because it has the highest genetic yield potential among the cereals. Worldwide, it was cultivated on 197.0 million hectares and recorded the production of 1,148 million tonnes of grains with an average grain yield of 5.82 t/ha (Anonymous, 2020a). In India, maize is grown on 9.9 million hectares with 30.0 million tonnes of production and average grain yield of 3.03 t/ha (Anonymous 2020b). Presently, India ranks 4th, 7th and 6th with respect to area, production and consumption of maize, respectively at the world level. Rice-wheat is major cropping system in Haryana, resistance in *Phalaris minor* in wheat crop and deteriorating of soil health are the major problems in paddy-wheat cropping system. Crop rotation/ diversification is must to way out these serious problems. The spring maize is sown in the months of February and March after harvesting of potato and is harvested in June. The sudden rise in temperature in the month of February during the past few years has adversely affected wheat grain filling; this problem can be solved by replacing late sown wheat with the spring maize in Haryana. In Haryana area of maize in *kharif* season is about 6,200 ha and production is about 17,000 tonnes and with average productivity of 2.74 t/ha (Statistical abstract of Haryana 2019–20), but area in spring maize is increasing every year and is grown on around 10,000–12,000 hectares with productivity of nearly 4.5 t/ha. During spring season, the maize has very high yield potential and it may yield up to 10.0 t/ha. In Haryana, short duration paddy-potato-spring maize is a profitable cropping system as compared to conventional rice-wheat system and it may be useful in

crop diversification by replacing rice-wheat system and overcoming the above said problems.

Materials and methods

A field experiment on the effect of date of sowing on grain yield of spring maize was conducted at Regional Research Station, Karnal during the year 2015, 2016 and 2017 to work out the performance of seven maize hybrids (HQPM 1, HQPM 4, HQPM 5, HM 9, HM 10, HM 11 and HM 12) with five sowing dates (last week of January, first week of February, second week of February, third week of February and fourth week of February). The experiment was laid out in split-plot design with three replications. The soil of experimental site was clay loam in texture, alkaline (pH 8.3) with electrical conductivity of 0.4 dS/m, low in organic carbon (0.28 per cent) and available phosphorus (P) (7 kg/ha) and medium in available potash (K) (193 kg/ha). The grain yield (t/ha), days to 50 per cent tasseling, days to 50 per cent silking days to maturity and economics as returns over variable cost and B: C ratio were recorded in this experimental studies.

Results and discussion

On three years mean basis, the highest grain yield was obtained when the crop was sown during first week of February (8.64 t/ha) followed by last week of January (8.27 t/ha), second week of February (8.09 t/ha), third week of February (7.34 t/ha) and the lowest in fourth week of February (6.60 t/ha). Dahmardeh (2012) observed that sowing dates affect the gain yield of spring maize, similar trend was observed for B: C ratio. The highest B:C ratio (1.9) was found when the crop was sown during first week of February followed by last week of January (1.8), second week of February (1.8), third week of February (1.6) and the lowest fourth week of February (1.5) (Table 2). Year-wise data also shows similar trend (Table 1). The hybrid HM 10 (8.29 t/ha) gave the highest grain yield followed by HM 11 (8.10 t/ha), HQPM 4 (7.98 t/ha) and HQPM 1 (7.85 t/ha). In other studies early sowing gave the highest yield of maize (Sherstha *et al.*, 2016). Similarly, Khanal *et al.*, (2019) observed that February 1 sown had higher yield than 2nd date of sowing i.e. February 12 as well as 3rd date of sowing i.e. February 23, so earlier planting in spring maize was the best than delayed sowing. The least grain yield was recorded in hybrid HM 12 (Table 2). Days to 50 per cent tasseling, 50 per cent silking and maturity were decreased with delayed sowing of spring maize crop. The crop duration reduced to 114.3 from 126.4 days when crop planted in fourth week of February compared to planting in last week of January. Among the hybrids tested days taken to 50 per cent tasseling was the highest in HQPM 5 (73.1) as compared to rest of the hybrids. Among hybrids tested, days to 50 per cent silking were delayed in HQPM 5 (76.4) as compared to all other hybrids. Among hybrids tested the maximum days to maturity were observed in HQPM 5 (123.0) as compare to rest of the hybrids (Table 2). Shrestha *et al.* (2018) observed that plant cultivar response differently with different planting date. Optimum planting date plays important role in optimum growth and thus helps in achieving higher yield for that crop season. Delayed planting greatly affects the growth, development and productivity of maize plants and lesser duration of crop leads to lower yield as duration is normally directly linked to higher crop productivity. It brings changes in weather parameters such as temperature, solar radiation, humidity during crop season that are responsible for changes in morphology, plant physiology and molecular level of plants. Thus, planting date has prime importance for crop production due to its variation in weather.

Table 1. Effect of different sowing dates and hybrids on grain yield on spring maize during 2015-2017

Treatment	Grain yield (t/ha)			Mean
	2015	2016	2017	
Sowing dates				
Last week of January	8.20	8.40	8.20	8.27
First week of February	8.51	8.80	8.60	8.64
Second week of February	8.02	8.22	8.02	8.09
Third week of February	7.41	7.61	7.00	7.34
Fourth week of February	7.01	7.20	5.60	6.60
LSD (P=0.05)	0.26	0.25	0.40	0.30
Hybrids				
HQPM 1	7.90	8.10	7.56	7.85
HQPM 4	8.01	8.21	7.71	7.98
HQPM 5	7.61	7.81	7.31	7.58
HM 9	7.62	7.82	7.32	7.59
HM 10	8.33	8.53	8.01	8.29
HM 11	8.15	8.33	7.83	8.10
HM 12	7.30	7.50	7.10	7.30
LSD (P=0.05)	0.39	0.40	0.40	0.35

Table 2. Effect of different sowing dates and hybrids on grain yield, days to 50% tasseling, days to 50% silking, days to maturity and economics of different hybrids (mean of 2015-2017)

Treatment	Grain yield (t/ha)	Days to 50% tasseling	Days to 50% silking	Days to maturity (Nos.)	Return over variable cost (Rs./ha)	B:C
Sowing dates						
Last week of January	8.27	83.0	86.0	126.4	51,031	1.8
First week of February	8.64	79.5	83..0	123.3	56,269	1.9
Second week of February	8.09	71.0	72.3	120.2	48,763	1.8
Third week of February	7.34	65.0	67.4	117.2	38,779	1.6
Fourth week of February	6.60	58.1	61.2	114.3	30,028	1.5
LSD (P=0.05)	0.30	0.3	0.3	0.6	–	–
Hybrids						
HQPM 1	78.5	72.3	75.1	121.2	45,383	1.7
HQPM 4	79.8	72.4	75.3	121.0	47,320	1.8
HQPM 5	75.8	73.1	76.4	123.0	42,013	1.7
HM 9	75.9	70.1	73.2	118.5	42,065	1.7
HM 10	82.9	72.0	75.0	120.0	51,600	1.8
HM 11	81.0	72.4	75.4	121.0	49,150	1.8
HM 12	73.0	68.3	71.3	118.2	37,288	1.6
LSD (P=0.05)	4.0	0.4	0.4	0.4	–	–

Conclusion

The highest grain yield (8.64 t/ha), returns over variable cost and B: C ratio was recorded in spring maize crop when it was sown during first week of February followed by last week of January (8.27 t/ha) and second week of February (8.09 t/ha) while these were the highest with HM 11 hybrid.

References

Anonymous (2020a). FAO Stat 2020, Food and Agriculture Organization of United Nation.

Anonymous (2020b). Statistical abstract of Haryana (2019-20), Department of economic and statistical analysis, Haryana.

Dahmardeh, M. (2012). Effects of sowing date on the growth and yield of maize cultivars (*Zea mays* L.) and the growth temperature requirements. *African Journal of Biotechnology,* **11**(61): 12450–12453.

Khanal, P., Karn, R., Chhetri, P. B., Karki, S. & Sah, S. K. (2019). Response of maize varieties to sowing dates in inner *Tarai* region, Dang, *Nepal. Malaysian Journal of Halal Research Journal (MJHR)*, **9**(2): 27–31.

Shrestha, J., Kandel, M. & Chaudhary, A. (2018). Effects of planting time on growth, development and productivity of maize (*Zea mays* L.). *Journal of Agriculture and Natural Resources,* **1**(1): 43–50.

Shrestha, U., Amgain, L. P., Karki, T. B., Dahal K. R. & Shrestha J. (2016). Effect of sowing dates and maize cultivars in growth and yield of maize along with their agro-climatic indices in Nawalparasi, Nepal. *Journal of Agric Search,* **3**(1): 57–62.