The Pharma Innovation Journal 2021; 10(6): 1179-1181

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2021; 10(6): 1179-1181

www.thepharmajournal.com
Received: 18-03-2021
Accepted: 30-05-2021

Karishma Singh
M.Sc., Scholar, Department of Agronomy NAI, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh, India

Vikram Singh
Associate Professor, Department of Agronomy NAI, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh, India

Dhananjay Tiwari
Ph.D., Scholar, Department of Agronomy NAI, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh, India

Corresponding Author:
Karishma Singh
M.Sc., Scholar, Department of Agronomy NAI, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh, India

Response on growth and yield of maize (*Zea mays* L.) hybrids under agro climatic conditions of Prayagraj (U.P.)

Karishma Singh, Vikram Singh and Dhananjay Tiwari

Abstract
A field experiment was conducted during *kharif* season of 2020 at experimental field of the Crop Research Farm, Department of Agronomy, SHUATS, Prayagraj (UP) to determine the "Response on growth and yield of maize (*Zea mays* L.) hybrids under agro climatic conditions of Prayagraj (U.P.)". The soil of experimental site was sandy loam in texture, nearly neutral in soil reaction. The experiment consists of different hybrids *Viz.*, KM-1, KM-2, KM-3, KM-4, KM-5, KM-6, KM-7, KM-8, KM-9 and KM-10. It was carried out through a statistical design of Randomized Block Design (RBD) with three replications. Full dose of phosphorus and potassium fertilizers were applied as basal while, half of nitrogen was applied as basal and remaining half was applied 25, 45 days after sowing. Report of study indicate that, among different hybrids KM-8 produced significantly higher plant height (207.50 cm), number of leaves per plant (11.80), dry weight/plant (75.20g), number of cobs per plant (1.67), length of cob (13.90cm), number of rows per cob (13.20), number of grains per row (32.30), seed index (27.70g), Seed yield (7.69 t/ha) and stover yield (21.1t/ha). However, the hybrid KM-8 also showed significantly minimum number of days to 50% Tasselling (48.20 days).

Keywords: Hybrids, yield attributes, growth attributes

Introduction
Maize (*Zea mays* L.) is one of the most important food grains, industrial and versatile emerging crops having wider adaptability under varied agro-climatic conditions. Globally, maize is known as "queen of cereals" because it has the highest genetic yield potential among the cereals in the world both as food for man and feed for animals. Maize is the third most important food grain in India after wheat (*Triticum aestivum* L.) and rice (*Oryza sativa* L.). It has a very high yield potential (22 t ha^{-1}) (Anonymous, 2013) [1]. The rapid climate changes are imperative to evaluate and find ways that suite to maize-specific varieties either hybrids or varieties with appropriate sowing dates to avoid the critical growth stages from the stresses due to climate condition. Sowing at proper time and selection of good verity are the most important factor cropping system. Its grain has high nutritive value containing 66.2% starch, 11.1% protein, 7.12% oil and 1.5% minerals. Moreover, it contains 90 mg carotene, 1.8 mg niacin, 0.8 mg thiamin and 0.1 mg riboflavin per 100 g grains (Hasan *et al.* 2018) [4]. In general local varieties of Uttar Pradesh failed to give higher yields in comparison with hybrids. Thus there is a great need for replacing local varieties with hybrids of different groups. Hybrid maize cultivars possessed a prominent role in enhancing the production and quality of maize which is used for feed, fiber and aesthetic value. These not only helped with their direct contribution but also created a way for adoption of other components of production. These single cross hybrids possess certain advantages like increased grain yield potential, abiotic and biotic stress tolerance, early maturity etc. These advantages had led to cross many barriers faced by farmers in past (Anonymous, 2015) [2].
Adoption of modern and various varieties of maize, characterized by higher genetic potential, and adoptability to various climatic changes with a view of enhancing yield level of maize. There is no specific kind of organized system or well structured system for documenting the proper crop varieties and their area coverage in India. Various attempts are done to fulfill such knowledge gaps by documenting the major maize varieties and estimating the adoption rates of certain genotypes to different agro- climatic zones.

Material and Method

The field experiment was conducted during the *kharif* season of 2020 at the Crop Research Farm, Department of Agronomy, Sam Higginbottom University of Agriculture, Technology and Science (SHUATS), Prayagraj (UP). The Crop Research Farm is situated at 25.57° N latitude, 87.19° E longitude and at an altitude of 98m above mean sea level. The experiment consists of different hybrids *viz.*, KM-1, KM-2, KM-3, KM-4, KM-5, KM-6, KM-7, KM-8, KM-9 and KM-10. It was carried out through a statistical design of Randomized Block Design (RBD) with three replications. During the growing season, the mean weekly maximum and minimum temperature, relative humidity and rainfall were 35.73 °C, 26.25 °C, 84.75%, 50.03% and 6.08 mm respectively. Maize was sown at a spacing of 60 cm X 20 cm using seed rate of 20 kg/ha which were supplied by UPCAR. The field was uniformly irrigated before four day of sowing and further irrigated based on treatment. The RDF i.e Nitrogen (120 kg/ha) was applied through urea and DAP in two equal splits, first as basal and remaining dose at 45 DAS (days after sowing), whereas full dose P_2O_5 (80 kg/ha) and full dose of K_2O (60 kg/ha) were applied through DAP and MOP and $ZnSO_4$ (25 kg/ha). Observations on growth parameters, yield attributes and yield of maize hybrids, was recorded and their significance was tested by the variance ratio. (F-value) at 5% level (Gomez and Gomez, 1984). Relative economics was calculated as per the prevailing market prices of the inputs and produced during *kharif* season.

Result and Discussion

Growth parameter

Growth parameters of maize hybrid *viz*, Plant height (cm), Leaves per plant (No.), Days to 50% tasseling (No.), Days to 50% silking (No.), Plant dry weight (g/plant), Crop Growth Rate (g/m^2/day), Relative Growth Rate (g/g/day) varied due to different maize hybrid are presented in Table 1. The maize hybrid KM-8 resulted in higher plant height (207.50 cm) where hybrids KM-1 (207.1 cm), KM- 9 (202.6 cm), KM-10 (201.5 cm) and KM-3 (195.3 cm) were found statistically at par with KM-8. For Leaves per plant (No.) KM-8 (11.80) recorded the highest no. of plant leaves where KM-1 (11.5), KM-3 (11.0), KM-4 (10.5), KM-7 (10.5), KM-9 (11.7) and KM-10 (11.2) were found to be statistically at par with KM-8. KM-8 recorded highest plant dry weight (75.20 g/plant) where hybrids KM-1(75.1 g), KM-2 (73.6 g), KM-3 (74.2 g), KM-9 (73.8 g) and KM-10 (74.0 g) were found statistically at par with KM-8. At 60-80 DAS, the maximum crop growth rate (4.29 g m^{-2} day^{-1}) was observed by hybrid KM-5 where hybrid KM-2 (3.04 g m^{-2} day^{1}) was found statistically at par with KM-5 and the minimum crop growth rate was recorded by the hybrid KM-1 (0.92 g/m^2/day). At 60-80 DAS, crop growth rate was found to be significant. The maximum relative growth rate (0.008 g/g/day) was observed by hybrid KM-5 where hybrids KM-2 (0.005 g/g/day) and KM-3 (0.004 g/g/day) were found statistically at par with KM-5. The hybrid KM-8 showed highest days to 50% tasseling (48.2), where the hybrids KM-6 (46.4) and KM-9 (46.1) were statistically at par with the hybrid KM-8. The hybrid KM-5 showed highest days to 50% silking (51.5), where the hybrids KM-8 (49.9) and KM-9 (49.0) were statistically at par with the hybrid KM-5.

The differential growth with respect to plant height, leaves per plant, plant dry weight among the varieties may be attributed to differences in genetic characterization of the individual varieties, including rapid growth rates, tallness or shortness of species (Pal and Bhatnagar, 2012) [6].

Table 1: Evaluation of Growth parameters of maize hybrids under agro climatic conditions of Prayagraj (U.P.)

Hybrids	Growth attributes (at 80DAS)						
	Plant height (cm.)	No. of Leaves/plant (No.)	Dry weight/plant (g)	Crop growth rate (g/m^2/day) (60-80 DAS)	Relative growth rate (g/g/day) (60-80 DAS)	Days to 50% Tasseling	Days to 50% Silking
KM-1	207.1	11.5	75.1	1.43	0.002	44.0	47.9
KM-2	183.7	10.4	73.6	3.04	0.005	44.7	48.7
KM-3	195.3	11.0	74.2	2.17	0.004	44.6	48.3
KM-4	189.1	10.5	72.3	1.38	0.002	45.3	49.2
KM-5	164.9	9.5	70.0	4.29	0.008	44.2	51.5
KM-6	182.7	10.3	70.7	1.42	0.002	46.4	47.5
KM-7	184.6	10.5	71.6	1.24	0.002	44.4	47.9
KM-8	207.5	11.8	75.2	0.92	0.001	48.2	49.9
KM-9	202.6	11.7	73.8	1.15	0.002	46.1	49.6
KM-10	201.5	11.2	74.0	1.94	0.003	43.8	47.2
S.Em(+)	6.001	0.43	0.94	0.61	0.001	0.78	0.73
CD (P= 0.05)	17.83	1.29	2.80	1.84	0.003	2.34	2.20

Yield attributes and Yield

Yield attributes such as Cobs per plant (No.), Cob length (cm), Grain row/cob (No.), Number of grain/ row (No.) and Seed index (g) varied due to different maize hybrids are presented in Table 2. The hybrid KM-8 was recorded with higher yield attributes *viz.* Cobs per plant (No.) (1.67), Cob length (13.9 cm), Grain row/cob (No.) (13.2), Number of grain/row (No.) (32.3), Seed index (27.7 g). KM-8 was recorded with small round seed size and yellow seed colour. Different genetic makeup has resulted in increases yield attributes like Cobs per plant, Number of grains per row etc. which ultimately resulted in increase in seed yield (Kumar and Kandel, 2020). KM-8 was also recorded with highest seed yield (7.69 t/ha), stover yield (21.1) and biological yield (28.79 t/ha).

Table 2: Evaluation of yield attributes and yield of maize hybrids under agro climatic conditions of Prayagraj (U.P.).

Hybrids	Yield attributes and yield							
	Number of Cobs/plant (No.)	Cob length (cm)	Number of Rows/cob (No.)	Number of Grains/row (No.)	Seed index (g)	Seed yield (t/ha)	Stover yield (t/ha)	Biological yield (t/ha)
KM-1	1.56	13.3	12.9	30.7	27.3	7.52	20.77	28.29
KM-2	1.22	12.5	10.9	23.9	23.3	6.47	17.30	23.77
KM-3	1.22	12.6	12.6	26.6	26.0	6.82	19.10	25.92
KM-4	1.22	13.3	12.1	26.0	24.0	6.61	18.73	25.34
KM-5	1.00	12.1	12.3	28.6	25.3	6.30	16.67	22.97
KM-6	1.44	12.0	12.0	28.1	24.7	6.44	17.20	23.64
KM-7	1.33	12.7	11.9	25.8	23.0	6.55	18.60	25.15
KM-8	1.67	13.9	13.2	32.3	27.7	7.69	21.10	28.79
KM-9	1.44	13.1	12.4	29.0	27.0	7.21	20.33	27.54
KM-10	1.22	13.2	12.1	28.8	26.7	6.97	19.67	26.64
S.Em(±)	0.11	0.30	0.36	0.65	0.48	0.14	0.12	0.27
CD (P= 0.05)	0.34	0.89	1.09	1.94	1.45	0.43	1.38	0.81

References

1. Anonymous. Department of Agricultural Government of UP, Area production and productivity of different crops in India 2013.
2. Anonymous. Performance of private sector maize hybrids (*Zea mays* L.) under different agroclimatic zones of U.P. Uttar Pradesh Council of Agricultural Research 2015.
3. Gomez KA, Gomez AA. *Statistical procedures for agricultural research*. 2nd edition 1984.
4. Hasan MR, Rahman MR, Hasan AK, Paul SK, Alam AHMJ. Effect of variety and spacing on the yield performance of maize (*Zea mays* L.) in old Brahmaputra floodplain area of Bangladesh Archives of Agriculture and Environmental Science 2018;3(3):270-274.
5. Kumar S, Kandel BP. Performance evaluation of maize (*Zea mays* L.) hybrids in inner-plains of Nepal. *Heliyon* 2020;1:1-6.
6. Pal MS, Bhatnagar A, Singh V, Bisht AS. Growth dynamics, productivity and economics of quality protein maize (*Zea mays* L.) under varying plant density and nutrient management practices. Madras Agriculture Journal 2012;99(3):73-76.