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Evaluation of growth and yield of maize (*Zea mays* L.) hybrids under agroclimatic conditions of Prayagraj, U.P.

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Abstract
A field experiment was conducted during *kharif* season of 2021 at Crop Research Farm, Department of Agronomy, SHUATS, Praygaraj, (U.P) to evaluate the "Performance of Maize Hybrids Under Different Agroclimatic Conditions of Prayagraj, U.P." Soil texture of experimental site was sandy loam, nearly neutral in soil reaction having pH 7.8 and the available organic carbon percentage is 0.35%. The experiment was laid out through a statistical design of Randomized Block Design (RBD) with three replications consists of 20 different hybrids. Hybrid UM-2 recorded significantly highest plant height (cm), number of leaves/plant, dry weight/plant, number of cobs/plant, number of rows/cob, seed yield, stover yield and harvest index. However, the Hybrid UM-2 also showed significantly minimum number of days to 50% silking, 50% tasseling and days to maturity.

Keywords: Hybrids, growth attributes, yield attributes, randomized block design, Prayagraj

Introduction
Maize (*Zea mays* L.) known as "Queen of cereals" is considered one of the most important food grains in India after rice and wheat, it ranks fifth and third in area and production respectively in our country. Though it is consumed all over the country but it is a staple food of people in hilly and sub mountain area of North India. It is extensively grown in Uttar Pradesh, Bihar, Rajasthan, Madhya Pradesh etc. (Dayanand and Jain, 1994) [3].
In Uttar Pradesh it is considered third most important crop. The nutrient content of maize is crude protein 7.6%, crude fibre 2.3%, crude fat 3.6%, starch 63.8%, Total sugar 1.7%, Gross energy 3840 kcal/kg. (Afzal *et al.* 2017) [1]. It proficiently utilizes solar energy and has great potential for higher yield, and called as "Miracle Crop". It is the crop of the future as mentioned by the Father of Green Revolution, Renounced Nobel Laureate Dr. Norman E. Borlaug. Maize plays a significant role in ensuring food security and nutritional security through quality protein (Rawool, 2004) [11]. In India, area and production of maize are about 9.23 million hectares and 23.73 million tonnes respectively, having average productivity about 2564 kg ha^{-1}. Given that in Uttar Pradesh maize accounts for 7.36 lakh hectare area with the production of 12.86 lakh ton and productivity of 18.47 kg/ha (Department of Agricultural Government of UP 2013). Public sector varieties need to be brought under an efficient seed production system as well as an efficient transfer of hybrid maize cultivation technology to enhance the maize yield levels and production in our country. (Dahmardeh M. 2010) [2].
Local varieties of Uttar Pradesh have failed to obtain higher yield compared to other hybrids. So, the need arises to replace local varieties with hybrids of different groups. Hybrid's maize plays an important role in enhancing the production, productivity and quality of maize which is used for feed, fiber and fodder purpose. Single cross hybrids have certain advantages like high grain yield potential, biotic and abiotic stress tolerance, early maturity, and more disease resistance capacity.
Considering the requirements of farmers, higher grain yield and disease resistant hybrids production needs to be focused. As well as their evaluation and performance under different agroclimatic conditions of Prayagraj, U.P. need to be carefully estimated and observed. This helps farmers in choosing better performing and yielding hybrid variety.

Materials and Methods
The experiment was conducted at the Crop Research Farm, Department of Agronomy,

SHAUTS, Prayagraj, U.P. during *Kharif* season of 2021. The CRF is situated at 25.57º N latitude, 87.19º E longitude and at an altitude of 98m above mean sea level. The experiment is conducted on 20 different hybrids. *viz*., UM-01, UM-02, UM-03, UM-04, UM-05, UM-06, UM-07, UM-08, UM-09, UM-10, UM-11, UM-12, UM-13, UM-14, UM-15, UM-16, UM-17, UM-18, UM-19, UM-20. The experiment was laid out in Randomized Block Design (RBD) with twenty hybrids replicated thrice. The experiment comprising of 20 different maize hybrids, *viz*., T1: UM-1, T2: UM-2, T3: UM-3, T4: UM-4, T5: UM-5, T6: UM-6, T7: UM-7, T8: UM-8, T9: UM-9, T10: UM-10, T11: UM-11, T12: UM-12, T13: UM-13, T14: UM-14, T15: UM-15, T16:UM-16, T17: UM-17, T18: UM-18, T19: UM-19, T20: UM-20. The experimental soil is sandy loamy in texture with the available nitrogen (243 kg/ha), available phosphorus (20.10 kg/ha) and available potassium (105.00 kg/ha). Maize was sown at ta spacing of 60 cm × 20 cm using seed rate of 20 kg/ha which were supplied by UPCAR. During the growing season, the mean weekly maximum and minimum temperature, relative humidity and rainfall were 35.71ºC, 26.71ºC, 85.14%, 77.10% and 3.05 mm respectively. 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), full dose Phosphorus (60 kg/ha) whereas full dose of Potassium (40 kg/ha) were applied through DAP and MOP and Zinc sulphate (5.5 kg/ha). The observations on growth attributing parameters were recorded from five randomly tagged plants from each plot at various growth stages whereas yield attributing parameters were recorded at harvesting stage from net plot and their significance was tested by the variance ratio (F-value) at 5% level (Gomez and Gomez, 1984). Significant difference among the treatment mean was verified against the critical difference at 5% level of significance. Relative Economics were also calculated according to the prevailing market prices of inputs during *kharif* season.

Results and Discussion

Growth parameters

Crop growth parameters in Maize were measured in terms of Plant height (cm), leaves per plant (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. During research trial, significantly higher Plant height (218.48 cm), Number of leaves per plant (12.80) and Plant dry weight (91.18 g/plant) was recorded by hybrid UM-2. Plant height is the most important traits taken into consideration during breeding programs. Because of fertilizer responsive and resistant to lodging semi-dwarf type plant variety are selected. (Muchie and Fentie 2016) [9].

Days to 50% tasseling and days to 50% silking

The data on mean number of days taken for 50% tasseling and 50% silking plant as influenced by different hybrids are presented in Table 1. The least number of days taken to 50% tasseling and 50% silking was recorded by hybrid UM-2. Similar results have been obtained by (Naveena *et al*., 2021) [7] and Shingne *et al*., 2018) [13].

Table 1: Evaluation of growth attributes of maize hybrids under different agroclimatic conditions of U.P

	AT 80 DAS	AT 80 DAS		At 60 DAS			
Hybrids	**Plant height (cm)**	**Leaves/plant (No.)**	**Dry weight (g/plant)**	**CGR 40-60 DAS (g/m2/day)**	**RGR 40-60 DAS (g/g/day)**	**Days to 50% Tasseling**	**Days to 50% Silking**
UM-1	203.48	12.20	66.08	12.74	0.031	52.00	55.33
UM-2	218.48	12.80	74.00	13.23	0.028	44.67	48.67
UM-3	196.23	11.87	66.71	12.71	0.031	51.67	54.00
UM-4	188.08	11.40	66.34	12.33	0.030	51.00	54.67
UM-5	195.85	11.13	66.34	12.00	0.029	50.00	54.67
UM-6	182.19	11.00	61.47	11.60	0.030	49.00	53.33
UM-7	182.26	11.33	67.55	12.40	0.029	49.33	53.33
UM-8	202.26	11.07	65.97	12.52	0.030	50.00	52.00
UM-9	217.89	12.20	68.38	12.23	0.028	47.33	51.67
UM-10	193.13	11.93	68.38	13.61	0.033	50.00	54.00
UM-11	187.68	12.40	71.56	13.41	0.030	49.33	55.67
UM-12	204.23	12.80	72.69	14.23	0.032	47.33	50.67
UM-13	199.49	12.53	68.08	12.65	0.030	49.33	53.33
UM-14	202.12	11.60	71.08	13.08	0.029	49.00	53.67
UM-15	199.89	12.33	67.70	13.27	0.032	50.67	53.67
UM-16	208.85	11.80	71.96	13.41	0.030	48.67	55.33
UM-17	196.48	11.00	68.00	12.26	0.028	48.00	53.33
UM-18	207.73	11.67	70.08	12.73	0.029	47.33	50.67
UM-19	217.05	11.87	67.47	12.94	0.031	47.33	51.33
UM-20	194.51	11.93	67.41	13.00	0.031	49.67	53.33
F test	S	S	S	NS	NS	S	S
S.Em (±)	4.59	0.42	1.85	0.79	-	0.87	0.79
CD (p=0.05)	13.13	1.19	5.30	2.27	-	2.50	2.26

Yield parameters

The observations related to yield and contributory attributes *viz.*, Cob length (cm), Cobs per plant (No.), Grain rows/ cob (No.), Number of grains/row (No.), Seed index (g), Seed yield (t/ha), stover yield (t/ha) and harvest index (%) varied due to Hybrids are shown in Table 2. Hybrid UM-2 recorded higher cob length (16.91 cm), no. of cobs/plant (2.13), no. of rows/cob (15.60), no. of grains/row (32) and seed index (32.33 g). The differences between maize hybrid in relation to growth and yield attributes were also reported by (Ramchadrappa *et al*., 2007) and (Singh *et al*., 2013) [5, 6].

Yields

The data on seed yield, stover yield and harvest index is presented in table 2. UM-2 hybrid has recorded significantly maximum seed yield (8.62 t/ha), stover yield (21.84 t/ha) and harvest index (33.38%) among all other hybrids in the same agro-climatic zone. Kumar and Kumar (1997) while conducting experiment on five maize lines reported that plant height was positively correlated with Seed yield.

Table 2: Evaluation of yield attributes of maize hybrids under different agroclimatic conditions of U.P

Hybrids	Cob Length(cm)	Cobs/plant (No.)	Grain rows/cob(No.)	Grains/row (No).	Seed index (g)	Seed Yield (t/ha)	Stover Yield (t/ha)	Harvest Index (%)
UM-1	15.40	1.87	13.13	26.67	27.67	7.58	18.44	25.76
UM-2	16.91	2.13	15.60	32.00	32.33	8.62	21.84	33.38
UM-3	15.33	1.60	14.00	30.60	27.67	7.38	20.70	26.14
UM-4	16.01	1.67	13.07	24.33	27.00	6.22	18.95	24.79
UM-5	15.93	1.47	12.93	31.47	26.00	7.51	17.02	30.57
UM-6	13.81	1.13	12.20	24.00	25.33	5.49	12.78	27.02
UM-7	14.60	1.73	12.47	27.47	31.00	6.17	17.33	26.26
UM-8	15.73	1.73	12.87	26.80	28.00	6.38	14.22	30.95
UM-9	16.27	1.73	13.80	28.00	28.00	6.89	16.35	29.67
UM-10	14.64	1.40	14.13	25.67	30.00	6.78	19.17	26.34
UM-11	15.37	1.47	13.27	27.73	26.33	5.55	20.83	21.09
UM-12	16.89	1.80	15.33	31.73	32.00	8.27	21.47	30.96
UM-13	15.64	1.47	14.20	29.07	28.67	7.35	17.56	29.52
UM-14	14.57	1.67	13.60	28.53	27.67	5.96	19.10	23.79
UM-15	16.39	1.67	13.93	24.80	27.67	6.80	15.67	30.30
UM-16	15.24	1.47	13.00	28.27	29.67	6.67	13.47	28.67
UM-17	16.51	1.27	14.73	30.33	26.00	5.53	14.95	30.15
UM-18	15.66	1.47	14.47	28.00	25.67	5.54	15.68	26.17
UM-19	16.28	1.53	14.80	29.60	30.33	8.04	20.72	28.32
UM-20	16.62	1.60	13.67	29.13	31.33	5.77	20.07	22.34
F test	NS	S	S	NS	NS	S	S	S
S.Em (±)	0.78	0.10	0.46	1.87	1.84	0.39	0.78	1.53
CD (p=0.05)	-	0.29	1.31	-	-	1.12	2.24	4.38

Seed shape and seed colour

Most of the seeds were bold and yellow in color and remaining grains were orange in colour and round in shape. UM-2 hybrid was yellow in color and bold in shape.

Economics

The data pertaining to economics was calculated by using following formulas given below. hybrid UM-2 recorded with higher gross returns (2,19,163.00 INR/ha), net returns (1,65,568.00) and benefit cost ratio (3.09).

Gross return (₹/ha) = Income from grain + Income from stover

Net return (₹/ha) = Gross return (₹/ha) – Cost of cultivation (₹/ha)

$$\text{B: C ratio} = \frac{\text{Net Returns (₹/ha)}}{\text{Cost of cultivation (₹/ha)}}$$

Conclusion

Climate specific evaluation of maize hybrids reveals the most productive and adaptive hybrid the hybrid which has recorded highest yield and maximum profit is regarded as superior hybrid among all. The experiment results indicates that hybrid UM-2 found to be more promising and profitable maize hybrid in agro-climatic condition of Prayagraj by obtaining highest growth attributes, yield attributes and economics. When compared to other hybrids under agroclimatic conditions of Prayagraj, U.P.

Future Scope

Since the findings were based on one season further trials are to be done to confirm the above obtained results from this experimental research trial.

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References

1. Afzal US, Anjum MM, Usman H, Khan M, Iqbal OM, Khan K. Seed yield performance of different maize (*Zea mays* L.) genotypes under agroclimatic conditions of Haripur. International Journal of Environmental Sciences and Natural Resources, 2017, 5(5).
2. Dahmardeh M. The effect of sowing date and some growth physiological index on grain yield in three maize hybrids in South-Eastern Iran. Asian Journal of Plant Sciences. 2010;9(7):432-436.
3. Dayanand, Jain OP. Rabi maize cultivation for enhanced production. India Fm. 1994;43(10):11-12.
4. Gomez KA, Gomez AA. Statistical procedures for agriculture research work second edition. An International Rice Research Institute Book, A wiley, *inter science publication*, John Wiley and Sons, New York, 1984.
5. Ramachandrappa BK, Nanjappa HV, Soumya TM.

Sensory parameters, nutrient contents, yield and yield attributes of baby corn varieties as influenced by stages of harvest. Mysore Journal of Agricultural Sciences. 2007;41(1):1-7.
6. Singh MV, Kumar N, Mishra BN. Integrated use of nitrogen and FYM on yield, nutrient uptake and economics of maize in eastern Uttar Pradesh. Annals of Plant and Soil Research. 2013;15(2):128-130.
7. Kadiyala Naveena, Singh V, Tiwari Dhananjay, George Shruti, Scholar M. Evaluation of growth and yield of maize (*Zea mays* L.) hybrids under agro-climatic conditions of Prayagraj, U.P. 2021;10(5):831-833.
8. Kumar A, Kumar D. Correlation studies in maize (*Zea mays* L.). Annals of Agri-Bio Research. 1997;13(2):271-273.
9. Muchie A, Fentie D. Performance Evaluation of Maize Hybrids (*Zea mays* L.) In Bahir Dar Zuria District, North Western Ethiopia. Int. Inv. J Agric. Soil Sci. 2016;4(3):37-43
10. Rawool HV. Effect of integrated nutrient management on yield and nutrient balance in maize (*Zea mays* L.). Indian J Agril. Sci. 2004;46(4):698-701.
11. Shingne Sunil, Asewar Bhagwan, Kadam Yadav. Performance of Maize Hybrids (*Zea mays* L.) under Different Sowing Windows. International Journal of Current Microbiology and Applied Sciences, 2018, 7(10).