AGRONOMIC PERFORMANCE OF SINGLE CROSS MAIZE (ZEA MAYS L.) HYBRIDS UNDER ZONE 3 OF KARNATAKA

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ABSTRACT

Hybridization plays a vital role in increasing the production and productivity of maize. Evaluating maize hybrids in a specific environment is a key task for the hybrid maize program. The objective of this study was to identify a promising maize hybrid for zone 3 of Karnataka. eight maize hybrids were evaluated including checks in a randomized complete block design (RCBD) with three replications during the Kharif season of 2020 –21 at the Agricultural Research Station, Arabhavi field of University of Agricultural Sciences, Dharwad. The results suggested that among tested hybrids, PAC 745 Gold (12.021 tons ha⁻¹) of UPL Limited (Advanta Limited), Hyderabad, followed by MRM 4070 (11.514 tons ha⁻¹) of Mahyco Co. Jaina compared with the National Check, NK – 6240 (11.270 tons ha⁻¹) and private check CP – 818 (11.055 tons ha⁻¹). Hence the study suggested PAC 745 Gold of UPL Limited (Advanta Limited), Hyderabad and MRM 4070 of Mahyco Co. Jaina as promising hybrids for the maize growers in the zone 3 of Karnataka.

KEYWORDS: Performance, Maize hybrids, Evaluation, hybrids, Zone 3

Received: Dec 04, 2020; **Accepted:** Dec 24, 2020; **Published:** Dec 31, 2020; **Paper Id:** IJASRDEC202019

INTRODUCTION

Maize is called as queen of cereal due to its great importance in human, animal diet and high yielding ability. It efficiently utilizes solar energy and has immense potential for higher yield, and called as “Miracle Crop”. It is the crop of the future as mentioned by the Father of Green Revolution, Renowned Nobel Laureate Dr. Norman E. Borlaug. Maize plays a vital role in ensuring food security as well as nutritional security through quality protein (Rawool, 2004). 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. In Maharashtra, the area and production of maize is about 1.35 million hectares and 4.40 million tonnes production with the productivity of 3500 kg ha⁻¹ (Anonymous, 2015). It ranked next to rice, wheat and sorghum in respect of area and production. 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, Karnataka, Maharashtra, Bihar, Rajasthan, Madhya Pradesh etc. (Dayanand and Jain, 1994). Climate variability has a direct influence on the quantity and quality of maize production as water shortage combined with thermal stress adversely affect maize productivity. To deal with the impact of climate change, the potential adaption strategies are changing sowing dates; crop diversification, integrated farming system, etc. Optimum sowing date is important to mitigate climate change. Growing a suitable hybrid at an optimum sowing time may be better agronomic option under the zone 3 of Karnataka. Further, there is need to evaluate the different maturity hybrids of maize for their growth and yield under varying sowing dates (Parashar, 2011).

MATERIALS AND METHODS

The hybrids under evaluation were sown in Randomized complete block design with three replications with spacing of 60 cm between the rows and 20 cm between the plants. Each entry was raised in four rows of 4 meter length by dibbling two seeds per hill and later thinned down to single seedling after 15-18 days after sowing. The standard recommended package of practices was followed to raise a healthy and disease free crop.

At pre-flowering stage initial plant count was recorded from entire four rows and in all three replications, followed by days to 50 % pollen shedding and days to 50 % silking was recorded. Later five randomly chosen plants were selected for recording plant height (cm) and ear height traits (cm). Cob weight per plot, cob number and moisture (%) were recorded at the time of harvest of the crop. Furthermore, ten cobs were randomly selected, shelled and grain weight and pith weight was documented. Shelling per cent was calculated using the grain weight and pith weight of these ten sampled cobs. Cob weight per plot, moisture (%) and shelling (%) was used to calculate grain yield and expressed at 15 per cent moisture. The grain yield was computed using the below mentioned formula.

$$\text{Grain yield (tons)} = \{[\text{Cob weight (100 - \% grain moisture) Shelling per cent} \times 10000] - (100 \times \text{Per cent grain moisture} \times \text{plot area})\} / 1000$$

Statistical Analysis

The obtained field data were subject statistical analysis compute all the critical difference and the variance (Sunderraj *et al.*, 1972).

EXPERIMENTAL RESULTS AND DISCUSSION

Among the hybrids tested for their yield performance, the hybrid from UPL Limited (Advanta Limited), Hyderabad PAC 745 Gold recorded highest in all the yield attributing characters like ear height (58.00 cm), cob weight (11.16 kg) and shelling percentage (83.36 %) with highest recording yield of 12.021 tonnes per hectore which was followed by the hybrid MRM 4070 from Mahyco Co. Jaina ear height (49.33 cm), cob weight (9.16 kg) and shelling percentage (82.62 %) with the yield of 11.514 tonnes per hectore. These results indicates that the, among the tested entries at the Agricultural Research Station, Arabhavi, PAC 745 Gold from UPL Limited (Advanta Limited), Hyderabad was showed significantly higher yield compared with other entries. Hence, the experiment showed that the, above hybrid is suitable for the zone 3 of Karnataka.

The results indicate that the test hybrid PAC 745 Gold from UPL Limited (Advanta Limited), Hyderabad was the highest yielding maize hybrid with 12.02 t/ha grain yield (Table 1) and it was numerically superior over National check hybrid NK-6240 by 13.8 *per cent* and over popular private hybrid check CP-818 by 11.7 *per cent*. It was followed by MRM 4070 (11.54 t/ha) and S-505 (10.05 t/ha). The obtained results are in line with Jadhav *et al.*, 2015; Hemalatha *et al.*, 2013 and Sulochana *et al.*, 2015.

The ancillary data of the test hybrids in comparison with the check hybrids (Table 2) indicated that, the test hybrids were on par for days to 50% flowering and days to 50% silking with the check entries. The yield contributing traits Cob length, No of Kernel rows and No of Kernels/ row in the test hybrid PAC 745 Gold recorded were significantly superior over National check NK-6240.

CONCLUSIONS

Among the four test hybrids from UPL Limited (Advanta Limited), Hyderabad the test hybrid PAC 745 Gold recorded highest grain yield of 12.021 t/ha and it was superior over the National Check (NK-6240) by 13.8 per cent and also over popular private hybrid (CP-818) by 11.7 per cent. This was followed by another test hybrid MRM 4070 and S-505 which recorded 11.514 q/ha and 10.05 t/ha grain yield respectively.

REFERENCES

1. Anonymous, 2015. The current status published on website – <http://www.indiastat.in>.
2. Dayanand and Jain, O. P. 1994. Rabi maize cultivation for enhanced production. *India Fm.*, 43 (10): 11-12.
3. Hemalatha, S., Sreelatha D., Anuradha, M. and Saikumar, R. 2013. Crop weather relations in maize. *J. Agrometeorology, Andhra Pradesh*, 15(92):165-166.
4. Jadhav, A., Kumar A., Singh, A. K., Singh, I. and Das, T. K. 2015. Response of maize hybrids (*Zea mays L.*) to staggered sowing. *Indian Journal of Agronomy.*, 60(3):476-478.
5. Parashar, A. 2011. Phenology and productivity of maize cultivars as influenced by crop weather environment. M.Sc. Thesis, Maharana Pratap University of Agriculture and Technology, Udaipur.
6. Rawool, H. V. 2004. Effect of integrated nutrient management on yield and nutrient balance in maize (*Zea mays L.*). *Indian J. Agril. Sci.*, 46(4): 698-701.
7. Sulochana, Solanki, N. S., Dhewa, J. S. and Bajia, R. 2015. Effect of sowing dates on growth, phenology and agro meteorological indices for maize varieties. *An International Quarterly Journal of Life Sciences*. 10(3): 1339- 1343.
8. Sunder raj, N., Nagaraju, S., Venkararamu, M. N. and Jagannath, M. K., 1972. Designs and analysis of field Experiment, Univ. Agril.Sci., Hebbal, Bangalore.

Table: 1: Grain Yield of the Test Hybrids and Per Cent Superiority over the Check Hybrids

Sl.No.	Source of hybrids	Entry	Grain yield (t/ha)
1	Mahyco Co. Jaina	MRM 4070	11.514
2	Mahyco Co. Jaina	MRM 4065	7.798
3	Spriha BioSciences Pvt. Ltd., Hyderabad	S-505	10.273
4	UPL Limited (Advanta Limited) Hyderabad	PAC 740	9.850
5	UPL Limited (Advanta Limited) Hyderabad	PAC 745 Gold	12.021
Checks			
6	Local Check (LC)	GH-0727	7.186
7	National check (NC)	NK-6240	11.270
8	Private Check (Pvt.C)	CP-818	11.055
	S. Em +		1.63
	CD @ (5.0%)		7.61
	CV %		17.33

Table 2: Mean Ancillary data of the test Hybrids in comparison with checks

Genotypes	Days to 50% Pollen Shed	Days to 50% Silk	Plant Height (cm)	Ear Height (cm)	Cob weight per plot (kg)	Grain Moisture %	Shelling %	100 Grain weight	Grain Yield tons /ha
MRM 4070	59.33	65.00	132.0	49.33	9.16	18.53	82.62	37.12	11.514
MRM 4065	65.00	68.66	103.0	49.33	8.5	21.93	79.53	32.76	7.798
S- 505	64.00	66.66	112.66	53.00	8.5	16.53	83.71	34.18	10.055
PAC 740	67.33	71.00	120.66	54.66	9.0	18.53	86.72	28.39	9.850
PAC 745 Gold	67.66	69.66	130.00	58.00	11.16	17.76	83.36	38.91	12.021
Checks									
GH-0727 (LC)	63.33	66.66	125.66	57.66	6.83	18.96	85.82	36.56	7.186
NK-6240 (NC)	60.33	65.00	110.66	50.33	10.66	19.16	86.74	38.31	11.270
CP-818 (Pvt.C)	59.00	65.66	118.66	53.33	8.83	18.76	86.17	36.83.3	11.055
S.Em $\pm$	1.33	1.19	3.9	2.9	1.65	1.92	5.05	0.72	1.63
CD @ (5.0%)	NS	NS	11.8	8.7	NS	NS	3.18	NS	7.61
CV %	3.82	3.38	3.5	4.8	14.61	5.86	15.95	2.58	17.33