RESEARCH ARTICLE

YIELD AND YIELDS PARAMETER OF MAIZE GENOTYPES AS INFLUENCED BY FUNGICIDAL SPRAY

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Abstract: Among the genotypes, irrespective of the fungicidal spray significantly higher grain yield was recorded in the genotype Mograon (80.32q) compare other genotypes. Next followed by Pinnacle (80.28 q) and were on par with each other. Next genotype which was recorded higher grain yield was Prabal (66.62 q) and significantly least grain yield was recorded in the genotype Arjun (34.07 q) and followed by GH 0727 (49.54 q). genotypes Super 900 M recorded numerically higher starch content (71.50%) followed by CP 818 (71.20%), NK 6240 and Shimsha 517 (71.00%). Lowest starch content of 69.30 per cent was recorded in Arjun. Prabal recorded highest oil content of 4.90 % followed by CP 818 and Super 900M (4.75 %) ,CP 818 and Kaveri 244(4.73%), Shimsha 517 (4.70 %), GH 0727 and Arjun (4.68 %), All rounder (4.60 %), Pinnacle (4.58 %), MAH 957 (4.55 %) and NK 6240 (4.48 %) and were on par with each other. Least oil content of 4.28 per cent recorded in DKC 9133

Keywords: Genotypes, Yield, Fungicidal spray, Maize

INTRODUCTION

Among cereals, maize (*Zea may*s L.) is an important food and feed crop which ranks third after wheat and rice in the world. Because of its expanded use in the agro-industries it is recognized as a leading commercial crop of great agro-economic value. In recent years, several new types of corn have been developed with improved nutritional traits. Feeding nutritionally enhanced grain may be a viable method to improve feed efficiency and reduce expensive fat and protein inputs for people (U.S. Grains Council 2002). This approach might allow producers to manage the cost/benefit ratio of feed ingredients more economically. Balanced nutrition is an essential component of nutrient management and plays a significant role in increasing crop production and its quality. The yield loss determination of maize CLS showed significant correlation between yield loss and corn varieties or Curvularia strains. There were different effects on corn yield loss that same strain to different corn varieties or different strains to same corn variety. The range of corn yield loss was 10.10 to 48.62 per cent. This disease influenced the factors of corn yield constitution, the ear became shorter and thinner, the hundred-grain weight reduced, significant effects on the number of seeds per ear and of 100 grain weight (Yan *et al.,* 2003).

In India leaf spot disease of maize incited by *Curvularia clavata* Jain has been reported from Varanasi region (Mandokhot and Basu Chaudhary 1972). It was reported to cause a yield loss up to 60 per cent under inoculated conditions (Grewal and Payak, 1976). The disease incidence was recorded from four places in Uttatakhand. It was recorded in severe condition from Haridwar and Dehradun whereas from Kashipur and Haldwani it was recorded in moderate to traces. Extensive survey conducted in Rajasthan during *kharif* 2010 reveald that the incidence of *C. lunata* was in severe to moderate in villages like Lohira, Kavita, Iswal, Ghiyara and Baswara. Disease incidence was high in Rajasthan area due to high rain fall and high humidity (Anon., 2011).

MATERIALS AND METHODS

The experiment was laid out by adopting Split plot Design with two replications main plot consists of treanments *viz.*,M_1- Fungicidal sprayed (Protected), M_2- Fungicidal unsprayed (Unprotected) and sub plot consists of 15 Genotypes (CP 818, CP 808, NK 6240, 900M Gold, Prabal, Super 900M, Pinnacle, DKC 9133, All rounder, Shimsha 517, Kaveri 244, Mograon, Arjun, GH 0727 and MAH 957). With two replication and spacing adopted as 60 × 20 cm, with plot size of 18m x 4m. rest of all the cultured practices are carried out as per package of practice of University of Agriculture Sciences, Dharwad. The observation *viz.,* Grain yield, Grain weight, Stover yield, Oil content and Starch content

RESULTS AND DISCUSSION

Grain yield (q ha^{-1})

The differences in the grain yield as influenced by different genotypes were found significant. The differences in the grain yield in protected block were found significantly higher (74.14 q) compared to unprotected block (52.96 q). (Table.1)

Among the genotypes, irrespective of the fungicidal spray significantly higher grain yield was recorded in the genotype Mograon (80.32q) compare other genotypes. Next followed by Pinnacle (80.28 q) and were on par with each other. Next genotype which was recorded higher grain yield was Prabal (66.62 q)

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and significantly least grain yield was recorded in the genotype Arjun (34.07 q) and followed by GH 0727 (49.54 q).

The differences in the grain yield within the genotype in protected block, significantly higher grain yield was recorded 90.46 q in the genotypes of Mograon and Pinnacle and on par with NK 6240 (88.33 q).Significantly least grain yield was recorded in the genotype Arjun (42.59 q) followed by Shimsha 517 was recorded 57.78 q .

Similarly within the genotype in unprotected block, significantly higher grain yield was recorded in the genotypes of Mograon (70.19 q) and Pinnacle (70.09 q) on par with DKC9133 was recorded 68.15 q. Significantly lowest grain yield of 25.56 q/ha was recorded in the genotype Arjun followed by MAH 957 was recorded 37.96 q (Fig. 3).

Among all genotypes, Mograon was recorded significantly higher grain yield both in protected block as well as in unprotected block 90.46q and 70.19q respectively.

Among the genotypes, irrespective of the spray highest per cent loss in grain yield was recorded in the genotype MAH 957 (41.00 %) followed by Arjun (39.99%). Lowest per cent loss in grain yield was recorded in DKC 9133 (19.03 %).

100 grain weight (g)

The differences in the 100 grain weight as influenced by different genotypes were found significant. The differences in (Table.2) the 100 grain weight in protected block was found significantly higher (38.17 g) compared to unprotected block (35.73 g).

Irrespective of the fungicidal spray the genotypes NK 6240 recorded significantly highest 100 grain weight of 40.75 g. Shimsha 517and DKC 9133 were the next genotypes recorded higher 100 grain weight of 39.50 g followed by CP 818 (38.50 g), Prabal(39.25 g) and CP 808 (38.75 g) and were on par with each other. Genotype Arjun recorded least 100 grain weight of 33.00 g and it was on par with GH 0727 (33.50 g) and MAH 957 (34.00 g).

In protected block the genotype NK 6240 and Shimsha517 recorded significantly highest 100 grain weight 41.50 g compare to other genotypes. The least 100 grain weight 34.50 g was recorded in the genotype Arjun and it was on par with GH 0727 and MAH 957 (35.00 g)

Similarly within the genotype in unprotected block, significantly higher 100 grain weight was recorded in the genotype NK 6240 (40.00 g) compared to other genotypes. Prabal and DKC9133 (38.50 g) were the next genotypes which have recorded higher 100 grain weight compare to other genotypes. Least 100 grain weight was recorded in the Arjun (31.50 g) and it was on par with GH 0727 (32.00 g) and MAH 957 (33.00g).

Among all genotypes, NK 6240 has recorded significantly higher 100 grain weight (41.50g) in protected block as well as in unprotected block (40.00g).

Among the genotypes, irrespective of the spray highest per cent loss in 100 grain weight was recorded in the genotype Shimsha 517 (9.64%) followed by Arjun (8.70 %). Lowest per cent loss in 100 grain weight was recorded in NK 6240 (3.61%). The results agreed with the findings of Yadav and Ratnoo (2014)

Stover yield (t ha^{-1})

The differences in the stover yield as influenced by different genotypes and fungicidal spray were found significant. The stover yield in protected block was found significantly higher (7.56 t) compared to unprotected block (6.85 t) (Table 3).

Irrespective of the fungicidal spray higher stover yield was recorded in the genotype DKC9133 (8.00 t) followed by MAH 957 (7.92 t) and GH 0727(7.67t) and were on par with each other. Super 900M was the next genotype which was recorded 7.62 t and it was on par with NK 6240 (7.57 t) and 900M Gold (7.41 t). Significantly least stover yield of 6.27 t was recorded in the genotype Mograon and it was on par with CP 818 (6.32 t).

In protected block, higher stover yield of 8.33 t was recorded in DKC 9133 (8.33 t) followed by NK 6240 (8.13 t), and MAH 957 (8.06 t) and were on par with each other. Next genotype has recorded stover yield was Super 900M (7.86 t) and it was on par with CP 808 and GH 0727 genotypes with stover yield 7.84 t and CP 818 (7.60 t).

Similarly within the genotype in unprotected block, the higher stover yield was recorded in the genotype MAH 957 (7.78 t) followed by DKC 9133 (7.67 t) and were on par with each other. Next genotype which has recorded higher stover yield was GH 0727 (7.49 t) and it was on par with Super 900M (7.39 t), and 900M Gold (7.29 t). Significantly least stover yield was recorded in the genotype CP 818 (5.04 t) compared to other genotypes (Fig.5).

Among all genotypes, DKC 9133 has recorded significantly higher stover yield in protected block (8.33 t) as well as in unprotected block (7.67 t).

Among the genotypes, irrespective of the spray highest per cent loss in stover yield was recorded in the genotype CP 818 (33.68%) followed by CP 808 (15.31 %). Lowest percent loss in stover yield was recorded in 900M Gold (3.06 %).

Starch content (%)

The difference in the starch content as influenced by different genotypes and fungicidal spray were found no significant (Table.4). However within the protected block genotypes Super 900 M recorded numerically higher starch content (71.50%) followed by CP 818 (71.20%), NK 6240 and Shimsha 517 (71.00%). Lowest starch content of 69.30 per cent was recorded in Arjun.

Similarly in unprotected block maximum starch content was recorded in NK 6240 (71.00%) and minimum was in Arjun (69.10%). There is little difference in starch content between protected

(70.67%) and unprotected block (70.28%) Serah (2000) reported same result.

Oil content (%)

The differences in the oil content, irrespectively. The genotypes in protected (4.73%) and unprotected (4.47%) block were found significantly (Table.5).

Irrespective of the fungicidal spray the genotype Prabal recorded highest oil content of 4.90 % followed by CP 818 and Super 900M (4.75 %) ,CP 818 and Kaveri 244(4.73%), Shimsha 517 (4.70 %), GH 0727 and Arjun (4.68 %), All rounder (4.60 %), Pinnacle (4.58 %), MAH 957 (4.55 %) and NK 6240 (4.48 %) and were on par with each other. Least oil content of 4.28 per cent recorded in DKC 9133 and it was on par with 900M Gold and Mograon (4.33 %).

The interaction effect was also found significant. Among the genotypes, Prabal recorded higher oil content both in protected (4.95 %) and unprotected (4.65 %) blocks.

Among the genotypes, irrespective of the spray highest percent loss in oil content was recorded in the genotype 900M Gold (11.95%) followed by NK6240 (9.59 %). Lowest percent loss in oil content was recorded in Kaveri 244(1.05 %) followed by Pinnacle (1.08%). There is conflict opinion in literature that Gyenes-Hegyi *et al.* (2001), Zhang *et al.*, 1993, Kereliuk and Sosulski, 1995.

Table 1. Grain yield (qha^{-1}) in maize genotypes as influenced by fungicidal spray

Genotype	Protected	Unprotected	Mean	Percent loss in grain yield
CP 818	81.57	51.11	**66.34**	37.34
CP 808	82.96	56.48	**69.72**	31.92
NK 6240	88.33	65.83	**77.08**	25.47
900M Gold	78.98	57.50	**68.24**	27.20
Prabal	75.00	58.24	**66.62**	22.35
Super 900M	76.39	53.52	**64.95**	29.94
Pinnacle	90.46	70.09	**80.28**	22.52
DKC 9133	84.17	68.15	**76.16**	19.03
All-rounder	63.80	46.76	**55.28**	26.71
Shimsha 517	57.78	37.78	**47.78**	34.61
Kaveri 244	77.31	54.07	**65.69**	30.06
Mograon	90.46	70.19	**80.32**	22.41
Arjun	42.59	25.56	**34.07**	39.99
GH 0727	57.87	41.20	**49.54**	28.81
MAH 957	64.35	37.96	**51.16**	41.00
Mean	**74.14**	**52.96**		
For comparing mean	**S.Em±**	**C.D. at 5%**		
Fungicidal spray(F)	**2.1**	**6.5**		
Genotype(G)	**2.9**	**8.5**		
Interaction (F×G)	**4.1**	**12.1**		
Interaction at the same or different level	**4.5**	**13.2**		

Table 2. 100 grain weight (g) in maize genotypes as influenced by fungicidal spray

Genotype	Protected	Unprotected	Mean	Percent loss in 100 grain weight
CP 818	40.00	37.00	**38.50**	7.50
CP 808	39.50	38.00	**38.75**	3.80
NK 6240	41.50	40.00	**40.75**	3.61
900M Gold	37.50	35.00	**36.25**	6.67
Prabal	40.00	38.50	**39.25**	3.75
Super 900M	38.50	36.00	**37.25**	6.49
Pinnacle	37.50	35.00	**36.25**	6.67
DKC 9133	40.50	38.50	**39.50**	4.94
All-rounder	37.50	34.50	**36.00**	8.00
Shimsha 517	41.50	37.50	**39.50**	9.64
Kaveri 244	37.50	35.00	**36.25**	6.67
Mograon	36.50	34.50	**35.50**	5.48
Arjun	34.50	31.50	**33.00**	8.70
GH 0727	35.00	32.00	**33.50**	8.57
MAH 957	35.00	33.00	**34.00**	5.71
Mean	**38.17**	**35.73**		
For comparing mean	**S.Em±**	**C.D. at 5%**		
Fungicidal spray(F)	**0.96**	**2.96**		
Genotype(G)	**0.54**	**1.56**		
Interaction (F×G)	**0.76**	**2.21**		
Interaction at the same or different level	**0.75**	**2.19**		

Table 3. Stover yield (t ha^{-1}) in maize genotypes as influenced by fungicidal spray

Genotype	Protected	Unprotected	Mean	Percent loss in Stover yield
CP 818	7.60	5.04	**6.32**	33.68
CP 808	7.84	6.64	**7.24**	15.31
NK 6240	8.13	7.01	**7.57**	13.78
900M Gold	7.52	7.29	**7.41**	3.06
Prabal	7.39	6.97	**7.18**	5.68
Super 900M	7.86	7.39	**7.62**	5.98
Pinnacle	6.94	6.54	**6.74**	5.76
DKC 9133	8.33	7.67	**8.00**	7.92
All-rounder	7.41	6.91	**7.16**	6.75
Shimsha 517	7.54	7.06	**7.30**	6.37
Kaveri 244	6.94	5.95	**6.45**	14.27
Mograon	6.55	6.00	**6.27**	8.40
Arjun	7.48	6.94	**7.21**	7.22
GH 0727	7.84	7.49	**7.67**	4.46
MAH 957	8.06	7.78	**7.92**	3.47
Mean	**7.56**	**6.85**		
For comparing mean	**S.Em±**	**C.D. at 5%**		
Fungicidal spray(F)	**0.027**	**0.083**		
Genotype(G)	**0.074**	**0.214**		
Interaction (F×G)	**0.104**	**0.303**		
Interaction at the same or different level	**0.104**	**0.302**		

Table 4. Per cent starch content in maize genotypes as influenced by fungicidal spray

Genotype	Protected	Unprotected	Mean	Percent loss in starch content
CP 818	71.20(57.54)*	70.90(57.35)	**71.05(57.45)**	0.42
CP 808	70.80(57.29)	70.40(57.04)	**70.60(57.17)**	0.56
NK 6240	71.00(57.42)	71.00(57.42)	**71.00(57.42)**	0.00
900M Gold	70.80(57.23)	70.70(57.29)	**70.75(57.26)**	0.14
Prabal	70.70(57.23)	70.70(57.23)	**70.70(57.23)**	0.00
Super 900M	71.50(57.73)	70.80(57.29)	**71.15(57.51)**	0.98
Pinnacle	71.00(57.42)	70.70(57.23)	**70.85(57.32)**	0.42
DKC 9133	70.80(57.29)	70.40(57.04)	**70.60(57.17)**	0.56
All-rounder	70.80(57.29)	70.50(57.10)	**70.65(57.20)**	0.42
Shimsha 517	71.00(57.42)	70.00(56.79)	**70.50(57.10)**	1.41
Kaveri 244	70.80(57.29)	70.10(56.85)	**70.45(57.07)**	0.99
Mograon	70.90(57.35)	70.00(56.79)	**70.45(57.07)**	1.27
Arjun	69.30(56.35)	69.10(56.23)	**69.20(56.29)**	0.29
GH 0727	69.70(56.60)	69.20(56.29)	**69.45(56.45)**	0.72
MAH 957	69.80(56.66)	69.60(56.54)	**69.70(56.60)**	0.29
Mean	**70.67(57.21)**	**70.28(56.97)**		
For comparing mean	**S.Em±**	**C.D. at 1%**		
Fungicidal spray(F)	**0.61**	**NS**		
Genotype(G)	**1.92**	**NS**		
Interaction (F×G)	**2.71**	**NS**		
Interaction at the same or different level	**2.69**	**NS**		

*** Arc sine transformed values**

Table 5. Per cent oil content in maize genotypes as influenced by fungicidal spray

Genotype	Protected	Unprotected	Mean	Percent loss in oil content
CP 818	4.85(12.72)*	4.65(12.45)	**4.75(12.59)**	4.12
CP 808	4.85 (12.72)	4.60(12.38)	**4.73(12.55)**	5.15
NK 6240	4.70 (12.52)	4.25(11.90)	**4.48(12.21)**	9.59
900M Gold	4.60 (12.38)	4.05(11.61)	**4.33(12.00)**	11.95
Prabal	4.95 (12.86)	4.85(12.75)	**4.90(12.79)**	2.02
Super 900M	4.90 (12.79)	4.60(12.38)	**4.75(12.59)**	6.12
Pinnacle	4.60 (12.38)	4.55(12.32)	**4.58(12.35)**	1.08
DKC 9133	4.45 (12.18)	4.10(11.68)	**4.28(11.93)**	7.84
All-rounder	4.70 (12.52)	4.50(12.25)	**4.60(12.38)**	4.24
Shimsha 517	4.80 (12.66)	4.60(12.38)	**4.70(12.52)**	4.16
Kaveri 244	4.75 (12.59)	4.70(12.52)	**4.73(12.55)**	1.05
Mograon	4.45 (12.18)	4.20(11.83)	**4.33(12.00)**	5.61
Arjun	4.80 (12.66)	4.55(12.32)	**4.68(12.49)**	5.20
GH 0727	4.85 (12.72)	4.50(12.25)	**4.68(12.49)**	7.21
MAH 957	4.75(12.59)	4.35(12.04)	**4.55(12.32)**	8.42
Mean	**4.73(12.57)**	**4.47(12.21)**		
For comparing mean	**S.Em±**	**C.D. at 1%**		
Fungicidal spray(F)	**0.98**	**2.96**		
Genotype(G)	**0.14**	**0.56**		
Interaction (F×G)	**0.20**	**0.79**		
Interaction at the same or different level	**0.20**	**0.78**		

*** Arc sine transformed values**

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