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Screening of some maize genotypes against *Sitophilus oryzae* Linn.

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ABSTRACT

Various maize genotypes were tested against *Sitophilus oryzae* (Linn.) under storage conditions in laboratory. The genotypes MPQ-13, CML-469 and CM-119 were found least susceptible; whereas CML-334 and CML-339 were found to be highly susceptible to weevil. The rest of the genotypes were in intermediate group. On the basis of varietal response to the build up of insects population and per cent infestation, they can be arranged in following ascending order: MPQ-13, CML-469, CM-119, CML-422, DMR-5122, African tall, G18SeqC3F155-2-1-3-1-1-BBBB, CML-423, Sinetic-9529, C4MH7-1-B-1-1-6-1-BB, CML-468, G26C26H402-1-2-B-3-B6-10, CML-334 and CML-339.

Key words : *Sitophilus oryzae*, Maize, Varietal screening.

The maize crop has immense importance in Indian agriculture. It is not only staple food of millions of people but is also a crop par excellence for diversity of uses and as an animal feed. However, it is attacked by a number of pests in field as well as in storage also. *Sitophilus oryzae* (Linn.) acts as major limiting factor in storage causing up to 50 per cent loss in weight (Koura and El-Halfway,1967). The adults and larvae are internal feeders and cause great losses to the grain, both in quality and quantity. It causes enormous losses even up to 100 per cent to stored maize.

Keeping in view the biology and nature of damage of this pest, use of resistant varieties would be safe and economical method of its management during storage. Some workers (Pant *et al*., 1964; Singh, 1991) have studied the varietal resistance of maize against *S. oryzae* in the past. From time to time, new varieties are released and their susceptibility may vary in different agro-climatic conditions. Therefore, efforts were made to screen maize genotypes against *S. oryzae* in laboratory under storage conditions.

MATERIALS AND METHODS

The stock culture of *S. oryzae* was maintained in jam jars containing maize grains. The jars were kept at 30^0C and 70 ± 5 % relative humidity. The adults emerged out from this culture were used during the studies.

Fourteen maize inbred lines namely, MPQ-13, CML-469, CM-119, CML-422, DMR-5122, African tall, G18SeqC3F155-2-1-3-1-1-BBBB, CML-423, Sinetic-9529, C4MH7-1-B-1-1-6-1-BB, CML-468, G26C26H402-1-2-B-3-B6-10, CML-334 and CML-339 were used for the study. The grains of all genotypes were kept in oven at 60^0 C for 24 hours to check hidden infestation of the pest.

The initial grain moisture in 14 maize genotypes under study was determined by digital electronic moisture tester. In each case, 100 g seeds were weighed and kept in plastic container (7.5 x 7.00 cm). A set of three replications for each genotype was prepared. Twenty freshly emerged weevils were released in each container and allowed to oviposit for 10 days. Developmental 'F_1' weevil progeny was counted two months insect removal. In each case, the number of sound and damaged grains with their weight were recorded . The data obtained were subjected to analysis of variance. The physical characters like 100 grain weight, grain type and color were also recorded.

RESULTS AND DISCUSSION

It could be seen from Table 1 that the maize genotypes exhibited considerable difference in their susceptibility to weevil. None of the genotypes was found immune to weevil. On the basis of the response of genotypes to the build up of insects population, they can be arranged in following ascending order : MPQ-13, CML-469, CM-119, CML-422, DMR-5122, African tall, G18SeqC3F155-2-1-3-1-1-BBBB, CML-423, Sinetic-9529, C4MH7-1-B-1-1-6-1-BB, CML-468, G26C26H402-1-2-B-3-B6-10, CML-334 and CML-339. The genotype MPQ- 13 exhibited significantly minimum population (44.00) of weevil, followed by CML-469 (68.00) and CM-119 (100.00). Significantly highest F_1 progeny population was observed in CML-339 (378.00) followed by G26C26H402-1-2-B-3-B6-10 (310.00) and CML-334 (306.00).

The data pertaining to percentage-damage of maize varieties revealed that the genotype MPQ-13 exhibited significantly lowest (25.16 %) grain infestation followed by genotype CML-469(29.25 %). The inbred line CM-

Table 1: Relative susceptibility of some maize composite and inbred lines to *S. oryzae* under storage condition

Sr. No.	Hybrid/Composite/Inbred	Av. No.of 'F1' progeny	Grain infestation (%) Nos. basis	Average Weight Loss(%)	Moisture (%)	100 seed wt. (g)	Grain type	Grain colour
1.	CML-339	378 (2.575)*	92.55 (74.42)**	22.02	12.1	30.25	Dent	FY
2.	CML-334	306 (2.485)	90.54 (72.22)	18.14	12.6	28.98	Dent	OY
3.	G26C26H402-1-2-B-3-B6-10	310 (2.490)	58.54 (49.93)	10.63	11.3	24.57	Flint	OY
4.	CML-468	265 (2.422)	56.90 (48.96)	9.80	11.4	19.68	Flint	O
5.	C4MH7-1-B-1-1-6-1-BB	264 (2.421)	87.46 (69.50)	15.73	10.9	24.69	Dent	CW
6.	Sintetica-9529	224 (2.350)	65.27 (53.92)	9.43	11.6	25.64	Semi-Flint	W
7.	CML-423	218 (2.337)	56.27 (48.62)	10.93	10.8	28.21	Dent	OY
8.	G18SeqC3F155-2-1-3-1-1-BBBB	211 (2.321)	36.33 (37.01)	9.20	11.7	25.31	Flint	OY
9.	African tall	197 (2.291)	55.93 (48.40)	8.90	12.3	12.50	Semi-Dent	OY
10.	DMR-5122	202 (2.304)	48.68 (44.24)	9.03	11.9	18.76	Semi-Flint	Y
11.	CML-422	167 (2.221)	54.87 (47.79)	11.13	11.8	14.94	Semi-Dent	CW
12.	CM-119	100 (1.993)	35.64(36.63)	6.28	10.5	19.23	Flint	W
13.	CML-469	68 (1.945)	29.25 (30.07)	4.73	10.7	16.15	Semi-Flint	W
14.	MPQ-13	44 (1.627)	25.16 (32.68)	3.24	11.3	15.62	Flint	OY
	S.E. ±	0.038	1.296	0.47				
	C.D. (P=0.05)	0.110	3.767	1.41				

* Figures in parentheses are log transferred values. ** Figures in parentheses are arc sin percentage transferred values.
Y=Yellow; W=White; C=Creamy; O= Orange; F=Fain

119 was next best treatment recording 35.64 per cent grain infestation. The significantly highest grain infestation was noted in the genotype CML-339 (92.55%) , however, it was at par with that noted in CML-334 (90.54%).

The varieties compared on the basis of loss in grain weight pointed out that the minimum weight loss exhibited in the genotype MPQ-13 (3.24 %) followed by CML-469(4.73 %)and CM-119 (6.28 %). The maximum loss was recorded in CML-339 (22.02 %), CML-334 (18.14%) and CML-422 (11.13 %). Apparently, the physical characters of grain like seed weight, grain type and color did not show any relationship with the susceptibility to weevil.

Taking combined effect of above characters of insect population, per cent damage and weight loss, the genotypes *viz.*, MPQ-13, CML-469 and CM-119 could be included in less susceptible group; CML-334 and CML-339 in highly susceptible and rest of the genotypes in intermediate group. On the basis of varietal response to the build up of insects population and per cent infestation, they can be arranged in following ascending order: MPQ-13, CML-469, CM-119, CML-422, DMR-5122, African tall, G18SeqC3F155-2-1-3-1-1-BBBB, CML-423, Sinetic-9529, C4MH7-1-B-1-1-6-1-BB, CML-468, G26C26H402-1-2-B-3-B6-10, CML-334 and CML-339.

Various researchers have considered different parameters *viz*., grain weight, insect population and kernel infestation as criterion for evaluating maize varieties against stored pests (Pareek *et al*., 1977; Bernardo, 1972). and some scientists have screened number of maize genotypes for resistance to *S. oryzae* (Punj, 1965; Gupta, 1999; Sharma, 2000).

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