Indian Journal of Applied Entomology **24**(2) : 139-141 (2010)

EVALUATION OF SORGHUM GENOTYPES FOR RECOVERY RESISTANCE AGAINST SHOOT FLY, *ATHERIGONA SOCCATA* RONDANI (DIPTERA: MUSCIDAE)

SHRAWAN LAL*, T. HUSSAIN*, O.P. AMETA* AND H.K. JAIN**

*Deptt. of Entomology, R.C.A., Udaipur
**Department of Agricultural Statistics and Computer Application, R.C.A, Udaipur.

ABSTRACT

In a study on recovery resistance among the fifteen genotypes with the production of productive tillers, genotype SU 1326 provided maximum productive tillers followed by SU 1340 and SU 1325. Correlation coefficient between healthy and damaged plants with seed yield was positive, though non-significant.

Key words: Sorghum genotype, *Atherigona soccata,* recovery resistance

INTRODUCTION

Sorghum [*Sorghum bicolor* (L.) Moench] is infested by as many as 150 insect pests from germination till harvesting (Sheshu Reddy and Davies (1979) and nearly 32 per cent of the actual produce is lost due to insect pests in India (Borad and Mittal (1983). Among them sorghum shoot fly is the major constraint, causing an estimated losses of 85.87 and 44.86 per cent grain and fodder yield, respectively (Nandanwankar and Chundurwar (1985). Sorghum has an inherent ability to withstand the losses of sorghum shoot fly, which is called recovery resistance. It is the primary mechanism of resistance wherein genotypes exhibit an inherent capacity to produce side tillers when the main shoot is killed by shoot fly, which in turn can produce productive tillers. In the present investigation the recovery resistance of genotypes against *A. soccata* was evaluated in the IPM approaches.

MATERIALS AND METHODS

The present investigation was carried out at the Instructional Farm, Rajasthan College of Agriculture, Udaipur during *kharif* 2009 in Randomized Block Design with 3 replications. Sowing was done in four rows with the row length of 4 meters. The row-to-row and plant-to-plant spacing was maintained at 45 and 15 cm, respectively. A total of 15 genotypes were tested under natural infestation conditions with late sowing to ensure maximum shoot fly infestation along with one resistant and one susceptible check. The fifteen genotypes *viz.,* SU 1317, SU 1318, SU 1320, SU 1323, SU 1324, SU 1325, SU 1326, SU 1329, SU 1333, SU 1337, SU 1340, SU 1341, SU 1343, CSV 23 and PJ 1430 with two checks IS 2312 (resistant) and DJ 6514 (susceptible) were sown on 20th July, 2009. Ten days after germination, 30 plants in each row were maintained by adopting manual thinning. The plot size was $1.80 \times 4.0 = 7.20$ M^2. Twenty tagged plants per plot were selected for recording the observations on dead heart caused by shoot fly, number of tillers (panicles with grain) and grain yield at harvest in healthy and infested plants. The data recorded on dead hearts and tiller produced were converted to per cent values as below:

$$Dead\ heart\ (\%) = \frac{No.of\ plants\ with\ dead\ hearts}{Total\ no\ of\ plants\ observed} x\ 100$$

$$Productive\ tillers\ (\%) = \frac{No.of\ productive\ tillers}{Total\ no\ of\ tillers\ observed} x\ 100$$

RESULTS AND DICUSSION

It is apparent from the data (Table 1) that the number of tillers produced had positive correlation with the susceptible character of cultivar to the *A.. soccata*. The number of tillers produced in IS 2312 (10.67) were significantly less to other tested cultivars while significant maximum tillers (31.00) were observed in SU 1324. The

Table 1. Comparative performance of sorghum genotypes for recovery resistance against shoot fly

S. No.	Name of genotype	Average*		Seed weight (g)*	
		No. of tillers at 28 day after germination	Percent Productive tillers at maturity	Healthy plants	Damage plants
1.	SU 1317	25.33	42.62 (40.75)	203.00	57.00
2.	SU 1318	20.67	47.78 (43.72)	208.67	57.67
3.	SU 1320	20.67	45.00 (42.13)	207.67	52.17
4.	SU 1323	29.67	45.03 (42.14)	187.67	47.00
5.	SU 1324	31.00	44.70 (41.95)	206.17	65.67
6.	SU 1325	20.67	49.55 (44.74)	276.67	63.00
7.	SU 1326	22.00	51.99 (46.14)	204.50	58.83
8.	SU 1329	20.00	48.82 (44.32)	189.83	62.17
9.	SU 1333	23.33	43.76 (41.41)	190.33	53.83
10.	SU 1337	25.33	46.92 (43.23)	211.33	59.83
11.	SU 1340	20.67	49.70 (44.82)	220.67	72.00
12.	SU 1341	25.33	48.59 (44.19)	211.33	51.17
13.	SU 1343	20.00	45.95 (42.67)	171.67	58.83
14.	CSV-23	27.33	46.28 (42.86)	186.00	48.00
15.	PJ 1430	20.67	47.00 (43.28)	158.67	61.33
16.	IS 2312 (R)	10.67	46.92 (43.23)	175.83	42.17
17.	DJ 6514 (S)	28.67	31.21 (33.96)	241.83	56.83
	SEm±	1.79	2.48	5.43	2.78
	C.D. at 5%	5.15	7.15	15.85	8.00
	C.V. (%)	13.43	9.75	4.63	8.45

Figures in parenthesis are angular retransformed values.

* Average of 20 plant, * Average of five panicles, r = Correlation coefficient, r = 0.347

tillers observed in SU 1317, SU 1341, CSV 23, DJ 6514 and SU 1323 varied from 25.33 to 29.67 but were at par.

Data observed on productive tillers at maturity showed that DJ 6514 gave significantly less tillers (31.21), while other genotypes were statistically at par and the number of tillers ranged from 42.62 to 51.99.

The data recorded on seed weight of healthy and damaged plants (Table 1) showed that minimum seed weight was achieved in resistant check IS 2312 (175.83g), while maximum seed weight (276.67g) in SU 1325. Among all the test entries average seed weight ranged from 158.67g (PJ 1430) to 276.67g (SU 1325). Among the test entries SU 1325 provided significantly maximum grain weight over rest of the genotypes followed by SU 1340 which was at par with SU 1318, SU 1320, SU 1324 and SU 1341.

Data recorded on average seed weight of productive panicles from damaged plants (Table 1) showed that the maximum and minimum seed weight among these genotypes were 72.0g (SU 1340) and 47.0g (SU 1323), respectively. Among the test entries SU 1340 gave maximum grain weight over all test entries except to SU 1324. The correlation between seed yield of healthy V/s damaged plants (productive tillers) was positive, but non-significant. Many other workers have also reported that the resistant cultivars have a very high rate of axillary tillers survival with reasonable seed yield (Blum, 1972 and Dogett, 1972). Our findings get support from the work of Dhillon *et al.* (2005) who recorded out that at 28th day after seedling emergence plants produced more number of tillers with subsequent higher number of productive tillers produced in shoot fly resistant germplasm.

ACKNOWLEDGMENT

Authors are thankful to the Dean, Rajasthan College of Agriculture, Udaipur, All India Coordinated Sorghum Information Project Udaipur and Head, Deptt. of Entomology, R.C.A. Udaipur for providing the necessary facilities, during the present investigation.

REFERENCES

Borad, P.K. and Mittal, V.P. 1983. Assessment of losses caused by pest complex to sorghum hybrid CHS-5. Special issue of *Indian Journal of Entomology*. Entomological Society of India.

Dhillon, M.K., Sharma, H.C., Ram Singh and Naresh, J.S. 2005. Mechanism of resistance to shoot fly, *Atherigona soccata* in sorghum. *Euphytica*, **44**:301-312s.

Doggett, H. 1972. Breeding for resistance to sorghum shoot fly. *Proceedings of an International Symposium New Delhi*, India 192-201.

Nandanwankar, K.G. and Chundurwar, R.D. 1985. Sorghum cultivation in Marathwada. Paper presented at AICSIP workshops held at P.K.V. Akola 6-8 May, 1985.

Seshu Reddy, K.V.S. and Davies, S.C. 1979. Pest of sorghum and pearl millet and their parasite and predator recorded at ICRISAT Centre up to August 1979. *Cereal Entomological Progress Report 2*, International Crops Research Institute for the Semi-arid Tropics, Patancheru, Hyderabad, India.