International Journal of Agriculture Sciences
ISSN: 0975-3710 & E-ISSN: 0975-9107, Volume 10, Issue 15, 2018, pp.-6883-6885.
Available online at https://www.bioinfopublication.org/jouarchive.php?opt=&jouid=BPJ0000217

Research Article

SCREENING OF THE SORGHUM GENOTYPES FOR YIELD AND THEIR REACTION TO EAR HEAD BUGS AND WORMS

OJHA BHAGYASHREE*, CHOUDHARY R.K. AND PATIL SHIKHA
Department of Agricultural Entomology, Rajmata Vijayaraje Scindia Krishi Vishwa Vidhyalaya, Gwalior, 474 001, Madhya Pradesh India
*Corresponding Author: Email - bhagyaojha34@gmail.com

Received: July 12, 2018; Revised: August 10, 2018; Accepted: August 11, 2018; Published: August 15, 2018

Abstract: The present investigation was carried out in randomized block design during kharif 2016-17 at research field, AICSIP, College of Agriculture, Indore (MP). The ear head bug population ranged between 3.00 to 12.67.The lowest number of pest was recorded in resistance check IS 18551 (3.00) followed by IS 2205 (3.67), AKSV 410 (4.00), RSSV 350 (4.00), SPV 2433 (4.00), IS 2123 (4.00), SPV 2426 (4.33), SPV 2440 (4.33), SPV 2358 (4.67), CSV 27 (4.67), SPH 1862 (4.67) and SPV 2308 (4.67) and showed resistant against the insect. However, susceptible checks DJ 6514 (11.00) and Swarna (12.67) recorded maximum number of bug. The ear head worm population ranged between 3.67 to 13.00. The lowest number of ear head bug was recorded in resistance checks IS 2205 (3.67) which was statistically found to be at par with CSV 27 (4.33), SPH 1862 (4.33), SPV 2293 (4.67), SPV 2432 (4.67) and SPV 2305 (SR 2872) (4.67) and showed resistant against the insect. However, susceptible checks Swarna (11.33) and DJ 6514 (13.00) recorded maximum number of worms. Under yield attributing characters number of grains per ear head ranged from 733.79 to 1370.37, and yield in kg/ha. have been obtained between 3672 to 6594(kg). The maximum grain yield in (Kg/ha.) was obtained in genotype SPV 2299 (6594) and found significantly superior with rest of the genotypes.

Keywords: Sorghum, Genotypes, Ear head bugs, Ear head worms, Yield, Population, Susceptible

Citation: Ojha Bhagyashree, *et al*., (2018) Screening of the Sorghum Genotypes for Yield and their Reaction to Ear Head Bugs and Worms. International Journal of Agriculture Sciences, ISSN: 0975-3710 & E-ISSN: 0975-9107, Volume 10, Issue 15, pp.- 6883-6885.

Introduction

Sorghum [*Sorghum bicolor* L. Moench] locally known as "Jowar", is a self-pollinated crop. It belongs to *Graminae* (Poaceae) family and originated in North East Africa. Sorghum is an important staple food crop in the world and 5th most important cereal crop after wheat, rice, maize and barley. It is the major source of food, feed, fodder and fuel. The stem and foliage are used as green fodder, hay silage and pasture. Grain is mostly for food purpose. It is a principal feed ingredient for both cattle and poultry. Sweet sorghum is being used in the preparation of syrup, jaggery, beer, bio-fuel (ethanol) *etc*. Major producers are the USA, Mexico, Nigeria, India, and Argentina with 11.74, 6.5, 6.5, 5.5 and 3.4million tones production respectively [10]. In India sorghum is the third important cereal after rice and wheat, grown on average of 5.8 million ha^{-1} with production of 5.5 million tons and productivity 926kg ha^{-1} [10, 11]. In Madhya Pradesh sorghum crop is grown mainly in *Kharif* season and covers an area of 220 thousand hectares and the production 329thousand tones with productivity of 1500 kg ha^{-1} respectively[10,11,12]. Sorghum is cultivated in different agro ecosystems and the grain yields are influenced by various biotic and abiotic factors. Among the biotic factors, arthropods constitute a major problem to increase the sorghum production. About 150 insect species have been reported to damage sorghum in different agro-ecosystem [1]. Among them, the ear head bug (*Calocoris angustatus* Leth.) and ear head worm (*Cryptoblebes gnidiella* Mab.) are the important insect pests attacking at different stages of the crop growth.

Materials and Methods

In this experiment 50newly developed elite sorghum varietal and hybrid genotypes were evaluated along with two susceptible checks (DJ-6514 and SWARNA) and two resistant checks (IS 2205 and IS 18551). Observations were recorded on randomly selected 5 tagged plants for Ear head bug (*Calocoris angustatus* Leth.), Ear head worm (*Cryptoblabes gnidiella* Mab.) and for yield. The analysis was carried out by adopting the method of "Analysis of variance".

Results and discussion

Ear head bug (*Calocoris angustatus Leth.*) population

The ear head bug population ranged from3.00 to 12.67. Under the resistant category of genotypes, the lowest number of pest was recorded in resistance check IS 18551 (3.00) followed by IS 2205 (3.67), AKSV 410 (4.00), RSSV 350 (4.00), SPV 2433 (4.00), IS 2123 (4.00), SPV 2426 (4.33), SPV 2440 (4.33), SPV 2358 (4.67), CSV 27 (4.67), SPH 1862 (4.67) and SPV 2308 (4.67) and showed resistant against the insect. However, susceptible checks check DJ 6514 (11.00) and Swarna (12.67) recorded maximum number of bug (Table:1). These results were more or less in accordance with the findings reported by [2, 3, 5, 9, 13].

Ear head worm (*Cryptoblabes gnidiella* Mab.) population

The population of ear head worm was ranged from3.67 to 13.00. Under the resistant category of entries, the lowest number of ear head bug was recorded in resistance checks IS 2205 (3.67) which was statistically found to be at par with CSV 27 (4.33), SPH 1862 (4.33), SPV 2293 (4.67), SPV 2432 (4.67) and SPV 2305 (SR 2872) (4.67) and showed resistant against the insect. However, susceptible checks Swarna (11.33) and DJ 6514 (13.00) recorded maximum number of worms [Table-1]. These results were more or less in accordance with the findings reported by [9,13].

Yield attributing characters

Among the yield attributing character i.e. number of grain per ear head, grain yield per five plants, grain yield per hectare and was considered for observation. Throughout the season different insect pests, attacked to all the entries. Five panicles were threshed and grain yield was computed per five plants. The number of grains per ear head ranged from 733.79 to 1370.37.The lowest number of grains were received in tested entry SPV 2435 (733.79) and followed by rest of the entries. Further range of yield in grams per 5 plant have been obtained between 102.00(g) to 183.17(g).

Table-1 Reaction of sorghum genotypes against ear head bug and ear head worm / 3 plants

SN	Entry	head bug / 3 cob		head worm /3 cob	
		OV	TV*	OV	TV*
1	AKSV 410	4.00	2.12	6.67	2.67
2	PVK 1014	7.00	2.74	5.33	2.40
3	PVK 902 SS	5.00	2.34	7.00	2.73
4	RSSV 350	4.00	2.12	9.00	3.08
5	SPV 2299	5.00	2.34	5.00	2.34
6	SPV 2305 (SR 2872)	5.00	2.34	4.67	2.27
7	SPV 2431	6.00	2.55	7.33	2.78
8	SPV 2432	5.33	2.41	4.67	2.27
9	SPV 2433	4.00	2.12	5.67	2.47
10	SPV 2434	7.67	2.86	8.00	2.91
11	SPV 2435	5.67	2.47	7.00	2.71
12	SPV 2436	5.67	2.46	5.33	2.40
13	SPV 2437	5.67	2.48	5.67	2.48
14	SPV 2439	6.67	2.68	6.00	2.55
15	SPV 2293	5.00	2.34	4.67	2.27
16	SPV 2363	9.00	3.08	10.33	3.23
17	SPV 2364	5.67	2.48	6.67	2.64
18	SPV 2366	5.33	2.41	6.00	2.53
19	SPV 2372	5.33	2.41	5.00	2.34
20	SPV 2373	5.67	2.48	6.33	2.58
21	CSV 27	4.67	2.26	4.33	2.20
22	SPH1858(SS)	8.33	2.97	8.33	2.97
23	SPH1860	7.67	2.85	7.00	2.73
24	SPH1862	4.67	2.26	4.33	2.20
25	SPV2324	6.67	2.67	7.00	2.73
26	SPH 1847	6.00	2.53	6.00	2.53
27	SPH 1848	6.33	2.59	6.33	2.59
28	SPH 1849	6.67	2.67	6.33	2.61
29	ICSV 713	5.33	2.41	5.33	2.41
30	ICSV 25019	6.33	2.61	5.67	2.48
31	IS 2123	4.00	2.12	8.67	3.02
32	IS 2146	5.67	2.48	8.00	2.89
33	SPH 1778	8.00	2.90	7.33	2.76
34	SPH 1779	7.00	2.73	7.67	2.84
35	SPH 1789	7.00	2.73	6.33	2.60
36	AKSV 408	8.00	2.91	6.33	2.61
37	RSSV 397	5.00	2.33	7.67	2.86
38	S- 652	5.00	2.34	7.00	2.73
39	SPV 2296	8.33	2.97	7.00	2.73
40	SPV 2308	4.67	2.27	6.00	2.52
41	SPV 2358	4.67	2.24	6.67	2.65
42	SPV 2426	4.33	2.20	6.33	2.59
43	SPV 2438	5.33	2.41	5.33	2.41
44	SPV 2440	4.33	2.20	6.33	2.59
45	CSV 20	5.33	2.41	6.67	2.68
46	IS 18551	3.00	1.86	5.00	2.34
47	IS 2205	3.67	2.04	3.67	2.02
48	DJ 6514	11.00	3.39	13.00	3.67
49	Swarna	12.67	3.63	11.33	3.44
50	CSV 15	5.67	2.48	7.33	2.78
	S.Em. ±	0.12		0.18	
	C.D. at 5%	0.34		0.52	
	CV %	13.14		19.60	

Values are square root transformation value

The lowest grain yield in grams per 5 plant have been obtained in test entry SPV 2426 (102.00) and followed by rest of the entries. However, the lowest grain yield in (kg/ha.) obtained in test entry SPV 2426 (3672) followed by rest of the entries and the maximum grain yield in (Kg/ha.) obtained in test entry SPV 2299 (6594) and found significantly superior with rest of entries (Table:2). [4, 6, 7]These findings are in partial agreement with the present study as these researchers did not take all the parameters for the study as it was taken in present study but as a whole looking to the grain yield these researchers supported the present investigation.

Conclusion

The ear head bug and worm count ranged between 3.00 to 12.67 and 3.67 to 13.00 respectively. The maximum grain yield in (Kg/ha.) was obtained in genotype SPV 2299 (6594) and found significantly superior with rest of the genotypes.

Research Category: Screening, Genotype

Abbreviations:
AICSIP (All India Coordinated Sorghum Improvement project)

Acknowledgement / Funding: Author thankful to Rajmata Vijayaraje Scindia Krishi Vishwa Vidhyalaya, Gwalior, 474 001, Madhya Pradesh India

***Research Guide: Dr R.K. Choudhary**
University: Rajmata Vijayaraje Scindia Krishi Vishwa Vidhyalaya, Gwalior, 474 001, Madhya Pradesh India
Research project name: M.Sc. Thesis

Author Contributions: All author equally contributed

Table-2 Number of grains per ear head yield attribute character and panicle type of sorghum genotypes

SN	Entry	No. Of grain /ear head	Yield	
			Per 5 plant (g)	Kg/ ha.
1	AKSV 410	1109.57	119.83	4314.0
2	PVK 1014	861.21	121.00	4356.0
3	PVK 902 SS	1126.83	115.50	4158.0
4	RSSV 350	1114.04	105.83	3810.0
5	SPV 2299	1313.02	183.17	6594.0
6	SPV 2305 (SR 2872)	1146.89	135.33	4872.0
7	SPV 2431	1074.24	118.17	4254.0
8	SPV 2432	881.61	127.83	4602.0
9	SPV 2433	953.57	133.50	4806.0
10	SPV 2434	982.52	131.17	4722.0
11	SPV 2435	733.80	105.67	3804.0
12	SPV 2436	962.50	115.50	4158.0
13	SPV 2437	803.65	117.33	4224.0
14	SPV 2439	949.46	131.50	4734.0
15	SPV 2293	759.19	107.33	3864.0
16	SPV 2363	1193.06	131.83	4746.0
17	SPV 2364	818.41	109.67	3948.0
18	SPV 2366	803.20	108.83	3918.0
19	SPV 2372	775.03	109.67	3948.0
20	SPV 2373	1168.20	127.33	4584.0
21	CSV 27	1231.02	124.33	4476.0
22	SPH1858(SS)	1091.47	117.33	4224.0
23	SPH1860	944.68	113.83	4098.0
24	SPH1862	996.18	130.50	4698.0
25	SPV2324	756.07	114.17	4110.0
26	SPH 1847	832.82	135.33	4872.0
27	SPH 1848	813.24	118.73	4274.4
28	SPH 1849	789.79	131.50	4734.0
29	ICSV 713	1370.37	135.67	4884.0
30	ICSV 25019	1250.43	120.67	4344.0
31	IS 2123	1267.00	127.33	4584.0
32	IS 2146	1256.41	130.67	4704.0
33	SPH 1778	736.07	116.67	4200.0
34	SPH 1779	823.32	116.50	4194.0
35	SPH 1789	929.88	147.33	5304.0
36	AKSV 408	1057.84	115.83	4170.0
37	RSSV 397	1022.58	128.33	4620.0
38	S- 652	1143.98	121.83	4386.0
39	SPV 2296	941.44	104.50	3762.0
40	SPV 2308	1072.27	121.17	4362.0
41	SPV 2358	1031.75	130.00	4680.0
42	SPV 2426	784.62	102.00	3672.0
43	SPV 2438	1355.74	161.33	5808.0
44	SPV 2440	915.34	115.33	4152.0
45	CSV 20	915.03	116.67	4200.0
46	IS 18551	1163.77	133.83	4818.0
47	IS 2205	1017.91	123.17	4434.0
48	DJ 6514	1331.51	121.83	4386.0
49	Swarna	1214.66	116.00	4176.0
50	CSV 15	1084.94	140.50	5058.0
	S.Em. ±	0.47	1.80	1384.31
	C.D. at 5%	1.33	5.04	3885.00

Author statement: All authors read, reviewed, agree and approved the final manuscript

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.

References

[1] Jotwani M.G., Yong W.R. and Teets G.L. (1980) *FAO pl. production andprot. Paper, No. 39, Rome, Italy, Food and Agric.Organ*., 159.

[2] Mote U.N. and Kadam J.R. (1984) *Sorghum Newsl*., 27,85.

[3] Sekhar P.R. (1997) *J. Insect Sci*., 10(1), 78-79.

[4] Singh V.S. and Shankar K. (2000) *Indian J. of Ent*. 62(1), 34-36.

[5] Choudhary R.K. and Garg V.K. (2004) *JNKVV Res. J*., 37(2), 104-105.

[6] Badgujar M.P., Wadnerkar D.W. and Jadhav S.S. (2006) *J. Maha. Agric. Univ*., 13(3), 323-325.

[7] Gite B.D., Kahate P.A., Ratnaparkhi R.D., Ghodpage R.M. and Anokar D.N. (2006) *Annals of Pl. Physio*., 20(1), 154-155.

[8] Kumar A.A.; Reddy B.V.S., Sharma H.C. and Ramaiah B. (2008) *J. of SAT Agric. Res*., 6,1-4.

[9] Patel Rajesh (2011) M.Sc. *Thesis, RVSKVV, Gwalior (M.P.)*,53-57.

[10] Anonymous (2016) *http//;www.mpkrishi.org*.

[11] Anonymous (2016) *Agricultural Statistics at a glance 2016. Directorate of Economics and Statistics, Department of Agriculture and Cooperation. Govt. of India. Fourth advance estimate*, 84.

[12] Anonymous (2016) *FAO Statistical Year book 2016, Food and Agriculture Organization of The United Nations (http://FAOSTAT* 2016)

[13] Raipuriya Nilesh, Choudhary R.K., Swathi P. and Prajapati Sunil (2016) *Res. Environ. Life Sci*., 9(4) 407-412.