www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; 12(1): 824-826
© 2023 TPI
www.thepharmajournal.com
Received: 08-10-2022
Accepted: 19-11-2022

SR Thakur
Department of Entomology, AICRP On Oilseed (Sesame & Niger), JNKVV, College of, Agriculture, Tikamgarh, Madhya Pradesh, India

Corresponding Author:
SR Thakur
Department of Entomology, AICRP On Oilseed (Sesame & Niger), JNKVV, College of, Agriculture, Tikamgarh, Madhya Pradesh, India

Field screening of sorghum genotypes for resistance to ear head bug (*Calocoris angustatus* Leth) and ear head worms (*Contarinia sorghicola Coq*)

SR Thakur

Abstract
The present investigation of screening of Twenty five advanced breeding lines of sorghum along with three replications against earhead bugs (*Calocoris angustatus Leth)* and Ear head worms (*Contarinia sorghicola* Coq)was carried out in randomized block design (RBD) at research field ,RVVS, College of Agriculture ,Indore (M.P) in collaboration with all India Coordinated Sorghum Improvement Project (AICSIP), Indore (M.P), India. The advanced breeding lines were screened on the basis of Population were counted on / 10 plant per heads of each genotype randomly selected at milky stage separately. The data recorded on ear bug population exhibited significant difference among 25 genotype .The minimum bug population was recorded in genotype IS-2312(1.11),SPH-1574(1.22), CSH-18(1.55) SPH-1569(1.75), CSV17(1.81), and SPH-1571(1.88), The maximum bugs population was recorded in genotype, SPH-1570(3.55) and followed by DJ-6514(3.08), SPH-1573(3.11) SPH-1566(3.08) and SPH-1562(3.04). Ear head worms (*Contarinia sorghicola*) **.**The data recorded on ear bug population exhibited significant difference among 25 genotype. The observation were recorded at 45 days after sowing at ear heads/plant. The minimum head worms population was recorded in genotype CSH-18(0.24), SPH-1564(0.35), IS-2312(0.37), SPH-1561(0.53), SPH-1564(0.62), SPH-1565(0.68), SPH-1571(0.68), and SPH-1577(0.68) /plant .The maximum ear head worms population was recorded in genotype, SPH-1570(3.50) and followed by SPH-1572(3.11) DJ-6514(3.11). The values were subjected to square root transformation value and statically analyzed.

Keywords: Sorghum, Screening, genotypes, Head bug (*Calocoris angustatus)*, Ear head worms (*Contarinia sorghicola*)

Introduction
Sorghum [*Sorghum bicolor* (L.) Moench] locally known as Jowar is the fifth most important cereal crop in the world after wheat, rice, maize and barley. In India it has positioned third after rice and wheat.Sorghum grown in low and moderate rainfall condition and it has general ability to withstand drought makes it an ideal crop for rainfed condition. Importance of sorghum is increasing day by day because of its multiple uses as flour for bread and porridge as poultry feed, Jaggery syrup glucose, alcohol industrial raw material green and dry fodder for cattle. In India, during the year 2020-21.sorghum was cultivated in 5.13 million ha area with production of 4.37 million tonnes and productivity of 852 kg/ha Anonymous, (2021) [1]. In Madhya Pradesh it was grown as a rainfed crop and was cultivated in about 0.11 million ha area with an annual production of 0.21million tones and productivity of 1940 kg/ha Anonymous, (2021) [2]. It has been experienced since last few decades the average production of sorghum has slightly declined. The biotic and abiotic factors are the major constraints which attributes its lower production. Among the biotic factors about 150 insect pests have been reported in different agro ecosystem of sorghum crop (Sharma *et al.* (1997) [17], Sharma *et al.* (2000) [19] Sharma *et al.* (2003) [20] and Jotwani *et al*., (1980) [6] of which several heteropteran species are known to damage the developing grain Among them, *Calocoris angustatus* Lethiery (Hemiptera: Miridae) is the predominant species in India, while *Eurystylus oldi* Poppius is the most damaging species in West Africa (Sharma and Lopez, (1990) [16]. Mirid head bugs (*Calocoris angustatus*, *Creontiades pallidus, Eurystylus immaculatus*, and *Campylomma* spp.) are very serious pests of grain sorghum in India and Africa, of which *C. angustatus* is the most important species in India and E. immaculatus in West Africa.sorghum is an ceral crop in asia ,Africa and Latin America Mirid bugs *(Calocoris angustatus* Leth., (Hemiptera: Miridae) arc major pests of sorghum grain in Asia and Africa.C. *angustatus* the predominant species in India (Sharma, 1985) [14].

Avoidable losses due to head bugs in commercial cultivars vary from 55.0 to 88.6% under experimental conditions at the research farm (Sharma and Lopez, 1989) [15]. In different parts of India, avoidable losses of 6.6-84.2, have been computed (Leuschner & Sharma, 1983) [9]. Adults and nymphs suck sap from the developing grain, which remain unfilled, shrivel, and in severe infestations, become completely chaffy. Among the various pest control methods, host plant resistance is an important component in head bug control (Sharma & Lopez, 1990) [16]. while Garg(1990) [4] recorded that the incidence of ear head bugs on sweet sorghum varieties were ranged from 5.94 to 34.49% bug per ear head.

Materials and Methods

An experimental field was carried at research field, College of Agriculture, Indore (M.P) in collaboration with all India Coordinated Sorghum Improvement Project (AICSIP), Indore (M.P).in RBD with three replication .the plot size was 4.0x0.45 and row to row spacing was 0.45 m and plant to plant distance was at 0.10 m. In the presentation investigation, one resistant (IS-2312) and one susceptible (DJ-6514) check was taken for screening with other genotypes. Normal agronomic practices were followed for raising the crop (Shnrma & Lopez, 1990) [16]. The observation were recorded on flowering stage crop *viz*,. Mirid head bugs (*Calocoris angustatus*, Damage Evaluation for Resistance Screening Sorghum head bugs suck the sap from developing grain which results in shriveling and tanning of grains. Some of the grains may remain undeveloped. The damage symptoms are normally evident on some or all the grains. Head bug damage is generally higher inside the panicle. In some cases, a portion of the panicle may be more damaged than the rest, and some grains may be normal while others show damage symptoms. Head bug damage can be evaluated by the following criteria: Head Bug Counts. Five randomly selected panicles per plot were caged with 10 pairs of head bugs per panicle at the pre-anthesis stage. Head bug numbers were counted 20-days-after infestation (Sharma &Lopez, 1990) [17]. Head bug numbers were counted 20-days-after infestation (Sharma *et al.* 1988) [20]. and Harris K.M.(1961) [15]. while Garg (1990) [4] recorded that the incidence of ear head bugs on sweet sorghum varieties were ranged from 5.94 to 34.49% bug per ear head. The result were recorded evaluated genotypes Sarailoo (1986) [13] noted more damage 53.33 per cent (CS-3541) to 82.5 per cent (CSH-5) in late sown crop as compared to 37.88 per cent (CS-3541) to 66.89 per cent (CSH-5).

Results and Discussion

The results experiment showed about the overall mean population of Ear head bug (*Calocoris angustatus Leth.)* and Ear head worms on sorghum Presented in table1. It could be seen from table1 that there was significant different between the genotypes in respect of number of Significant difference were found among the genotype at milky stage. The lowest ear head bug per ear head were found in IS-2312, SPH-1574, CSH-18, SPH-1569, CSV17(1.81), and SPH-1571(1.88), The maximum bugs population was recorded in genotype, SPH-1570(3.55) and followed by DJ-6514(3.08), SPH-1573(3.11) SPH-1566 (3.08) and SPH-1562 (3.04), while Garg (1990) [4] recorded that the incidence of ear head bugs on sweet sorghum varieties were ranged from 5.94 to 34.49% bug per ear head. Ear head worms (*Contarinia sorghicola*). The data recorded on ear head worms feeding on grains per cob indicated that there was significant difference among genotype tested infestation of ear head worms ranged from 0.24 to 3.11 per cob. Sarailoo (1986) [13] noted more damage 53.33 per cent (CS-3541) to 82.5 per cent (CSH-5) in late sown crop as compared to 37.88 per cent (CS-3541) to 66.89 per cent (CSH-5) in early sown crop due to shoot fly . it was observed ear head bugs and ear head worms infestation was moderately low during kharif,2005. This varied reaction of different entries was mainly associated with grains per cob head par panicle indicating non-preference as a primary mechanism of ear head bugs and ear head worms resistance. The similar, observation were recorded by various workers *viz*., Sharma, et al. (1992) [20], Patel and Sukhani (1990) [10], Balikai, *et al.* (2009) [13] Kannababu *et al* (1998) [8] kulkarnni K.A. and S.G. Bhut (1983) [7] Padama Kumara *et al.* (2000) [11] and Patil and Bagde (2017) [12].

Table 1: Milking stage and dough stage caused by ear head bug and ear head worms (IHT)

S. n	Genoypes	No. of ear head bug/10plant	No.of HW/plant
1	SPH-1561	2.19 (1.46)	0.53 (0.71)
2	SPH-1562	3.04 (1.72)	1.20 (1.86)
3	SPH-1563	2.26 (1.50)	0.62 (0.77)
4	SPH-1564	2.44 (1.55)	0.35 (0.59)
5	SPH-1565	2.57 (1.58)	0.68 (0.81)
6	SPH-1566	3.08 (1.75)	1.11 (1.05)
7	SPH-1567	2.22 (1.47)	0.88 (0.93)
8	SPH-1568	2.68 (1.61)	0.80 (0.87)
9	SPH-1569	1.75 (1.29)	1.46 (1.19)
10	SPH-1570	3.55 (1.86)	3.50 (1.85)
11	SPH-1571	1.88 (1.34)	0.68 (0.81)
12	SPH-1572	2.28 (1.50)	3.11 (1.75)
13	SPH-1573	3.11 (1.75)	0.75 (0.86)
14	SPH-1574	1.22 (1.06)	0.75 (0.86)
15	SPH-1575	2.50 (1.57)	0.86 (0.72)
16	SPH-1576	2.55 (1.64)	0.86 (0.90)
17	SPH-1577	2.33 (1.51)	0.66 (0.80)
18	CSV-17	1.81 (1.33)	0.88 (0.93)
19	CSV-14	2.48 (1.57)	0.80 (0.88)
20	SPH-1342	2.48 (1.57)	0.95 (0.93)
21	CSH-17	2.46 (1.56)	1.04 (1.01)
22	CSH-18	1.55 (1.23)	0.24 (0.40)
23	SPH-1578	2.80 (1.66)	0.75 (0.86)
24	IS-2312 (RC}	1.11 (1.05)	0.37 (0.61)
25	DJ-6514	3.08 (1.75)	3.11 (1.75)
	S.Em+-	0.13	0.06
	CDat 5%	0.37	0.18
		S	S

***** Figures in parenthesis are angular transformed value, DAE= days after emergence,
S= Significant

Conclusion

After evaluation of genotype (hybrids) it could be concluded that head bug (*Calocoris angustatus*), and Ear head worms (*Contarinia sorghicola*) is a major pest of sorghum during kharif, 2005.The interaction was low during cob formation and moderate infestation at maturity stage. it was observed ear head bugs and ear head worms infestation was moderately low during kharif, 2005.

References

1. Anonymous. Agricultural Statistics at a Glance. Government of India Ministry of Agriculture & Farmers Welfare Department of Agriculture, Cooperation &

Farmers Welfare Directorate of Economics and Statistics; 2021. p. 42.
2. Anonymous. Director of Economics and Statistics Department of Agriculture and FarmeWelfareare, Madhya Pradesh; c2021. (http://mpkrishi.mp.gov.in/)
3. Balikai RA, Bhagwat VR. Evaluation of integrated pest management components for the management of shoot fly, shoot bug and aphid in rabi sorghum. Karnataka Journal of Agricultural Sciences. 2009;22:532-534.
4. Garge DC. Screening of sweet sorghum varieties against major insect pests, M.Sc.(Ag.) Thesis, JNKVV, Jabalpur (M.P); c1980.
5. Harris KM. T'he sorghum midge. Contarinia sorghicola Nigeria. Bull. Ent. Rcs. 1961;52:129-146.
6. Jotwani MG, Young WR, Teetes GL. Elements of integrated control of sorghum pests. FAO Plant Protection; c1980.
7. Kulkarnni KA, Bhut SG. Grain weight loss in sorghum due to sorghum ear bug, (Calocoris angustatus) Leth sorghum Newsl; c1983. p. 26:73.
8. Kannababu N, Subbaray B, Rana BS, Tonapi VA, Chari A. Incidence of ear head worms Helicoverpa armigrea (Hubner) on sorghum (*Sorghum bicolor* (L) Moench) seed production plots .Insect Environment. 1998;4(3):88.
9. Leuschner K, Sharma HC. Assessment of losses caused by sorghum panicle pests. in All India seminar on crop losses due to insects pests, 7-9 Jan 1983, Andhra Pradesh Agriculltural University. Rajendranagar. Hyderabad India; c1983. p. 201-213.
10. Patel GM, Sukhani TR. Screening of sorghum genotypes for resistance to shoot fly Atherigona soccata Rondani. Indian Journal of Entomology. 1990;52(1):1-8.
11. Padma Kumara AP, Sharma HC, Reddy DRRR. Components of resistance to the sorghum head bug, Calocoris angustatus Crop protection, 2000 July, 19(6).
12. Patil SP, Bagde AS. Screening of advanced breeding materials sorghum against shoot fly Atherigona soccata Rondani. International Journal of Current Microbiology and Applied Sciences. 2017;6(9):2747-2750.00, Pages 385-392.
13. Sarailoo MH. Susceptibility of sorghum cultivars to shoot fly and stem borer and chemical control of ear head worms. M.Sc.(Ag) Thesis, JNKVV, Jabalpur; 1986.
14. Sharma HC. Screening for host plant resistance to mirid head bugs in sorghum. Proceodings. Internation sorghum entomology workshop. 1984 July;15(1):317-336. Texas A & M University. College Station. Tx, USA. Patancheru A.P, 1985, 502-324. India Internntronal Crops research Institute for the Semi-Arid Tropics.
15. Sharma HC, Iopez VF. Assessmecnt of avoidablc losses and economic injury levels for the sorghum hcad bug. hug. (*Calocoris angustatus* Leth). (Hemiptera: Miiidae). Crop Prot. 1989;8:419-475.
16. Sharma HC, Lopez VF. Screening for host plant resistance to sorghum head bug, Ca1ocoris angustatus Leth. J Insect Sci. Appl. (in press); c1990.
17. Sharma HC, Wanze NKF. Mechanism of resistance to insect in sorghum and their usefulness in crop improvement. Information Bulletin No.45.International Crop Research Institute for the semi-Arid Tropics, Patancheru; c1997. p. 55.
18. Sharma HC, Lopez VF. Screening for plant resistance to sorghum head bug, Calocoris angustatus Leth. Insect Science and Its Application. 1992;13(3):315-325.
19. Sharma HC, Sataynarayana MV, Singh SD, Stenhouse JW. Inheritance of resistance to ear heads bugs and its interaction with grain moulds in sorghum bicolor. Euphytica. 2000;112(2):167-173.
20. Sharma HC, Taneja SL, Kameswara Rao N, Prasada Rao KE. Evaluation of Sorghum Germplasm for Resistance to Insect Pests. Information Bulletin International Crops Research Institute for the Semi Arid Tropics, Patancheru, India. 2003, No. 63.
21. Sharma HC, Vidyasagarand P, Leuschner K. Field Screening Sorghum for Resistance to Sorghum Midge (Diptera: Cecidomyiidae) Journal of Economic Entomology. 1988;81(1):327-334.