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BIOLOGY OF SORGHUM SHOOT BUG *PEREGRINUS MAIDIS* AS INFLUENCED BY VARIETIES

Saicharan Dharavath* and Karabhantanal S S

Department of Agricultural Entomology, College of Agriculture, Vijayapur 586101
University of Agricultural Sciences Dharwad, Karnataka, India
*Email: charan.dharavath@gmail.com (corresponding author)

ABSTRACT

The influence of sorghum varieties on the biology of sorghum shoot bug *Peregrinus maidis* (Ashmead) when evaluated it was observed that the highly resistant variety (Y-75) led to reduced incubation, nymphal and total lifecycle periods (4.30± 1.04, 8.60± 0.76 and 33.50± 3.01 days, respectively). Fecundity was reduced to minimum in variety Y-75 (21.00± 3.60), in maximum while it was Hathi Kunta (55.30± 7.01), while in M 35-1 it was intermediate (42.00± 8.74). The survival was the least on Y-75 (25%) followed by that on M 35-1 (60%) and maximum was on Hathi Kunta (90%). The total lifecycle (days) was significantly less on Y-75 (33.50± 3.01 days) and maximum on Hathi Kunta (45.00± 4.83).

Key words: *Peregrinus maidis*, sorghum, varieties, resistance, biology, oviposition, incubation, larval and lifecycle periods, survival

Sorghum [*Sorghum bicolor* (L.) Moench] is one of the major sources of food for millions of people in tropics and semiarid tropics of world. India holds fifth position in sorghum production next to wheat, rice, maize and barley among the world cereals. There are several factors responsible for decline in the area under sorghum in India. Amongst these insect pests are the major ones. Nearly 150 pests are known to attack the crop from sowing till harvest (Reddy and Davies, 1979; Jotwani et al., 1980; Akshata, 2020). Sorghum shoot bug *Peregrinus maidis* (Ashmead) (Hemiptera: Delphacidae) is a major sucking pest in the northern dry zone of Karnataka. The pest was previously considered to be of minor importance, but now has become a serious pest in rabi sorghum. The qualities of a genotype to counteract insect pests in relation to others is required to be quantified. Thus, insect-plant interactions along with plant chemistry on the preference (choice made by individuals) and performance (growth, survival and reproduction) of insect herbivores needs to be studied. Keeping these in view, the biology of sorghum shoot bug *P. maidis* was studied on different sorghum varieties in this study.

MATERIALS AND METHODS

The biology of *P. maidis* (Ashmead) was studied on three sorghum varieties viz., M 35-1 (moderately susceptible), Hathi kunta (highly susceptible) and Y-75 (highly resistant) during November and December, 2020 under laboratory conditions at the Regional Agricultural Research Station (RARS), Vijayapura, Karnataka. The plants were raised in two sized plastic pots, with 10 days old seedlings in small (1.0 kg capacity) used to study the adult longevity; and 30 days old ones in large pots (5 kg capacity) used to study the oviposition behaviour. The nymphal stages were reared in petriplates (Tsai and Wilson, 1986), and observed for biology and morphometrics. The fecundity was counted under stereozoom microscope by dissecting sorghum leaf near the midrib with fine needles along with staining technique (Gifford and Trahan, 1969).

RESULTS AND DISCUSSION

Among sorghum varieties, fecundity was maximum on susceptible variety Hathi Kunta (55.30± 7.01) which was followed by moderately susceptible M 35-1 (42.00± 8.74) and resistant one Y-75 (21.00± 3.60) (Table 1). Eggs on susceptible variety (Hathi Kunta) hatched in 5.10± 1.26 days as compared to moderately susceptible M 35-1 (4.80± 1.03 days). Chinni Prakash (2019) observed that the lines having glossy leaves during the seedling stage were comparatively resistant. Rajasekhar (1997) observed a fecundity of 29 to 46 eggs with incubation period of 7-10 days. The nymphal duration when reared on resistant variety (Y-75) was least (8.60± 0.76 days), while longer period (13.10± 0.76 days) on Hathi Kunta; intermediate duration of 12.30± 1.04 days was observed with the moderately susceptible M

Table 1. Biology of *P. maidis* on sorghum

Stage of insect		Variety		
		Y- 75 (Highly resistant)	M 35-1 (Moderately susceptible)	Hatthi kunta (highly susceptible)
Egg (Incubation)		4.30± 1.04	4.80± 1.03	5.10± 1.26
I instar		2.00± 0.50	2.30± 1.04	2.80± 1.54
II instar		1.83± 0.28	2.16± 0.27	2.30± 0.76
III instar		1.50± 0.50	2.16± 0.75	2.50± 0.50
IV instar		1.80± 0.76	3.10± 0.76	3.30± 0.76
V instar		2.16± 1.03	2.30± 1.03	3.30± 1.03
Total nymphal stage		8.60± 0.76	12.30± 1.04	13.10± 0.76
Pre-oviposition		2.00± 0.50	1.83± 0.76	2.10± 0.97
Oviposition		6.00± 1.00	6.80± 1.10	7.10± 0.97
Post-oviposition		3.00± 1.00	3.30± 1.25	3.60± 1.57
Survival %		25%	60%	90%
Adult longevity with food	Male	4.80± 0.28	5.00± 1.00	6.50± 1.80
	Female	8.60± 1.52	9.30± 1.50	10.30± 1.31
Adult longevity without food	Male	1.30± 0.57	1.60± 0.76	2.00± 0.5
	Female	1.50± 0.50	2.00± 0.50	2.30± 0.76
Fecundity (Macropterous)		21.00± 3.60	42.00± 8.74	55.30± 7.01
Total lifecycle (Egg to complete death)		33.50± 3.01	42.10± 5.07	45.00± 4.83

35-1. The observations on macropterous adult male and female longevity with food (reared on leaf bits) revealed the least value of 4.80± 0.28 and 8.60± 1.52 days on highly resistant Y-75; while on the moderately susceptible M 35-1 it was 5.00± 1.00 days and 9.30± 1.50 days with the highly susceptible Hathi Kunta) and with lifespan of 6.50± 1.80 and 10.30± 1.31 days, respectively. The survival on highly resistant Y-75 was less (25%) followed by 60% in moderately susceptible M 35-1, and 90% in highly susceptible Hathi Kunta.

The variation in nymphal period, adult longevity and survival with genotypes might be due to various morphological, physiological and biochemical characters. Chinni Prakash (2019) observed a significant and negative correlation between damage at 70 DAE and total phenol content of leaf at seedling (r=-0.201**), vegetative (r=-0.956**) and reproductive stages (r-0.554). Rioja et al. (2006) observed that duration of nymphal instars was 10.05± 1.28, 8.94± 2.02, 9.94± 1.03, and 10.35± 1.73 and 11.06± 2.30 days for the first to the fifth instars. The present observations on adult longevity corroborates with those of Rawat and Saxena (1967). The highly resistant Y-75 was observed with oviposition sites only along the midribs; while in moderately susceptible (M 35-1) and highly susceptible (Hathi Kunta) it was on the midribs and stem, also inside the whorls without any insertion. Thus, the highly resistant Y-75 led to the least survival of *P. maidis* (25%), low fecundity (21.00± 3.60), with low total nymphal (8.60± 0.76) and lifespan (33.50± 3.01).

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Author Contribution Statement

Dharavath designed and conducted experiments. Karabhantanal analyzed data and wrote the manuscript. All authors read and approved the manuscript.

Conflicts of Interest / Competing Interests

Authors clearly state that there is no conflict of interest.

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