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Influence of different host seeds on the development of sesame pod bug, *Elasmolomus sordidus* Fabricius

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Abstract: The comparative performance of sesame pod bug *Elasmolomus sordidus* on four different host seeds *viz.* sesame, groundnut, sorghum and bajra was studied under laboratory condition in terms of egg hatchability, nymphal duration, nymphal mortality, oviposition period, fecundity and adult longevity. The egg hatchability was higher on groundnut (54.6%) and sorghum (50.0%) than on bajra (48.8%) and sesame (48.6%). The nymphal period recorded was 23.0, 24.4, 26.6 and 29.6 days on sesame, groundnut, sorghum and bajra respectively. The nymphal mortality percentage was more on bajra (65.2) and sorghum (59.0) than on groundnut (55.2) and sesame (41.6). The oviposition period was shorter on sesame and groundnut than on sorghum and bajra. Fecundity of the bug was higher on sesame (99.5 eggs / female) and groundnut (81.0) than on other two hosts. The adult longevity of female and male bugs was 32.8 and 35.0, 31.8 and 43.6, 29.6 and 32.6, 24.6 and 28.8 on bajra, sorghum; groundnut and sesame respectively. This study apparently proved that the sesame and groundnut acted as suitable breeding host while sorghum and bajra acted only as feeding host.

Key words: Sesame, Elasmolomus sordidus, Groundnut, Sorghum, Bajra seeds.

Introduction

A substantial number of phytophagous insects utilize more than one plant species in their diet and polyphagous species select the preferred host from an array of host plants depending upon their availability. Insects are capable of discriminating between host and non-host plant species by means of chemoreceptors, the olfactory and gustatory nutritional profiles of the host plant (Saxena, 1969). The seed feeding lygaeid bug, *Elasmolomus sordidus* Fabricius is a pest on groundnut (Slater,1972) and sesame (Sharma *et al.* 1990). This bug was also reported to attack safflower (Deshpande and Rama Rao, 1915), millets (Ghosh, 1924), bajra (Singh and Rai, 1967), soybean (Ali, 1988), wheat(Lefroy, 1971), peepal (Mukhopadhyay, 1989) and a weed plant *Cleome viscosa* (Sanjayan and Ananthakrishnan, 1987).

The effect of variation in diet was measured in terms of growth, development, reproduction, mortality, longevity and morphological abnormalities (Singh, 1977). The influence of different host seeds on the development of lygaeids have been studied by many workers (Ananthakrishnan *et al.* 1982; Mukhopadhyay and Saha, 1992). In the present study, the comparative performance of *E. sordidus* on four-host seeds *viz.* groundnut, sesame, sorghum and bajra was investigated.

Materials and Methods

The influence of different host seeds on the development of *E.sordidus* was studied under the laboratory condition. The biology of sesame pod bug was studied on four different host seeds *viz.* sesame, groundnut, sorghum and bajra in terms of egg hatchability, nymphal duration, nymphal mortality, oviposition, fecundity and adult longevity.

Biology of E.sordidus on sesame

Four mated female bugs were transferred to plastic jars (10 x 8cm) from the mass culture at the rate of one per jar for oviposition. The mature sesame capsules were provided to the bugs served both as food and substrate for oviposition. After the oviposition, the capsules were examined for the eggs laid on them and separated carefully using a camel hair brush.

Table 1. Influence of different host seeds on the development of *E.sordidus**

Host Seed	Hatchability (%)	Nymphal Period (days)	Nymphal Mortality (%)	Oviposition Period (days)	Fecundity eggs/ female	Longevity (days) Male	Female
Groundnut	54.6±1.74	24.4±0.48	55.2±0.75	22.2±0.75	81.0±3.74	32.6±0.49	29.6±0.46
Sesame	48.6±0.49	23.0±0.63	41.6±0.49	19.6±0.8	99.5±3.26	28.8±0.98	24.6±0.49
Sorghum	50.0±0.63	26.6±0.49	59.0±0.63	27.0±0.63	61.8±2.69	34.6±0.49	31.8±0.40
Bajra	48.8±0.75	29.6±0.49	65.2±0.98	25.2±0.49	52.0±2.45	35.0±0.63	32.8±0.75

* Mean of ten observations

Egg hatchability or Viability

The eggs laid per female were counted daily and separated. All the eggs laid by a female were placed on a moist sponge lined with filter paper in Petriplates were observed for hatching. The per cent viability of eggs was worked out using the following formula.

$$\text{Egg Viability (\%)} = \frac{\text{Number of eggs hatched}}{\text{Total no.of eggs laid per female}} \times 100$$

Nymphal duration and mortality

Ten neonate nymphs were transferred to a tubular mylar film cage (45 x 6 cm) containing a branch of sesame plants with capsules for feeding. The period from hatching of neonate nymphs to their development into adults was considered as nymphal duration and ten individuals were observed.

The hatched-out nymphs were reared carefully by providing sufficient food. The nymphs were observed periodically and mortality, if any was recorded. The nymphal mortality was worked out using the formula,

$$\text{Nymphal Mortality} = \frac{\text{Total no.of nymphs died}}{\text{Total no.of hatched out nymphs}} \times 100$$

Nymphs that reached final instar were taken from the rearing cage to a plastic jar (10 x 8 cm) containing sesame capsules for observing the adult emergence. Observation on oviposition period, fecundity and adult longevity were made after the adult emergence. Sexing of bug was done by observing the posterior segment of the abdomen and genital organs. A pair of male and female bugs were transferred to a tubular mylar film cage (45 x 6 cm) for oviposition.

Oviposition period

The time between the first and last oviposition was considered as oviposition period. A total of ten pairs were observed for oviposition period.

Fecundity

A total of ten mated females were transferred to oviposition cages individually for egg laying. The eggs laid per female were counted daily till the egg laying ceased. The mean of total number of eggs laid by ten females worked out and expressed as fecundity.

Adult longevity

Ten each of newly emerged adult male and female bugs were confined individually in plastic jar containing matured sesame capsules and they were observed daily for mortality. The period from the day adult emegencec to death was considered as adult longevity.

The biology of bug studied on groundnut kernels, sorghum and bajra ear heads by adopting the same procedure as on sesame to find out the influence of different hosts on the development of *E. sordidus*.

Results and Discussion

The comparative performance of *E. sordidus* on the four different host seeds

viz. groundnut, sesame, sorghum and bajra is presented in Table 1. The hatchability of eggs was higher when the insect fed on groundnut (54.6%), followed by sorghum (50.0%), bajra (48.8%) and sesame (48.6%). There was no significant difference between sesame and bajra. The nymphal period of *E. sordidus* was 223.0, 24.4, 26.6 and 29.6 days on sesame, groundnut, sorghum and bajra respectively. The results indicated that the nymphal duration was prolonged on bajra. The per cent nymphal mortality on bajra was the highest (65.2), followed by sorghum (59.0), groundnut (55.2) and sesame (41.6). The oviposition period lasted 19.6, 22.2, 25.2 and 27.0 days on sesame, groundnut, bajra and sorghum respectively. Though oviposition period of the bug was longer in sorghum and shorter on sesame, the fecundity was higher on sesame (99.5 eggs/female) followed by groundnut (81.0), sorghum (61.8) and bajra (52.0). The adult longevity of female and male in days was 32.8 and 35.0, 31.8 and 34.6, 29.6 and 32.6, 24.6 and 28.8 on bajra, sorghum, groundnut and sesame respectively.

Mukhopadhyay and Saha (1992) studied the influence of sesame, groundnut, wheat and peepal seeds on the development of *E. sordidus* and found that the nymphal duration was 26.8 on peepal, 29.9 on groundnut, 21.9 on wheat and 20.6 days on sesame. Nymphal duration of *E. sordidus* was 32.5 days on *C. viscosa,* 31.07 days on peepal and 27.7 days on groundnut (Sanjayan and Anandakrishnan, 1987). In the present study, the total nymphal duration was more on bajra (29.6) followed by sorghum (26.6), groundnut (24.4) and sesame (23.0). It is evident that the nymphs completed their development faster on sesame than on other host seeds. When the suitable hosts are available the insects complete their life cycle quickly, enabled by shorter developmental periods of immature stages .The nymphal mortallity of *E. sordidus* on bajra (65.2%) was the highest followed by sorghum (59.0%), groundnut (55.2%) and sesame (41.6%). Earlier findings of Mukhopadhyay and Saha (1992) reinforces the results of the present investigation that nymphal mortality was comparatively lower on sesame than on other hosts.

Though the oviposition period was shorte on sesame than groundnut, bajra and sorghum the highest fecundity was on sesame. Simila observations were made by Mukhopadhyay an Saha (1992). The egg hatchability of *E. sordidu* was higher on groundnut than on other host including sesame and this is in conformity wit earlier findings. Sanjayan and Ananthakrishna (1987) reported that adult longevity of mal and female were 16.5 and 40.5 on groundnut 11.0 and 31.0 on *C. viscosa* and 9.0 and 25.(on peepal. Mukhopadhyay and Saha (1992 reported that adult longevity of male and femal were 33.9 and 31.6 days on sesame, 35.2 an 33.3 on groundnut, 40.5 and 40.5 on whea and 32.1 and 28.5 on peepal. Mukhopadhya and Saha (1995) further observed that the fina instar nymphs and the adults showed the highes consumption of food and weight gain on th seeds of sesame followed by groundnut, whea and peepal.

In the present study, adult longevity o male and female was found to be 32.6 an 29.6 days on groundnut, 28.8 and 24.6 o sesame, 34.6 and 31.8 on sorghum and 35.(and 32.8 on bajra respectively. As reporte by earlier workers, in the present investigatio also the females outlived the males and th longevity of adults was more on groundnu than on sesame. From the above study it i inferred that the sesame and groundnut acte as more suitable breeding hostes for *E. sordidu* than sorghum and bajra which might suppor feeding rather breeding.

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