

Seasonal incidence of sorghum shootfly and correlations with weather parameters

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ABSTRACT

Studies were undertaken on the seasonal occurrence of sorghum shootfly during the *kharif* 2002 at the Main Agricultural Research Station, Dharwad from July to October. Results revealed that, the pest was active through out the study period of four months starting from July first week (27th Standard week) to October last week (44th standard week). The oviposition by shoot fly on 27th standard week was 0.90 eggs per plant, which reached a peak on 33rd standard week (3.2 eggs/plant) and declined gradually up to 0.70 eggs per plant on 44th standard week. Similar trend was observed with respect to dead hearts. During 27th standard week it was 43.1 per cent and reached a peak with 93.4 per cent on crop sown during 33rd standard week and gradually declined to 35 per cent during 44th standard week. Attempts to determine the relationship between egg load and dead heart with weather parameters of 1, 2, 3 and 4 weeks lead time (prior) and same week of the observations revealed the following results. In all the aforesaid correlated weeks, the combined weather parameters of maximum temperature with afternoon and morning relative humidity were highly significant and negatively correlated with egg load and dead heart formation. Whereas, the morning and afternoon relative humidity, minimum temperature and after noon relative humidity together exerted highly significant positive relationship with egg load and dead hearts due to shoot fly. However, the same week weather parameters influenced more on egg load (54 %) and dead heart formation (44.7 %) due to shootfly.

Key words: Sorghum shootfly, Prediction models, Lead time, Weather factors, Correlations

INTRODUCTION

Sorghum shootfly, *Atherigona soccata* Rondani (Muscidae : Diptera) is a major pest during seedling stage and its infestation causes dead heart formation leading to killing of the plants. Nearly 32 per cent of the sorghum crop is lost due to insect pests in India (Borad and Mittal, 1983), of which 5 per cent of the loss has been attributed to sorghum shoot fly (Jotwani, 1983). The incidence of shootfly is known to vary from region to region and season to season. Singh and Verma (1988) reported peak activity of shootfly during August in Hariyana. The activity of shootfly was adversely affected by the atmospheric temperature (> 40°C). However, high relative humidity (>60 %) increased its population. In this study, the relationship of weather parameters of different lead weeks on shootfly incidence and also regression models were developed for early prediction of damage. This may be fruitfully utilized for forewarning farmers and screening of genotypes.

MATERIALS AND METHODS

Studies were undertaken on the seasonal occurrence of sorghum shootfly during the *kharif* 2002 at the Main Agricultural Research Station, Dharwad from July to October. Sowing of hybrid sorghum, CSH-16 was taken up at weekly intervals commencing from 27th standard week (first week of July) to 44th standard week (last week of October) covering 18 sowings. The sowing was carried out on a plot size measuring 3 x 1.35 m with spacing of 45 x15 cm and replicated twice.

Observation on egg load per plant was recorded on twenty randomly selected plants in each plot on 14th day after emergence (DAE) of the crop. Observation on dead heart was recorded on 28th DAE. The per cent dead hearts due to shootfly was worked out based on the number of plants per plot and the number of plants showing dead heart symptoms.

$$\text{Deadhearts \% due to shootfly} = \frac{\text{Number of plants with deadhearts per plot}}{\text{Total number of plants per plot}} \times 100$$

Weather parameters that prevailed during 4th, 3rd, 2nd and 1st week prior (lead weeks) and same week of observation were

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correlated with biological observations (Number of eggs per plant and per cent deadhearts). Multiple regression equation models were developed for the relationship.

RESULTS AND DISCUSSION

Observations recorded on egg load and per cent deadhearts on weekly sown crop are presented in table 1. In the present study all the correlated lead weeks with egg load, the combination of weather parameters *viz.*, maximum temperature with afternoon and

Table 1 : Seasonal incidence of shootfly, *Atherigona soccata* on sorghum

Sowing week (Std. Weeks)	Mean eggs per plant (14 DAE)	Per cent dead heart (28 DAE)
27 (Jul 02-08)	0.90 (1.37)*	43.1 (41.00)**
28 (Jul 09-15)	1.20 (1.49)	69.0 (56.17)
29 (Jul 16-22)	1.50 (1.59)	68.6(55.93)
30 (Jul 23-29)	2.10 (1.76)	79.9(63.36)
31 (Jul 30-05)	2.60 (1.91)	84.4(66.75)
32 (Aug 06-12)	2.80 (1.96)	91.5(73.06)
33 (Aug 13-19)	3.20 (2.04)	93.4(75.12)
34 (Aug 20-26)	3.00 (2.00)	92.0(73.58)
35 (Aug 27-02)	2.80 (1.96)	89.8(75.36)
36 (Sept 03-09)	2.70 (1.92)	86.2(68.19)
37 (Sept 10-16)	2.60 (1.90)	83.3(65.87)
38 (Sept 17-23)	2.30 (1.81)	80.70(63.94)
39 (Sept 24-30)	2.10 (1.76)	73.00(58.68)
40 (Oct 01-07)	1.90 (1.70)	68.80(56.04)
41 (Oct 08-14)	2.10 (1.76)	71.0(57.43)
42 (Oct 15-21)	2.00 (1.73)	68.2(55.68)
43 (Oct 22-28)	1.50 (1.58)	63.5(52.84)
44 (Oct 29-04)	0.70 (1.30)	35.0(36.25)

* Figures in parentheses indicate $\sqrt{x+1}$ transformations

** Figures in parentheses indicate arc sin transformations

DAE = Day after emergence