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Seasonal incidence of maize stem borer-record of new stage and site of oviposition of *Sesamia inferens*

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ABSTRACT :

A field experiment on seasonal incidence of stem borers in corn was conducted at Maize Research Centre, Rajendranagar, Hyderabad. Undertaking sowings at monthly intervals from Jan 2013 to Dec 2013 in an area of 150 m^2 as a replicated trial. DHM 117 hybrid was sown in ridge and furrow method at 75x20 cm spacing. Random destructive sampling was done twice at 30 and 60 DAG @ 4 plants per replication to quantify the genera wise stem borer larval population and also stem tunneling. Observations on stem borer incidence and yield were recorded. Data was subjected to arcsine and square root transformation and two way analysis was conducted. It is evident from the results that among the monthly sowings, September and February are subjected to severe stem borer attack, however, low yields are observed in summer. Hence, it is advisable to take up sowings in July during *Kharif* and in November during *Rabi* to obtain maximum yields with low stem borer incidence.

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INTRODUCTION

In India, though maize crop is being attacked by about 139 species of insect pests, stem borers seriously limit potentially attainable maize yields by 25-40 per cent according to the pest population density and phenological stage of the crop at infestation. Among them *Chilo partellus* is most dominant contributing 90-95 per cent of the total damage in *Kharif* season (Jalali and Singh, 2002) and *Sesamia inferens* is predominant in *Rabi* season. To develop models for predicting pest population based on weather parameters, continuous study on seasonal incidence of pest is essential.

MATERIAL AND METHODS

A field experiment on seasonal incidence of stem borers in corn was conducted at Maize Research Centre, Rajendranagar, Hyderabad. Undertaking sowings at monthly intervals from Jan 2013 to Dec 2013 in an area of 150 m^2 as a replicated trial. DHM 117 hybrid was sown in ridge and furrow method at 75x20 cm spacing. Random destructive sampling was done twice at 30 and 60 DAG @ 4 plants per replication to quantify the genera

wise stem borer larval population and also stem tunneling. Observations on stem borer incidence and yield were recorded. Data was subjected to arcsine and square root transformation and two way analysis was conducted.

RESULTS AND DISCUSSION

Significantly highest stem borer incidence was observed in September (34.93%) and February (32.22%) sown crop. Least incidence was noticed in December (1.39%) which was on par with June (2.53%), July (3.38%) and May (3.65%) sowings. Similarly, significantly highest dead hearts were recorded in September (13.13%) followed by October (6.32), November (5.35%) and February (4.32%) sowings. April to July and December sowings had significantly least number of dead hearts ranging between 0.12 to 1.14 per cent. Though incidence was more, dead hearts were low in February. Divya *et al*. (2009) recorded maximum of 38% stem borer infested plants in sorghum during 40th standard week. Damage by *Busseola fusca* and *Ostrinia nubilalis* in maize had a positive correlation with the number of larvae per plant (Lynch *et al*., 1980 and Usua, 1973).

Stem tunneling at 30 and 60 DAG was highest and significantly on par in September (3.99% and 5.1%, respectively), February (3.6% and 8.8%, respectively) and August sowings (2.18 and 4.79%, respectively). In October, tunneling was noticed in tassels also.

Mixed population of *C.partellus* and *S. inferens* was observed from September to February whereas *Chilo* alone was seen from March to July. Destructive sampling at 30 DAG for *C.partellus* larval recovery revealed no significant differences among june (0.0) and May to December sowings (0.33 to 2.0). Observation at 60 DAG revealed that highest number of spotted stem borer larvae were seen in August (4.33), February (4.0) and March (3.33) sowings. *Chilo* larvae were observed in tassels in March sown crop at 60 DAG. Progressive decrease in the number of larvae recovered from infested plants with increase in plant age might be due to antibiosis, natural predation and environmental factors which affected larval survival (Dayal,1989 and Sarup *et al.*,1977).

Number of *Sesamia* larvae observed at 30 DAG was highest in February (5.33) followed by October (4.33). No significant difference was observed in the number of pink borer larvae at 60 DAG among all the sowings. Stemborer pupae were recorded in July sowing at 60 DAG. Several cocoons of *Cotesia* were recovered from February sown crop at 60 DAG.

Of all the species, pink stem borer eggs are probably the most effectively protected. Eggs are laid in 2-3 longitudinal rows, usually 30-100 per batch between the leaf sheath and the stem of bottom 1-2 leaves. It was

Table 1 : Stem borer incidence in 2013

Month of sowing	Stemborer		Yield Q/ha
	% dead hearts	% infestation	
Jan. 2013	2.69 (8.75) cde	8.64 (16.81) b	40.3 d
Feb.	4.32 (11.86) def	32.22 (34.58) d	26.98 b
Mar.	4.29 (11.47) def	8.74 (16.98) b	0.91 a
April	0.12 (1.15) a	9.83 (17.92) b	25.84 b
May	0.20 (1.48) a	3.65 (10.65) a	26.98 b
June	1.14 (4.73) abc	2.53 (8.67) a	50.84 f
July	0.79 (5.08) abc	3.38 (10.29) a	71.07 g
Aug.	1.83 (7.64) bcd	10.64 (19.03) bc	33.93 c
Sep.	13.13 (21.22) g	34.93 (36.22) d	26.08 b
Oct.	6.32 (14.32) f	17.11 (24.12) c	46.8 e
Nov.	5.35 (13.37) ef	9.23 (17.66) b	135.2 h
Dec. 2013	0.49 (3.99) ab	1.39 (6.77) a	44.98 e
CD	4.7	5.36	3.4

Figures in parentheses are angular transformed values Figures followed by same letter are significantly on par with each other

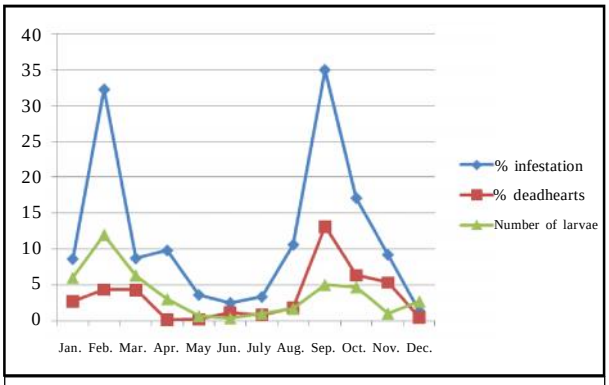

Fig. 1 : Stem borer incidence

found that 12-day old maize plants attracted maximum number of eggs (Anonymous, 2013).On the contrary, an interesting observation was recorded on stage and site of oviposition of *Sesamia inferens*. In December sowing, oviposition was observed on seventh leaf sheath at 35 days after germination (11th leaf stage) when plant height was around 50 cm. Around 100 eggs were observed in one egg batch. This may probably be the source for the secondary infestation manifested in the form of tassel and also immature cob damage. In such cases, full grown stem borer larvae are seen in around 55 days old crop.

Highest yield was obtained from November (135.2 Q/ha) followed by July (71.07 Q/ha) sown crop. Remarkably lowest yield was recorded in March sowing (0.91Q/ha) because of drastic reduction in cob size and almost nil grain filling may be due to high temperatures prevailing during pollination.

Conclusion:

It is evident from the results that among the monthly sowings, September and February are subjected to severe stem borer attack, however, low yields are observed in summer. Hence, it is advisable to take up sowings in July during *Kharif* and in November during *Rabi* to obtain maximum yields with low stem borer incidence.

Table 2 : Mixed population of *C. partellus* and *S. inferens*

Month of sowing	Stem tunneling (%)		Mean no.of *Chilo* larvae/4 plants		Mean no.of *Sesamia* larvae/4 plants	
	30 DAG	60 DAG	30 DAG	60 DAG	30 DAG	60 DAG
1	2	3	4	5	6	7
Jan. 2013	0.0 (0.0) a	3.61(10.75) cd	3.33 (1.90) bcd	2.33 (1.68) cd	2.67 (1.67) abc	1.0 (1.17)
Feb.	3.6 (8.39) cd	8.8 (17.14) e	6.67 (2.58) cd	4.0 (2.11) e	5.33 (2.16) c	1.0 (1.17)
Mar.	0.0 (0.0) a	3.31 (10.28) cd	6.33 (2.63) d	3.33 (1.95) de	0.0 (0.71) a	0.0 (0.71)
April	0.67(3.67) abc	1.79 (5.97) abc	3.0 (1.86) bcd	0.33 (0.88) a	0.0 (0.71) a	0.0 (0.71)
May	0.0 (0.0) a	0.33 (1.9) a	0.67 (1.05) ab	0.0 (0.71) a	0.0 (0.71) a	0.0 (0.71)
June	0.26 (1.68) ab	0.49 (3.04) ab	0.0 (0.71) a	0.0 (0.71) a	0.33 (0.88) ab	0.0 (0.71)
July	0.0 (0.0) a	2.67 (8.75) bcd	1.0 (1.17) ab	1.0 (1.23) bc	0.0 (0.71) a	0.0 (0.71)
Aug.	2.18 (6.93) bcd	4.79 (12.48) de	1.0 (1.09) ab	4.33 (2.09) de	0.67 (0.99) ab	0.0 (0.71)
Sep.	3.99 (11.3) d	5.10 (12.88) de	2.0 (1.48) abc	0.33 (0.88) ab	3.0 (1.81) bc	3.0 (1.68)
Oct.	0.0 (0.0) a	3.87 (10.65) cd	0.33 (0.88) ab	0.0 (0.71) a	4.33 (1.94) c	1.0 (1.17)
Nov.	0.0 (0.0) a	0.23 (1.58) a	0.67 (0.99) ab	0.67 (1.05) ab	0.33 (0.88) ab	0.0 (0.71)
Dec. 2013	0.73 (4.0) abc	1.09 (5.96) abc	2.0 (1.43) ab	1.0 (1.23) bc	0.67 (0.99) ab	0.0 (0.71)
C.D.	5.99	6.06	1.11	0.51	0.98	NS
	Max. temp.	Min. temp.	RH I	RH II	Rainfall	Sunshine hrs
Deadhearts	-0.224	-0.299	0.198	0.086	0.351	0.109
%infestation	0.04	-0.123	-0.121	-0.116	0.173	0.226

Figures in parentheses in columns 2 to 3 are angular transformed values and in columns 4 to 7 are √x+0.5 transformed values
Figures followed by same letter are significantly on par with each other NS= Non-significant

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