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RESEARCH ARTICLE

Comparative study of incubation period of *Chilo partellus* (Swinhoe) in different temperature under the natural conditions

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ABSTRACT

Chilo partellus (Swinhoe) (Lepidoptera: Pyralidaea) as reported by Kumar (1997) and Songa et. al. (2002) is the most notorious of insect pests attacking Maize (Zea mays L.) in Asia and Africa. Subhasinghe and Amersena (1988) reported that the population of C. partellus increased in March at the end of maha season. Mahadevan and Chelliah (1986) conducted study in Tamil Nadu and found positive correlation between maximum daily temperature and percentage of stem damage, Therefore, the present work was carried out to study population dynamics of Maize stem borer in relation to weather condition. This would help farmer to control the pest effectively. The incubation period of eggs show the usual kind of relation with temperature expressed as the average daily maximum, minimum and mean temperature during monthly period from July 2008 to June 2009. The eggs were kept in natural condition of the environment to note their incubation period. The Fig. 1 shows that in natural condition of environment of the incubation period varies from 2 to 10 days the mean incubation varying from 2.33 ± 0.23 days in January to 7.33 ± 0.23 in November. In January and December there was very poor hatching of eggs as well as incubation period.

Keyword: *Chilo partellus, Maize, Incubation period.*

INTRODUCTION

Maize (*Zea mays* L.) is one of the most important cereal crops in the world and provides more human food than any other cereal. In India Maize is grown over an area of 5.7 million hectares with total production of about 6 million tons. The states of Uttar Pradesh, Bihar, Madhya Pradesh, Rajasthan and Punjab account for over 75 per cent of the area and production of this cereal in the country. Maize is essentially a warm weather or *kharif* crop and as such is largely dependent upon the rains. In India Maize crop is being attacked by about 139 species of insect pests with varying degree of damage. However, only about a dozen are quite serious Sarup *et al.* (1987), Siddiqui and Marwaha (1994). Among them some important lepidopteran stem borers seriously limit potentially attainable by infesting the crop throughout its growth, from seedling stage to maturity. Seventeen species in two families (Pyralidae and Noctuidae) *Chilo partellus* (Swinhoe), *Chilo orichalcociliellus* (Strand), *Busseola fusca* (Fuller), *Sesamia calamistis* (Hampson), and *Eldana saccharina* (Walker) are of great importance. The yield losses caused by stem borers to Maize vary widely in different regions and range from 25-40% Khan *et. al*. (1997).

Chilo partellus (Swinhoe) (Lepidoptera: Pyralidaea) as reported by Kumar (1997) and Songa *et. al.* (2002) is the most notorious of insect pests attacking Maize in Asia and Africa. Feeding and stem tunneling by borer larvae on plants results in crop losses as a consequence of destruction of the growing point, early leaf senescence, interference with translocation of metabolites, and nutrients that result in malformation of the grain, stem breakage, plant stunting, lodging, and direct damage to ears Appert (1970); Bosque-Perez and Mareck (1991); Breniere (1971).

Modern insect control methods rely on a sound knowledge of insect seasonality, in controlling insect population there should be an accurate and rapid method of monitering pest population. Subhasinghe and Amersena (1988) reported that the population of *C.*

partellus increased in March at the end of maha season. Mahadevan and Chelliah (1986) conducted study in Tamil Nadu and found positive correlation between maximum daily temperature and percentage of stem damage, Therefore, the present work was carried out to study population dynamics of Maize stem borer in relation to weather condition. This would help farmer to control the pest effectively.

MATERIALS AND METHOD

The field experiments were conducted during July to October in the year 2008 and 2009 in the farmer's field at Etah district of western Uttar Pradesh. This Research site is within the semi arid zone of Uttar Pradesh and Rajasthan located at 26.2 North and 76.9 East latitude.

For the study of the population dynamics of the insect species experiment were conducted in small plots on the field. Net plot size was 2m x 3m, number of rows per plot -10, number of dibbles per plot 200, spacing between row 20 cm, spacing within row 15 cm, number of treatment -2, number of replication-3.

Stem borer infestation was assessed at 7 weeks after the crop emergence. The percent stem borer damage was estimated by the number of plants with stem borer larvae, pupae or exit holes of the adult emergence against the total number of plants per plot. Number of exit holes were counted in all plants and then dissected to count the total number of larvae and pupae. The eggs were collected manually that were laid on the leaves.

Singh and Sandhu (1981) observed the maximum number of stem borer eggs when the plant height was 2-4 cm above the ground level. Hence, abiotic factors namely maximum and minimum temperature and humidity were recorded for the Maize crop.

RESULTS AND DISCUSSION

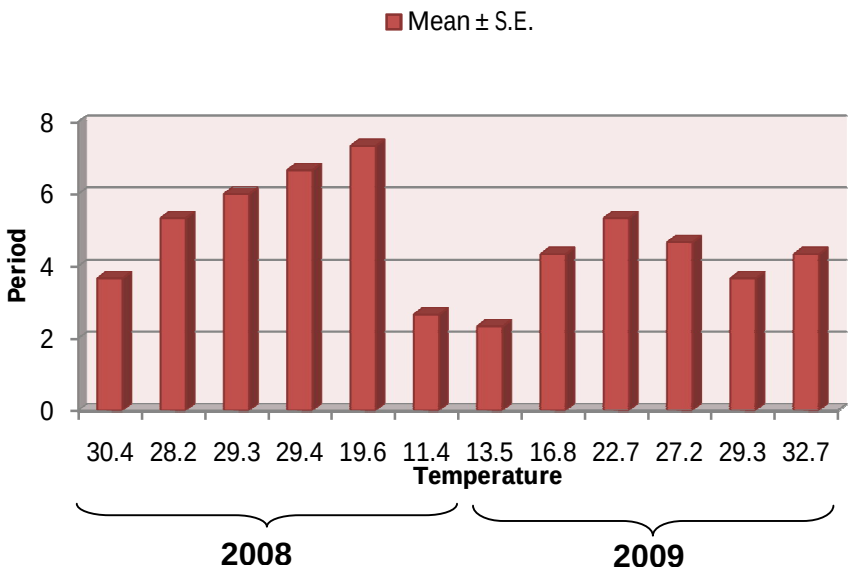
The incubation period of about 1589 eggs has been studied during different months and results are shown in (Table- 1). The incubation period of eggs show the usual kind of relation with temperature expressed as the average daily maximum, minimum and mean temperature during monthly period from July 2008 to June 2009. The eggs were kept in natural condition of the environment to note their incubation period.

Table-1 and Fig. 1 shows that in natural condition of environment of the incubation period varies from 2 to 10 days the mean incubation varying from 2.33 ± 0.23 days in January to 7.33 ± 0.23 in November. In January and December there was very poor hatching of eggs as well as incubation period.

Table- 1: Incubation period of *Chilo partellus*, in different months under the natural conditions of the environment

Period	Maximum Temp. °C	Minimum Temp. °C	Mean Temp. °C	No. of Eggs	Incubation period	Mean ± S.E.
Year 2008						
July	34.8	26	30.4	50	3 – 4 Days	3.66 ± 0.94
Aug.	32.9	24.5	28.2	155	4 - 6 Days	5.33 ± 1.65
Sept.	33.6	25.1	29.3	170	3 - 6 Days	6.00 ± 2.82
Oct.	34.8	24	29.4	200	4 - 8 Days	6.66 ± 1.65
Nov.	23.5	15.8	19.6	200	7 - 8 Days	7.33 ± 0.23
Dec.	19.0	3.9	11.4	172	2 - 4 Days	2.66 ± 0.94
Year 2009						
Jan.	21.5	5.4	13.5	480	2 - 6 Days	2.33 ± 0.23
Feb.	25.9	7.7	16.8	150	4 - 7 Days	4.33 ± 1.65
Mar.	32.8	12.7	22.7	150	4 - 10 Days	5.33 ± 1.65
April	36.4	18.1	27.2	40	4 - 7 Days	4.66 ± 0.23
May	38.2	20.4	29.3	72	3 - 3 Days	3.66 ± 0.23
June	40.2	25.2	32.7	50	4 - 5 Days	4.33 ± 1.65

Fig.- 1: Incubation period of *Chilo partellus* (Swinhoe) in different temperature under the natural conditions



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