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First record of *Helicoverpa armigera* (Hubner) infesting rapeseed (*Brassica napus* var. *napus*) in Dhemaji district of Assam, India

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Abstract

Helicoverpa armigera (Hubner) is a cosmopolitan pest and its polyphagous nature has resulted in loss of production of economically important crops including Tomato, King Chilli, Maize and blackgram in Dhemaji district of Upper Brahmaputra Valley Zone of Assam, India. On February 8, 2023, larvae of *Helicoverpa armigera* feeding voraciously on the pods of Rapeseed (*Brassica napus* var. *napus*) were reported for the first time in a village near Lechia river of Dhemaji where rapeseed is cultivated over 1000 hectares of contiguous area. The larvae were found to be feeding on the green pods as well as on the mature pods leaving behind its distinctive circular hole on the pods. The mean larval population was 14.8 /m². The infestation resulted in a yield reduction of 38% in the area. High relative humidity during the outbreak of the pest might have led to a high population buildup of the larvae. However further research is needed to unravel the exact cause behind the sudden outbreak of the pest.

Keywords: *Helicoverpa armigera*; polyphagous; rapeseed; relative humidity

Introduction

Helicoverpa armigera (Hubner) is a cosmopolitan pest that causes economic losses to a wide range of cash crops and horticultural crops. The polyphagous nature of the pest has served itself various acronyms like gram caterpillar or pod borer, cotton bollworm, Corn earworm and tomato fruit borer. It is able to adapt to various cropping systems due to its high mobility, migratory potential, facultative diapause and high fecundity. (Reigada *et al.* 2016) [10]. Adult *H. armigera* can engage in long distance migration in all geographies in the absence of suitable host plants or when environmental conditions become unfavorable. (Jones *et al.* 2019) [5]. Adults are helped by wind currents and can travel over 250 km/day. (Zhou *et al.* 2000 [15], Sullivan and Molet 2007 [13], Feng *et al.* 2009 [4]). The host range of *H. armigera* includes 300 plants (Sarate *et al.* 2012) [11] from both cultivated and weed plants across 45 families. (Celorio-Mancera *et al.* 2012 [2]; Tay *et al.* 2013 [14]). There has been reports of *Helicoverpa armigera* infesting *Brassica napus* and *Brassica juncea* as minor pest in Pakistan (Aslam and Razaq 2007) [1] and Iran (Karimi *et al.* 2012) [6].

Rapeseed-mustard is the major oilseed crop of Assam. In 2018-19, Rapeseed -mustard was cultivated in an area of 2.86 lakh ha, with a production of 1.84 lakh tonnes and productivity of 643 kg/ha (Chakrabarty *et al.* 2021) [3]. Dhemaji is a remote district in the state of Assam situated at the eastern most corner of the state. It is covered by the river Brahmaputra on the southern border and there are a series of about 20 rivers as its tributaries. Rapeseed is the main oilseed crop of Dhemaji district and second major crop after paddy by which covers about 16% of the gross cropped area with average productivity of 5.6 q/ ha. Farmers of Dhemaji mostly cultivate with their own seeds along with high-yielding varieties TS 36, TS- 38 etc. In the recent years, it has been seen that the weather parameters have played crucial role in crop establishment as well as for insect pest biology and their seasonal occurrence. In the present study, we present the data related to the first occurrence of *H. armigera* with gregarious feeding on rapeseed pods recorded in Dhemaji district of Assam, India.

Materials and Methodology

In February 8, 2023 farmers from Jamukani village along with the officials of District Agriculture Department, Dhemaji, Assam communicated with the scientists of Krishi Vigyan Kendra, Dhemaji about the incidence of a pest that was feeding voraciously on the green as

well as mature pods of Rapeseed. In a quick response to the concern of the farmers, scientist from KVK, Dhemaji visited the field. The geographical coordinates of the area was taken. The pod damage characteristic symptoms were recorded and the larval population per meter square was counted and replicated thrice to find out the average larval population per meter square. The larvae were collected and placed in plastic containers and brought to the KVK, Dhemaji laboratory for further study. Field collected larvae were reared on green and matured rapeseed pods kept in small plastic test tubes under room temperature. The pods were then replaced every second day. The larvae were then identified using the key by SANTOS, L.Q. 2005 [8].

Results and Discussion

The plot in which the outbreak of the pest occurred was 7 km South east from Dhemaji headquarter (Lat 27.447154° and Long 94.617905°). From the preliminary observation in the field it was seen that the larvae fed on the green pods as well as on the mature pods of rapeseed leaving behind its distinctive circular hole on the pods. The average larval population was 14.8 /m². From the laboratory observation of the larvae collected from field and from the keys by SANTOS, L.Q. 2005 [8] it was identified that they were the fifth instar larvae of *Helicoverpa armigera*. The larva was brown in color with brown lateral stripes and continuous dorsal stripe. The head was reddish brown. The average body length was 34.03mm and body breadth was 4.01mm. Similar results were reported by Sharma *et al.* 2011 [12] who recorded body length and breadth of fifth instar larvae of *H. armigera* to be 32.40±0.92 and 5.20±0.02 mm on tomato and also by Rabari *et al.* 2017 [9]. Moreover, the infestation resulted in a yield reduction of 38% in the area. The weather parameters recorded during the 6th SMW indicated that average maximum temperature was 24.44 °C, average relative humidity was 84.5% and average rainfall was 1.70mm. A study conducted by Mukherjee and Bhowmick 2009 [7] revealed that *H. armigera* population had significantly negative correlation with maximum temperature and significantly positive correlation with afternoon relative humidity. Thus, one can assume that weather parameters might have a role in the sudden outbreak and high population buildup of the pest in the area.

Conclusion

There is a possibility that *Helicoverpa armigera* might become a serious pest of this valuable oilseed crop due to the polyphagous nature and high population in rapeseed growing areas of Dhemaji. Apart from causing hindrance to the production sector it will also hamper the demand, supply and price chain. Moreover it has been seen that the increasing dependence on insecticides to minimize the losses because of *H. armigera*, has made this pest resistant to several insecticides. Hence it is utmost necessary to study about the early warnings of the risks associated with the pest along with the impact of climate change in buildup of pest population so that an effective IPM module can be framed for the management of *H. armigera*.

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