



REPORT OF FALL ARMY WORM *SPODOPTERA FRUGIPERDA* FROM BUNDELKHAND REGION OF UTTAR PRADESH

RAKESH PANDEY^{1*}, A K SINGH², M K MISHRA¹, B K SINGH¹ AND S K SINGH¹

¹Department of Entomology, College of Agriculture; ²Department of Plant Protection, College of Horticulture, Banda University of Agriculture and Technology, Banda 210001, Uttar Pradesh, India

*Email: pandeyent@gmail.com (corresponding author)

ABSTRACT

The fall army worm (FAW) *Spodoptera frugiperda* (J E Smith) is spreading throughout maize growing tracts of India. In the Bundelkhand region of Uttar Pradesh this pest was noticed in Banda district during 2020. The maize crop was badly affected in the region and even harvesting could not be possible because of the heavy toll caused by the FAW larvae in production of cobs. Finger millet and groundnut were other crops which were severely affected.

Key words: *Spodoptera frugiperda*, Banda, Bundelkhand region, damage, incidence, finger millet, groundnut, maize, Uttar Pradesh

The Bundelkhand region has semiarid landscape and the cropping pattern is monsoon based, with sorghum, maize, bajra, minor millets, pigeonpea, mung bean, urd bean, groundnut, linseed, sesame and vegetables grown during kharif season. These are heavily infested by insect pests with economic losses. The kharif crops viz., rice, maize, mungbean, urd bean, pigeonpea, sesame, groundnut, finger millet are grown in the university farm. Routine field inspection of these revealed occurrence of many caterpillars. Considering the damage severity, a study was done to ascertain the status of fall army worm *Spodoptera frugiperda* (J E Smith) (Lepidoptera: Noctuidae). This pest has gained attention internationally since its outbreak in Africa in 2016 and Asia in mid-2018. It is found in the western hemisphere's tropical zone, from the United States to Argentina. It was discovered in Africa in 2016, inflicting severe damage to maize (Goergen et al., 2016). It has a wide host range including maize, sorghum, millets, rice, sugarcane, soybean, vegetables, and cotton (Prowell et al., 2004; Bueno et al., 2010; Padhee and Prasanna, 2019). The occurrence of *S. frugiperda* and its associated natural enemies is reported from India (Shylesha et al., 2018; Sharanabasappa et al., 2018). This study explores its occurrence from the Bundelkhand region of Uttar Pradesh.

MATERIALS AND METHODS

The study was conducted in the field and laboratory of Banda University of Agriculture and Technology, Banda. The various crops grown were inspected to observe the incidence of insect pests, from July to

October, 2020. Under a routine inspection, it was noticed that a caterpillar infested entire maize fields and adjoining areas covering finger millet and groundnut. Scheduled visits were made at 10 days interval, and the pest was identified, with observations on symptoms of damage. Its morphological features of different stages were studied in the laboratory. Key characters were observed as described earlier (Oliver and Chapin, 1981; Prasanna et al., 2018; Sharanabasappa et al., 2018; Ganiger et al., 2018). Larvae collected from fields were reared in laboratory to confirm its biology..

RESULTS AND DISCUSSION

The damage observed in the fields revealed that leaves had longitudinal scars as well as irregular holes along with torned leaves. The lumps of excrement of larva were observed on the leaves as well as whorls of infested plants. The infested crop was at vegetative stage and more damage was noticed on the crops sown 15-20 days during July. Deshmukh et al. (2021) observed initially, first instar larva scrapes the chlorophyll from the leaves and make a longitudinal scar. However, second and third instar larvae make holes in tightly twisted whorls of the maize. Shylesha et al. (2018) also reported that in the later stages, larval feeding creates huge feeding patches on the open leaves. It was observed that larvae were usually hidden during the daytime and come out at night. It was observed that during kharif season, a number of crops viz., rice, maize, finger millet, groundnut, sesame, pigeonpea, mungbean, urdbean, etc. were grown in the farm of the University. Of these, severe infestation was observed

in maize, finger millet and groundnut. This pest is a polyphagous pest of voracious nature, with a large host range of >100 plant species in 27 families (Goergen et al., 2016). It prefers Gramineae plants, which include maize, millet, sorghum, sugarcane, rice and wheat (Shylesha et al., 2018).

The larval and adult stages collected and reared in the laboratory revealed that the eggs were laid in groups with a layer of gray over the egg mass. The hatched larvae were in groups, green, with black heads, while later instars were brown with white lines on the either side of the body. The head of the mature larva was reddish brown and there were dark spots on the body. In addition, a white inverted 'Y' mark observed on the front of the face of the mature larva as well as four visible black dots grouped in a square on the dorsum of the eighth abdominal segment. Fully grown larva underwent pupation with the remnants of dried leaves and other materials. Pupa was reddish brown with two spines on the cremaster. Adult moths emerged after 8 to 10 days of pupation. Moths were 35 to 38 mm in size, with fore wing of the male brown and the triangular white spots are at the apex and center of the wing; in female moth these marks were not evenly observed; but with variegated silver-white mark with narrow dark borders in both male and female. These findings corroborate with those of Oliver and Chapin, 1981; Prasanna et al., 2018; Sharanabasappa et al., 2018; Ganiger et al., 2018; Shylesha et al., 2018; Gavas and Balan, 2020. Moths were most active in the evening and during the night hours. Infestation in maize and other crops at Banda has been thus confirmed. IITA (2018) has raised greater concern about the invasion of *S. frugiperda* into India; it has also been reported in maize growing areas from Aligarh region of Uttar Pradesh (Shekhawat, 2019; Naganna et al., 2020).

AUTHOR CONTRIBUTION STATEMENT

All authors equally contributed.

CONFLICT OF INTEREST

No conflict of interest.

REFERENCES

- Bueno R, Carneiro T R, Bueno A F, Pratisoli D, Fernandes O A, Vieira S S. 2010. Parasitism capacity of *Telenomus remus* Nixon (Hymenoptera: Scelionidae) on *Spodoptera frugiperda* (Smith) (Lepidoptera: Noctuidae) eggs. Brazilian Archives of Biology and Technology 53: 133-139.
- Deshmukh Sharanabasappa S, Prasanna B M, Kalleshwaraswamy C M, Jaba Jagdish, Choudhary Bhagirath. 2018. Fall army worm (*Spodoptera frugiperda*). Polyphagous pests of crops. Omkar (ed.) Springer Nature Singapore Pte Ltd. 2021 https://doi.org/10.1007/978-981-15-8075-8_8.
- Ganiger P C, Yeshwanth H M, Muralimohan K, Vinay N, Kumar A R V, Chandrashekara K. 2018. Occurrence of the new invasive pest, fall army worm, *Spodoptera frugiperda* (J.E. Smith) (Lepidoptera: Noctuidae) in the maize fields of Karnataka, India. Current Science 115: 621-623.
- Gawas R, Balan S. 2020. The first report on fall army worm, *Spodoptera frugiperda* (J.E. Smith) (Lepidoptera: Noctuidae) as an invasive pest in banana from Kerala, South India and notes on its behaviour. Insect Environment 23: 20-24.
- Goergen G, Kumar P L, Sankung S B, Togola A, Tamo M. 2016. First report of outbreaks of the fall army worm *Spodoptera frugiperda* (J. E. Smith) (Lepidoptera, Noctuidae), a new alien invasive pest in west and Central Africa. PLoS One 11(10): e0165632. <https://doi.org/10.1371/journal.pone.0165632>
- IITA. 2018. Fall army worm has reached the Indian subcontinent! Available from: <http://www.iita.org/news-item/fall-armyworm-has-reached-the-indian-subcontinent/> published 04/08/2018.
- Naganna Repalle, Jethva D M, Bhut J B, Wadaskar Pankaj S, Kachot Akash. 2020. Present status of new invasive pest fall army worm, *Spodoptera frugiperda* in India: A review. Journal of Entomology and Zoology Studies 8(2): 150-156.
- Oliver A D, Chapin J B. 1981. Biology and illustrated key for the identification of twenty species of economically important noctuid pests. Louisiana Agricultural Experiment Station Bulletin, No. 733.
- Padhee A K, Prasanna B M. 2019. The emerging threat of fall army worm in India. Indian Farm 69(1): 51-54.
- Prasanna B M, Huesing J E, Eddy R, Peschke V M. 2018. Fall army worm in Africa: a guide for integrated pest management, 1st edn. CIMMYT, Mexico, CDMX.
- Prowell D P, McMichael M, Silvain J F. 2004. Multilocus genetic analysis of host use, introgression and speciation in host strains of fall army worm (Lepidoptera: Noctuidae). Annals of the Entomological Society of America 97: 1034-1044.
- Sharanabasappa D, Kalleshwaraswamy C M, Asokan R, Mahadeva Swamy H M, Maruthi M S, Pavithra H B, Hegde K, Navi S, Prabhu S T, Goergen G. 2018. First report of the fall army worm, *Spodoptera frugiperda* (J E Smith) (Lepidoptera, Noctuidae), an alien invasive pest on maize in India. Pest Management in Horticultural Ecosystems 24: 23-29.
- Sharanabasappa D, Kalleshwaraswamy C M, Maruthi M S, Pavithra H B. 2018. Biology of invasive fall army worm *Spodoptera frugiperda* (J E Smith) (Lepidoptera: Noctuidae) on maize. Indian Journal of Entomology 80(3): 540-543.
- Shekhawat, S. 2019. Fall army worm (*Spodoptera frugiperda*) on maize in Aligarh (UP). <https://www.researchgate.net/deref/https%3A%2F%2Fwww.linkedin.com%2Fpulse%2Ffall-armyworm-spodoptera-frugiperda-maize-aligarh-up-shekhawat>.
- Shylesha A N, Jalali S K, Gupta A, Varshney R, Venkatesan T, Shetty P, Ojha R, Ganiger P C, Navik O, Subaharan K, Bakthavatsalam N, Ballal C R. 2018. Studies on new invasive pest *Spodoptera frugiperda* (J E Smith) (Lepidoptera: Noctuidae) and its natural enemies. Journal of Biological Control 32(3): 1-7.

(Manuscript Received: May, 2022; Revised: March, 2022;

Accepted: May, 2022; Online Published: June, 2022)

Online First in www.entosocindia.org and indianentomology.org Ref. No. e22226