Journal of Entomology and Zoology Studies

Available online at www.entomoljournal.com

E-ISSN: 2320-7078
P-ISSN: 2349-6800
JEZS 2020; 8(1): 1038-1040

Received: 04-11-2019
Accepted: 08-12-2019

**Rashmi Joshi**
Research Scholar, G B Pant University of Agriculture & Technology, Pantnagar U S Nagar, Uttarakhand, India

**Neeta Gaur**
Associate Professor, G B Pant University of Agriculture & Technology, Pantnagar U S Nagar, Uttarakhand, India

**Sudha Mathpal**
Research Scholar, G B Pant University of Agriculture & Technology, Pantnagar U S Nagar, Uttarakhand, India

**JP Purwar**
Associate Professor, G B Pant University of Agriculture & Technology, Pantnagar U S Nagar, Uttarakhand, India

**Corresponding Author:**
**Rashmi Joshi**
Research Scholar, G B Pant University of Agriculture & Technology, Pantnagar U S Nagar, Uttarakhand, India

# Reporting of *Spodoptera frugiperda* (J. E. Smith) (Lepidoptera: Noctuidae) in Dehradun district of Uttarakhand, India

**Rashmi Joshi, Neeta Gaur, Sudha Mathpal and JP Purwar**

**Abstract**
Fall armyworm *Spodoptera frugiperda* (J. E. Smith) is an economically important pest native to tropical and subtropical regions of America. Recently this pest became new native species in India after its first occurrence was reported in 2018 in Karnataka. Its occurrence was noticed in Dehradun district of Uttarakhand and morphological tools were used to identify the pest. The studies revealed that the pest obtained from the region was fall armyworm and herewith we report the invasion of this pest in Dehradun, Uttarakhand and the pest may become a challenge to the farming of hill state.

**Keywords:** *Spodoptera frugiperda* (J. E. Smith), castor, Dehradun, Uttarakhand

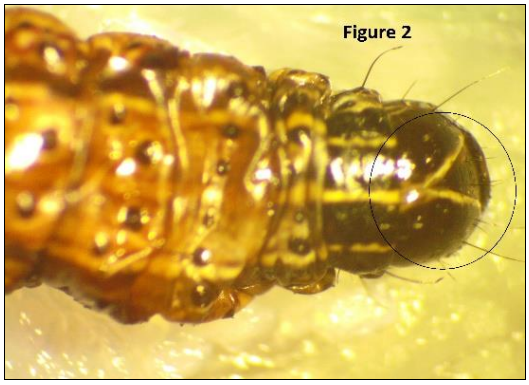
## Introduction
Invasive pest species also referred as Invasive alien species contribute second most important threat to agricultural biodiversity, forestry and result in heavy damage (CBD, 2001) [3]. "Alien species are non-native or exotic organisms that occur outside their natural adapted ranges and dispersal potential" (Raghubanshi *et al*, 2005) [9]. *Spodoptera. frugiperda* is one of the economically important pest natives to America and spread to African continent which was reported in 2016 (Goergen *et al*., 2016) [7]. *S. frugiperda* has been found to be occurring in 30 African countries (FAO, 2018) [4] and also caused damage of around US dollar 500 million in South-East United States and the Atlantic coast (Young, 1988) [11]. Out of the various invasive insect pest species established in India, *S. frugiperda* is gaining attention after its first report of introduction in the country (Sharanabasappa *et al*, 2018) [10], due to its highly destructive nature. It has been also reported from other parts of India after its first incidence was reported in Karnataka in 2018 following extensive surveys. In one of such surveys conducted in Dehradun district of Uttarakhand, it was found to occur in one of the farmers field growing maize and vegetables. The egg mass collected was initially confused with Cutworm, *Spodoptera litura* egg masses however after further studies it was found as occurrence of *S. frugiperda*.

## Materials and Methods
### Collection of samples
Survey was conducted in first week of October in Dehradun district of Uttarakhand. Village Bimora, Dakpathar is a locality in Dehradun famous for agriculture *viz*. fruits, vegetables, cereals etc. It is located at 30.28'29.4"N and 77.46'40.3"E (Figure 4). Egg masses were collected from Castor and reared in laboratory for further identification (Figure1).

### Identification of insect
The insect was identified on the basis of its larval morphological characteristics of early and late instars and was also identified from ICRISAT, Patancheru, Hyderabad

## Results and Discussion
The egg mass was collected from Castor plant near maize fields since the maize plant was at its maturity. These egg masses being confused with *S. litura* was brought to the laboratory and reared. The egg mass resembled that of *S. litura* being creamy white and covered with scales of grey colour. Further identification of larvae was confirmed on the basis of specific characters described earlier (EPPO, 2015; CABI Datasheet; Ganiger, 2018 and Gilligan & Passoa, 2014) [1, 2, 5, 6]. Characters such as suture on head region, colour, Pinacula were studied to observe larval identification.


1.




2.


3.


4.

**Fig 1:** Laboratory rearing of *S. frugiperda*, 2) Characteristic head feature of early instar larvae preserved sample, 3) Abdominal features of late instar larvae and 4) Location of Vikasnagar, Dehradun using Google map.

**Identification of Early instar larvae**

The pattern on the head is very pronounced which is otherwise very difficult to identify (Figure1).

**Identification of Late instar larvae**

The fourth instar *Spodoptera* larva was studied for major morphological characteristics that is used to identify the *frugiperda* species of the insect. The larva was almost black in colour (Pogue, 2002) [8] and dark pinacula were present. Body of late instar larvae is cuticle with granular texture. The dorsal pinacula on abdominal segment one to eight were peculiar and were larger than diameter of spiracle of the corresponding segment. On 8th segment pinacula were arranged in a square while in 9th segment they were present in trapezoid fashion (Figure3) (Ganiger *et al*, 2018) [5]. Detailed information on its larvae was also retrieved from http://idtools.org/id/leps/lepintercept/frugiperda.html (Gilligan & Passoa, 2014) [6].

**Conclusion**

Thus, it was concluded from the pronounced morphological characters that *S. frugiperda* has even entered into one of the major agriculture districts i.e. Dehradun in hill state Uttarakhand and may become a potential pest of agriculture belts of Uttarakhand which is a matter of serious concern.

**Acknowledgement**

We hereby acknowledge Pantnagar University to provide all the facilities related to survey and collection of data. We are also sincerely thankful to Dr. Jaba Jagdish, ICRISAT for helping us in identification of pest and Mr. Suneel Kumar Pandey for his efforts in making the survey successful.

**References**

1. Bulletin OEPP/EPPO Bulletin. *Spodoptera littoralis, Spodoptera litura, Spodoptera frugiperda, Spodoptera eridania*. European and Mediterranean Plant Protection Organization. 2015; 45(3):410–444.
2. CABI, Data sheet. *Spodoptera frugiperda* (fall army worm). Invasive species compendium. http://www.cabi.org/ isc/datasheet/29810.2016.
3. Convention on Biological Diversity (CBD). Alien species that threaten ecosystems, habitats or species. Annex: interim guiding principles for the prevention introduction and mitigation of impacts of alien species. http://www.biodiv.org, 2001.
4. FAO. Briefing Note on FAO Actions on Fall Armyworm in Africa 31 January 2018. In: Briefing Note on FAO Actions on Fall Armyworm in Africa 31 January 2018 FAO, Rome, Italy, 2018, 6.
5. Ganiger PC, Yeshwanth HM, Muralimohan K, Vinay N, Kumar ARV, Chandrashekara K. First report on the occurrence of the Fall Armyworm, *Spodoptera frugiperda* (J. E. Smith) (Lepidoptera, Noctuidae), a New Pest in Karnataka, India. Current Science. 2018; 115(4):621-623.
6. Gilligan TM & Passoa SC. LepIntercept, an Identification Resource for Intercepted Lepidoptera Larvae. Identification Technology Program (ITP), USDA-APHIS-PPQ-S&T, Fort Collins (US). www.lepintercept.2014.
7. Goergen G, Kumar PL, Sankung SB, Togola A, Tamò M.

First report of outbreaks of the fall armyworm *Spodoptera frugiperda* (J E Smith) (Lepidoptera, Noctuidae), a new alien invasive pest in West and Central Africa. PLoS ONE. 2016, 11(10). Doi: 10.1371/journal.pone.0165632.
8. Pogue MG. A world revision of the genus *Spodoptera* (Guen´ee) (Lepidoptera: Noctuidae). Memoirs of the American Entomological Society, number 43. 2002.
9. Raghubanshi AS, Raj LC, Gaur JP, Singh JS. Invasive alien species and biodiversity in India. Current Science. 2005; 88:539-540.
10. Sharanabasappa, Kalleshwaraswamy CM, Asokan R, Mahadeva Swamv HM, Marutid MS, Pavithra HB *et al*. First report of the fall armyworm, *Spodoptera frugiperda* (J E Smith) (Lepidoptera: Noctuidae), an alien invasive pest on maize in India. Pest Management in Horticultural Ecosystems. 2018; 24(1):23-29.
11. Young JR. Relationship of Fall Armyworm (Lepidoptera: Noctuidae) from Florida, Honduras, Jamaica, and Mississippi: Susceptibility to Insecticides with Reference to Migration. The Florida Entomologist. 1988; 71(1):56-61.