

First record of the fall armyworm, *Spodoptera frugiperda* (J. E. Smith, 1797) (Lepidoptera: Noctuidae), an evil attack on paddy in Magadh, Bihar (India).

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ABSTRACT

The fall armyworm *Spodoptera frugiperda* (J. E. Smith), (Lepidoptera: Noctuidae) is a well-known voracious insect pest. Due to its polyphagous nature, the rate of population and propagation in the field is very high. The fall armyworm has been recorded over 80 types of crop which has high potential to cause severe yield losses of crop those are economically important, especially; maize, sorghum, cauliflower, tomato etc.

S. frugiperda is native of the American continent. In 2016 it was reported for the first time from Africa (IITA, 2016). In 2018, it was reported from Karnataka (ICAR-NBAIR, 2018a) on maize crop in India. Now here we are reporting first record of *S. frugiperda* is reporting from Bihar in different localities of Magadh division for the first time on paddy crop type Arize 6444, Pranava mansuri and Pioneer.

Key words: - Fall armyworm, *Spodoptera frugiperda*, Paddy, Infestation, Arize 6444, Pranava mansuri, Pioneer.

INTRODUCTION:-

The fall armyworm is one of the notorious and polyphagous insect belonging to the family Lepidoptera. According to the all previous reporting, this species is considered an extremely dangerous pest in American continent and its periphery. Fall army worm has been recorded on more than 80 types of plants species including maize, sorghum, sugarcane, cotton and a number of vegetable crops. The feeding stage of this notorious pest is the larval stage which having the different instars of its life cycle. During the field study in Sep-October 2018, we have selected different fields of paddy at Nawada and Gaya district under Magadh division, Bihar. Number of paddy cultivating farms was observed infested with the fall armyworm caterpillars. The larvae were collected from four different localities namely Narhat, Hisua, Chakand, Hario. This is the first confirmed record of fall army worm in Bihar (Magadh division, 24⁰45'N85⁰00E); It is not yet reported anywhere from Bihar till date. Basically fall armyworm is known pest of maize, but in the Magadh division we observed on paddy crop (*oryza* spp.) for the first time. It is not yet reported anywhere in India. Study on the first record has been made to follow the guideline of different first record has been made by the different scientists are; Uzayisenga et. al., 2017, Sharanabasappa et. al., 2018, Thierry et.al., 2018.

METHODOLOGY:-

During the course of observation, paddy crop damaging pests were found; the authors observed aforementioned pest on paddy plant in farms located in different locations of Magadh division during Sep-Nov 2018. Forty larvae were collected for the identification (10 larvae from each locality) in 70% ethanol and brought to P. G. Department of Zoology (M. U. Bodhgaya). Based on morphological characteristics the larvae were identified as fall army worm *Spodoptera frugiperda* (J. E. Smith, 1797) (Lepidoptera: Noctuidae) by senior professors of entomology. Field photographs were taken using a Samsung j max tablet in GPS enabled mode in the view of piracy.

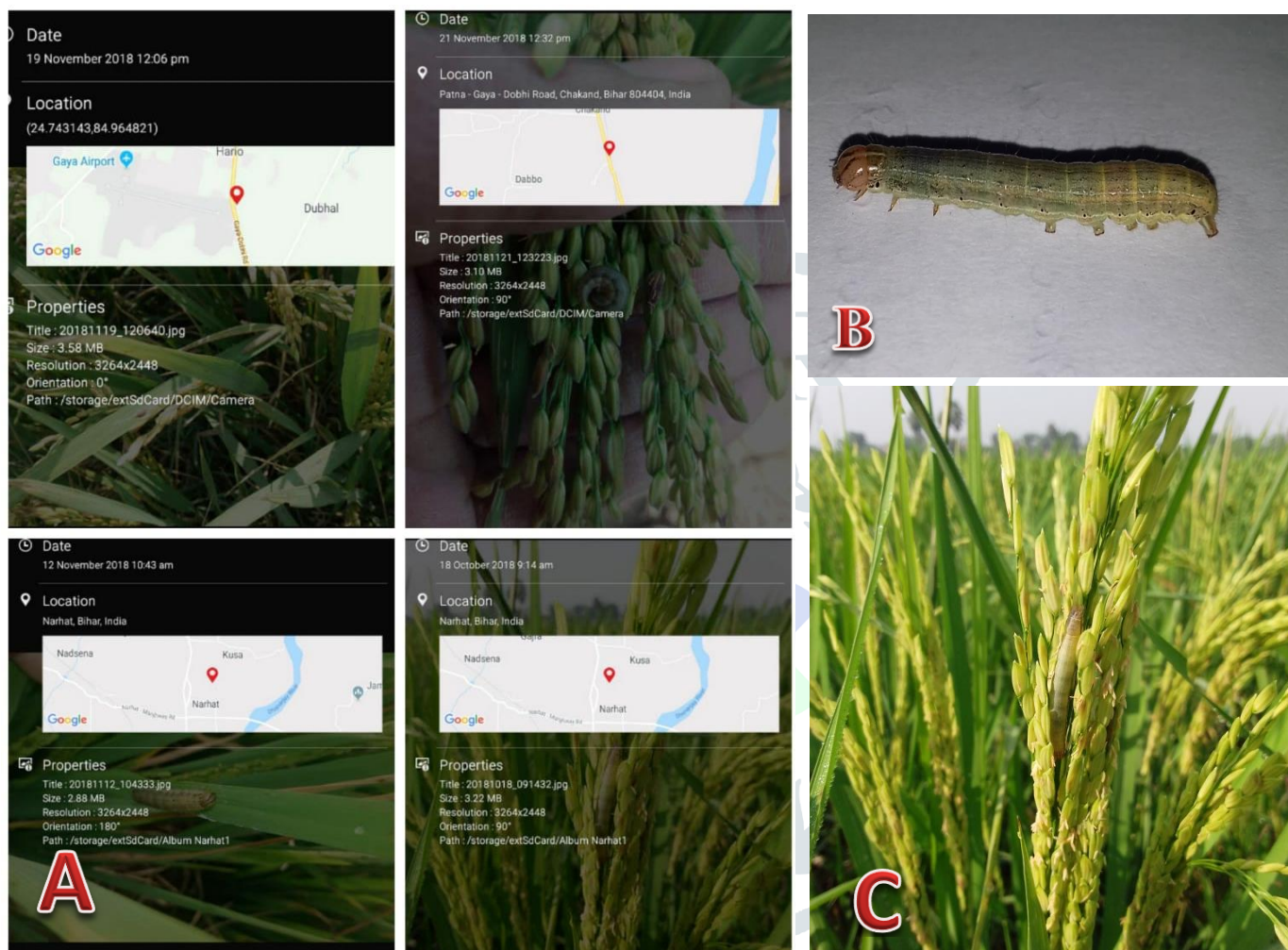


Fig: - (A) showing GPS enabled photographs of *Spodoptera frugiperda* under different localities of Magadh division (Bihar).

Fig: - (B) showing fifth instar larvae collected from the field.

Fig: - (C) showing infestation of paddy by *Spodoptera frugiperda* (J. E. Smith).

RESULT AND DISCUSSION:-

Morphological studies of larvae and adult were studied. Mode of infestation, damaging and injury symptoms of paddy plant made by fall armyworm were observed. This is first hand record on the paddy crop stand was about 45-70 days old in most of the observed localities. Feed by early instars larvae resulting holes in lower node of paddy plant stem and late instars causing

infestation of soft newly emerged ears of paddy. The Infestation of *S. frugiperda* resulting stem boring, plant mortality, defoliation, stem sap less and seedling losses.

MATERIAL EXAMINED:-

Spodoptera frugiperda 1st instar larvae, 3rd instar and 4th instar larvae, pupa, adult moth, paddy crop type Arize 6444, Pranava mansuri, Pioneer, Narhat, Hisua, Chakand, Hario, Bihar. Larvae are most variable in color. Late instar larvae have a characteristic inverted Y-shape on the head, yellowish or white sub dorsal and lateral lines along the body and four black spots in a square on the eighth abdominal segment. Fully grown larvae measured as 3.5-4cm long. The male has brown forewing with contrasting markings. Female had a small faint marking on forewing.

DISTRIBUTION RANGE:-

The fall armyworm is found through area of paddy cultivating land located in Magadh division. Its distribution encompasses around as mentioned below:-

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|------------|--|
| 1. NARHAT | : - Narhat-Baniyabigha road, Narhat- Manjwey road. |
| 2. HISUA | : - Hisua – Nawada road near Ursha village. |
| 3. CHAKAND | : - Gaya-Patna road near tuba masjid. |
| 4. HARIO | : - Gaya- Dobhi road near airport. |

DAMAGE POTENTIAL:-

Fall armyworm known as destructive pest having inverted Y-shape on head. Feed on a wide range of economically important crop including maize, sorghum, sugarcane, cauliflower and tomato etc. it is reported to cause a 34% reduction in grain yield (Lima et al., 2010). Now it is first hand report on paddy crop in Magadh division of Bihar, India.

CONCLUSION:-

In reference to the present communication the availability of *Spodoptera frugiperda* is now available in India, first record published in Pest Management in Horticultural Ecosystem (2018) on their primary host plant which is maize. Now this is also firsthand record we are reporting a new host plant which is paddy (Type: Arize 6444, Pranava mansuri, Pioneer) from Magadh division, Bihar. Keeping in view the damage potential of this type of particular insect pest is very high. Therefor it can be a new threat for paddy crop in Magadh division, Bihar. We cannot deny availability and propagation of *Spodoptera frugiperda* in Bihar.

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REFERENCES:-

1. CABI.2018.Datasheet, *Spodoptera frugiperda* (fall army worm). Invasive species compendium [http://www.cabi.org/isc/datasheet/29810\(2016\)](http://www.cabi.org/isc/datasheet/29810(2016)) (Date of access: 20/09/2018).

2. EPPO.2015 PM 7/124 (1) *Spodoptera littoralis*, *Spodoptera litura*, *spodoptera frugiperda*, *Spodoptera eridania*. EPPO Bul, 2015: 45: 410-444, doi: 10.1111/epp.12258. Available on <http://www.eppo.int>
3. ICAR-NBAIR, 2018a, PEST ALERT: 30th July, 2018. *Spodoptera frugiperda* (Smith. J. E.) (Insecta: Lepidoptera). http://www.nbair.res.in/recent_events/Pestalert30thjuly2018_new1.pdf
4. IITA, 2018: Fall army worm has reached the Indian subcontinent! Ibadan, Nigeria: IITA. <http://www.iita.org/news-item/Fall-armyworm-has-reached-the-indian-subcontinent/>
5. Sharanabasappa, Kalleswara swamy, C. M., Asokan, R., Mahadeva Swamy, H. M., Maruthi, M. S., Pavithra, H. B., Kavita Hedge, Shivaray Navi, Prabhu, S. T., Goergen, G., 2018. 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 Ecosystem, 24(1): 23-29.
6. Goergen, G., P. Lava kumar, Sangnia, B., Sankung, Abou Togola and Manuele Tamo. 2016. First report of outbreaks of the fall army worm *Spodoptera frugiperda* (J. E. Smith) (Lepidoptera: Noctuidae), a new Alien pest in west and central Africa, Plos ONE 11(10): e0165632, doi: 10.1371/Journal. Pone.0165632.
7. Lima, M. S., Silva, P. S. L., Oliveira, O. F., Silva, K. M. B and Freitas, F. C. L. 2010. Corn yield response to weed and fall army worm controls. Planta Daninha, 28: 103-111.
8. Paine, D.R., Sheppard, A. W., Cook, D. C., De Barro, P. J., Worner, S. P. and Matthew, B. T. 2016. Global threat to agriculture from invasive species. PNAS, 113(27): 7575-7579. DOI: 10.1073/Pnas.1602205113.
9. Prasanna, B. M., Joseph, E., Huesing, Regina Eddy. And Virginia, M. P., 2018. Fall army worm in Africa: A guide for integrated pest management, first edition Mexico.
10. B. Thierry, N. Awa, B. Djibril, B. B. Amadou, S. Mbacke, S. Pierre, H. Julien: 2018, First records of the fall armyworm, *Spodoptera frugiperda* (Lepidoptera: Noctuidae), in Senegal. Entomologia Generalis, 1-14, DOI: 10.1127/entomologia/2018/0553.
11. B. Uzayisenga, B. Waweru, T. Kajuga, P. Karangwa, B. Uwumukizza, S. Edgington, E. Thompson, L. Offord, G. Cafa, A. Buddie: 2017, First record of the fall armyworm, *Spodoptera frugiperda* (J. E. Smith, 1797) (Lepidoptera: Noctuidae), in Rawanda. African Entomology 26(1): 244-246(2018). DOI: <https://doi.org/10.4001/003.026.244>.
12. Clavijo S, Fernanmdez, Ramirez A, Delgado A, Lathullerie J (1991) Influence de la tamperatura sobre el desarrollo de *Spodoptera frugiperda* (Smith), Agronomia Tropical 41(5-6): 245-256.