

E-ISSN: 2320-7078

P-ISSN: 2349-6800

www.entomoljournal.com

JEZS 2021; 9(2): 1419-1422

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Received: 22-01-2021

Accepted: 24-02-2021

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First report of *Spodoptera eridania* (Stoll) (Lepidoptera: Noctuidae) on soybean [*Glycine max* (L.) Merrill] from Kolhapur, Maharashtra, India

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DOI: <https://doi.org/10.22271/j.ento.2021.v9.i2q.8664>

Abstract

The Southern armyworm *Spodoptera eridania* (Stoll) (Lepidoptera: Noctuidae) is a polyphagous defoliator having a wide host range including Soybean. They are one of the important defoliators in the tropical and subtropical regions of the hemisphere. However, this pest is reported for the first time from Kolhapur, Maharashtra, India on Soybean [*Glycine max* (L.) Merrill].

Keywords: soybean, southern armyworm *Spodoptera eridania*, India

1. Introduction

Spodoptera is a genus of the Noctuidae family of moths, which was erected by Guenée in 1852. The larvae are called armyworm and most of them are pests on the crop. Approximately 30 species of this genus are distributed across six continents^[1, 2]. A study of the literature on species of genus *Spodoptera* reveals that 3 species of it have been found in India so far, namely *Spodoptera frugiperda*^[3], *Spodoptera exigua*^[4] and *Spodoptera litura*^[5] as a pest of various crops including Soybean.

Soybean [*Glycine max* (L.) Merrill] is one of the most important oilseed crops in the world and due to its multi-dimensional uses it is known as 'Golden Bean' or 'Miracle Bean'. In India, considering the prevalence of *Spodoptera* on soybean, it is found that so far only *S. litura*, a defoliator species, has been attacked and the crop has been damaged^[6, 15, 8, 9]. The southern armyworm *Spodoptera eridania* which has not yet been recorded in India is found mainly in North America, South America through the Caribbean and Central America. They are the most important defoliators in the tropical and subtropical regions of the Western Hemisphere, which feed the plants in large quantities when they are young, resulting in often skeleton leaves of the host plants^[10]. For the first time in India, *S. eridania* is being recorded at village Tamgaon (16°39'14.0"N, 74°18'23.4"E), Kolhapur, Maharashtra, India (Fig. 1) on soybean crop through this article.

2. Material and Methods

The sowing of Soybean seed (Mahabeej JS-335 variety) was done on June 24, 2019, at Tamgaon (Fig.1) and observations were made up to the harvest of the crop. The identification of late instar larvae was done with the help of recent literature Passoa^[11], Capinera^[12], OEPP/EPPO^[13] and caterpillar photographs at the website of CABI^[14]. In the laboratory, attempts were made to obtain their adults by rearing *S. eridania* larvae but could not succeed.

3. Results and Discussion

While inspecting the soybean crop in my field initially in June and July it was healthy (Fig.2a) but during Sep. 2019, it was noticed that soybean seedlings have turned white in some places (Fig.2b). After careful observation, it was noticed that the crop was infested with larvae and so the soybean leaves were completely skeletonized (Fig.2c). The incidence of such a pest has never been seen before, so curiosity was created about this soybean pest. Meanwhile, while inspecting other soybean fields in my village, it was found that other fields have suffered

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similar damage. Upon closer inspection, it was found that caterpillars, other than *S. litura*, were hiding near soybean pods and eating pods (Fig.2d). Photographs of the larvae were taken and their characters were examined, and it was concluded that the larvae were *S. eridania*, which had not yet been found on any crop in India. The larvae were identified from Passoa^[11], Capinera^[12], OEPP/EPPO^[13] and caterpillar photographs at the website of CABI^[14].

The *S. eridania* is native to the American tropics found in the South Eastern United States from Maryland South to Florida and to the west in Kentucky and Texas; in the Neotropics, it is from Mexico to the whole of the Caribbean and South through Central America to Argentina^[13]. They attack heavily on crops while they are young, often resulting in skeleton leaves on their food plants. As they mature, they become solitary and also bore readily into fruit, often damaging tomato in Florida^[12]. The observation in the present study is following the observation of Capinera^[12] in which *S. eridania* has done so much damage by eating whole soybean leaves and making soybean leaves skeletonize and its late instar larvae have been found to remain solitary and eat soybean pods.

According to OEPP/EPPO^[13], the late instar larva of *S. eridania* shows a strong resemblance to the larva of *S. littoralis* and *S. litura*. The abdominal segments are with large dark dorsal patches are present on abdominal segments (1-8) and smaller patch on thoracic segments while other

abdominal segments dark but smaller dorsal patches present. The late instar form of *S. eridania* of the present study shows a prominent dark lateral spot on the first abdominal segment, which passes through the spiracular line which is not pronounced as in *S. litura*. The characters and position of the lateral spot are following the observations made by Passoa^[11] who reported that the spot in the larva of *S. eridania* obscures the spiracular line on and sometimes in front of the first abdominal segment. He also stated that *S. eridania* can be recognized from different species on the grounds that in different species this lateral spot doesn't go through the spiracular line. If the origin is America, the most steady character that distinguishes *S. eridania*, is the presence of large dorsal marking on abdominal segment 1 which is bigger than the ones, if present, on segments 2-7^[13]. Although *S. eridania* in the present study is found in India, the characters in it match the observations reported by OEPP/EPPO^[13]. According to the District Disaster Management Cell, the Kolhapur district receives an average rainfall of 1,772 mm between June 1 and September 30. However, the average rainfall till September 19, 2019 was 2,584 mm, breaking the record of the last ten years. The Karveer taluka, which includes Tamgaon, a present locality of *S. eridania*, received double the average rainfall in the year 2019. An outbreak of *S. eridania* may have been found on soybeans due to this excess rainfall.

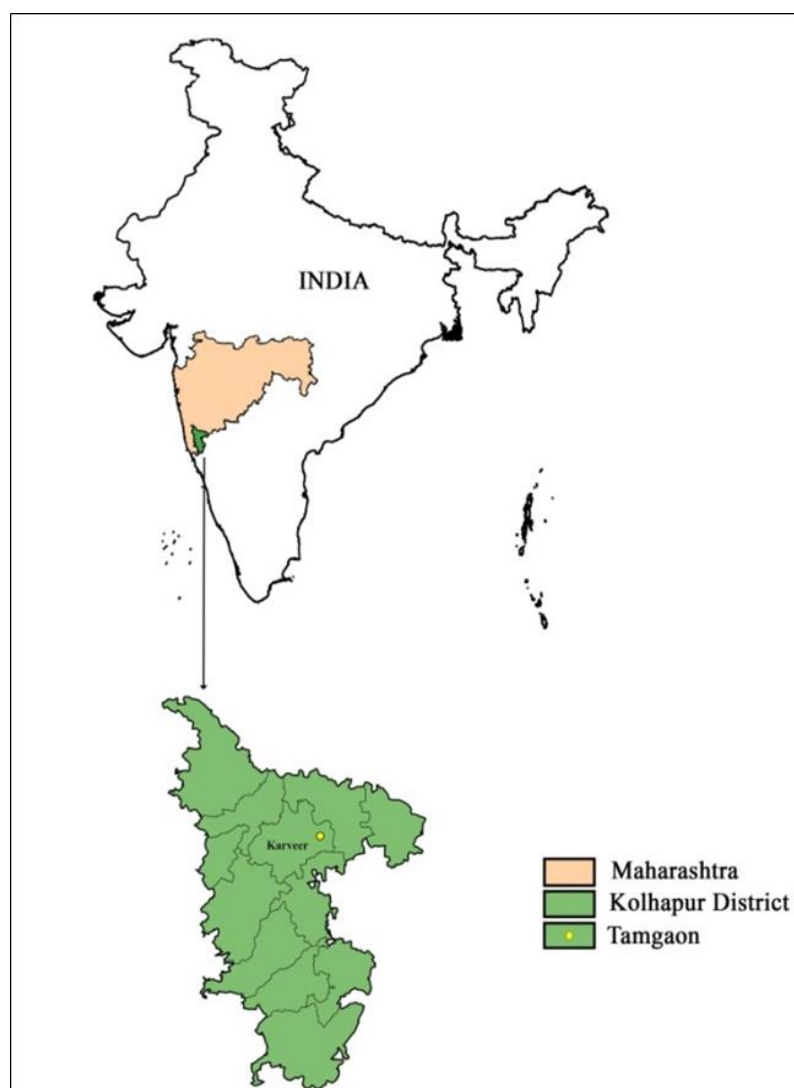


Fig 1: Map showing locality (Tamgaon) of *Spodoptera eridania*



Fig 2: Healthy crop of soyabean in last week of July (a). Skeletonisation of soyabean leaves by attack of *S. eridania* (B). damage to the soyabean foliage by *S. eridania* larvae (C). and late instar larva of *S. eridania* feeding on soyabean pods (E).

4. Conclusion

The larvae found during the present study are *S. eridania* which is being reported on soybean for the first time from India. This leads to the conclusion that *S. eridania* is now invaded in India and needs to be addressed soon.

5. Acknowledgements

The author is thankful to the Head, Department of Zoology, Shivaji University, Kolhapur (India) for providing a laboratory facility.

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