DISTRIBUTIONAL RANGE EXTENSION OF BANANA SKIPPER *ERIONOTA TORUS* (LEPIDOPTERA: HESPERIIDAE) TO THANE AND PALGHAR DISTRICTS OF MAHARASHTRA, INDIA WITH DISCUSSION ABOUT ITS HARMFUL EFFECTS ON LOCAL BANANA PLANTATIONS

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Abstract

The Banana Skipper *Erionota torus* is reported from Thane and Palghar districts in the northernmost parts of Konkan region in Maharashtra with observations of its different life-stages on banana.

Introduction

The Banana Skipper *Erionota torus* Evans, 1941 (Lepidoptera: Hesperiidae) has been recorded in India from Uttarakhand to Northeast India, Karnataka, Kerala and Tamil Nadu (Varshney & Smetacek, 2015). Since 2015, it has been reported from various parts of Maharashtra extending towards northern areas of the Western Ghats and west coast (Konkan region) of Maharashtra. It was first observed in Amboli, Sindhudurga district (Hemant Ogale, 2015), Satara (Milind Bhakare, 2016), Tamhanmala, Ratnagiri district (Pranav Gokhale, 2017) and further north in Kurul, Raigad district (Tushar Bhagwat, 2017-18) (*personal communications*) making its appearance to the areas in northern and coastal parts of Maharashtra (Fig. 1).

Banana (*Musa* x *paradisiaca (*Musaceae)) is an important crop in India. In southern India, the fruit and leaves are economically important, the latter for use as platters, especially in restaurants. In Maharashtra, the leaves are not usually used as platters and the object of banana plantation owners is to produce fruit.

The occurrence of the adult butterflies, along with immature life-stages, feeding in remarkably large numbers on banana leaves, from an area close to the banana plantation hotspots in Vasai tehsil, Palghar, Maharashtra is a matter of concern. Caterpillars are known to feed voraciously on the leaves of banana, causing qualitative as well as quantitative damage to the plantations. Areas studied in this report showed active infestation by larval stages of *E. torus* on banana plants, indicating the colonisation by this pest species of these regions due to the widespread cultivation of its larval food plant.

Observations

On 03.xi.2019, in Patonapada village, Yeoor range of Sanjay Gandhi National Park (19°24”15’N, 72°94”09’E; 497 msl), Thane district, Maharashtra, four banana plants in agricultural plantations were found with rolled leaves. Closer observation of the leaves revealed the presence of Hesperiidae caterpillars and pupae in them. The same plants were revisited on 12.xi.2019 and more caterpillars were found. One caterpillar and one pupa were collected. On 14.xi.2019, an adult *E. torus* butterfly emerged.

On 09.xi.2019, in Tungareshwar Wildlife Sanctuary (19°40”33’ N,72°95”56’ E; 726 msl), Palghar district, Maharashtra, two banana plants full of rolled leaves were observed. In total there were about 80-90 larval cells as rolled leaves seen. A few of them had actively feeding caterpillars with powdery white substance on their body while a few cells had freshly formed yellow pupae covered with a similar white powdery substance as the larvae. Some of the pupae were darker, indicating the imminent emergence of adult butterflies. Two adult butterflies were also spotted. These individuals were identified as *E. torus* (Bhakare & Ogale, 2018).

Later, on 28.xi.2019, during the second visit to the same location those banana plants were again observed with an increased number of larval cells on the host and correspondingly severe damage by defoliation to both the banana plants. Further, two more visits to the same location showed similar results.

On 05.xii.2019, banana plants in the campus of B.N. Bandodkar College, Thane-West were observed with eggs of *E. torus* on them. Further, on the nearby banana plants, 20-30 larval cells rolled on the leaves were observed. On 14.i.2020, once again 10-15 larval cells and pupae were observed on same plants.

In the month of December 2019, a single, bigger sized banana plant in Dombivli-West, Thane loaded with 30-40 larval cells, mainly on the larger leaves, was observed. Another banana plant with 20-25 larval cells and pupae was observed in Dombivli-East, Thane in the month of January 2020.

On 08.i.2020, in Kasarwadavali, Thane-West, three banana plants with eggs and larval cells with actively feeding caterpillars were seen. Since these were present on the lower leaves, it was possible to monitor the growth of life-stages in their natural habitat without collecting them. Similar observations were also made in the month of February, 2020.

In the month of February 2020, during a visit to Vasai fort, Vasai-Palghar, it was seen that most of the banana plants present in the vicinity of the fort showed evidence of attack by the *E. torus*.

Discussion

All the above mentioned observations from various locations indicated the continuing spread of *E. torus* in Thane and Palghar districts. Being known as a pest on banana, the species showed signs of its active and aggressive attack on its host, causing defoliation within this study area too. The infestation by the larval stages of the species showed some ill effects on the banana leaves in the following ways: cutting and rolling of leaves, defoliation leaving only midrib of the leaf and in later stages, drying as well as darkening of the leaf surfaces (Fig.4). A brief summary of all the above mentioned sightings is represented below in the form of an observation table. Locations of the reports from Thane and Palghar districts are indicated on a map (Fig.2).

E. torus is also commonly known as banana leaf-roller. Heavy infestation causes the defoliation of banana leaves, leaving only the midrib intact. Such severe defoliation can cause considerable reduction in photosynthetic efficiency of the plant resulting in a decreased bunch size and weight (Jayanthi *et.al,* 2015). Literature revealed that detailed studies on use of biorationals against *E. torus* on banana are not available (Sharanabasappa, 2017).

Between 2015 and 2018, there were several reports of adult insects along with life-stages and their infestations on local banana plantations, observed by people in several districts of Maharashtra mainly from Konkan region and western districts (*www.ifoundbutterflies.org*). The current report mentioning its occurrence in parts of Thane and Palghar district suggests the need for monitoring the northward spread of this insect in search of banana plantations.

A literature searches (Patwardhan, 2010; Kasambe, 2012; Patwardhan, 2014) revealed that there is no previous record of this species from Sanjay Gandhi National Park or from Thane-Mumbai area, including Sanjay Gandhi National Park or BNHS Nature Reserve, Mumbai (Kasambe *et. al.*, 2018). The butterfly fauna of these places is well documented. It was neither reported from Western Ghats or Maharashtra (Gaonkar, 1996; Kehimkar, 2016) in slightly older literature. Hence, this record of *E. torus* in banana plantations in SGNP assumes importance.

The observations on the increasing incidence and damage from Palghar and Thane is of significance as they are among the major banana growing areas of Maharashtra. The record of this species from Tungareshwar Wildlife Sanctuary is a cause for concern, since the sanctuary is located on outskirts of Vasai. Within a span of 2-3 months, *E. torus* was seen to have reached the interior areas of Vasai tehsil, with the possibility that infestation must have already started among plantations in the area.

In the near future, severe infestation of banana plantations in the area by *E. torus* can be expected in this area.

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Table.1- *E. torus* life-stages observed in Thane and Palghar districts (Fig.3)

Location	Date	Life-stages
Yeoor Range, SGNP, Thane	03-xi-2019	Caterpillars
	12-xi-2019	Caterpillars
	14-xi-2019	Adult reared
B.N.Bandodkar College Campus,Thane	05-xii-2019	Eggs, pupae (empty)
	14-i-2020	Larval cells, pupae
Dombivli, Thane	23-xii-2019	Larval cells
	26-i-2020	Larval cells, Pupae
Kasarwadavali, Thane	08-i-2020	Eggs, larval cells
	07-ii-2020	Adult, pupae (empty)
Vasai Fort, Palghar	16-ii-2020	Adult, larval cells

Fig.1: Records of *E. torus* from various locations in Maharashtra (2015-2018)

Fig. 2: Records of *E. torus* in Thane and Palghar district, Maharashtra (November 2019 – February 2020)

Fig.3: Egg

Fig.4: Caterpillar of early stage

Fig.5: Caterpillar of late stage

Fig.6: Pupa

Fig.7: *Erionota torus*, upperside

Fig.8: *Erionota torus*, underside

Fig.9

Fig.10

Fig.11

Fig.13

Fig.12

Fig. 9-13: Destruction of banana leaves caused by larval and pupal cells of *E. torus*