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Banana Leaf Roller, *Erionota torus* Evans (Lepidoptera: Hesperiidae): A Destructive Insect Pest of Banana

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Abstract

Banana leaf roller, *Erionota torus* Evans is a major devastating foliage pest of *Musa* spp. reported in several locations globally. It affects banana plant both during the vegetative and reproductive (flowering) stages. The main symptoms are incised and rolled-up leaves. The leaf roll can be extended to a length of 15 cm. The skipper larva's feeding activity causes significant harm to the banana leaves by rolling the leaf while feeding on it. Although banana plants can withstand up to 20% defoliation, a high infestation can cause the entire banana leaf to be damaged, leaving only the midrib intact. Defoliation by leaf roller larva will result in roughly 28% yield losses at a 50% defoliation rate. There is no much management practices are required, wherever the natural enemy's activity is at peak.

Introduction

The banana (*Musa paradisiaca* L.), also known as the apple of paradise, is India's most important fruit crop. Its cultivation has spread to over 150 countries. India and China are the world's largest banana producers, accounting for 28% of total production in 2016. There are numerous insect pests on banana, including slug caterpillars such as *Latioalepida*, *Miresadecadens*, hairy caterpillar, *Euproctis* sp., *Pericaliaricini* and leaf beetle, *Nodostoma* subcostatum. Besides all, the most important is the folivorous banana leaf roller, *Erionota torus* Evans; although it is frequently regarded as a minor pest in its native Southeast Asia, it is a serious pest when its natural enemies are absent, particularly outside of its native range. Though the damage caused by the larva is usually not above the economically threshold level, 100% defoliation has been reported in some farms during severe infestations.

Banana leaf roller is also familiar with other vernacular names such as banana skipper, red palm eye, rounded palm redeye, Sikkim palm dart, giant banana skipper and Sikkim palm redeye. Evans described *E. torus* in 1941 and early occurrences of this pest have been reported from South-East Asian countries such as South China, Burma, Malaya, Vietnam, Papua New Guinea, Thailand, Sri Lanka, and India's North Eastern states. It has been reported in India from North Eastern states such as Sikkim, Calcutta, Assam, Manipur, Madhya Pradesh, and South Indian states such as North Kerala, Coimbatore, Southern Karnataka, and the Andaman and Nicobar Islands. The pest outbreak in Karnataka was reported in 2012-14 from coastal parts of Uttar Kannada, Dakshina Kannada, and Udupi, and then spread to Malnad regions and its incidence was also noticed in banana fieldsin and around Bangalore district (Chatter *et al.*, 2020). This skipper's possible dispersal mechanisms include adult moth flight, transportation of eggs or neonate larvae across the borders along with leaves used for wrapping the banana and attraction to lights in boats and

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loading air-crafts as few egg masses have recently been found on bunches.

Species Conflict

Earlier workers recorded this skipper infesting banana as *Erionota thrax* L. since from several years. From the recent studies, it is confirmed that there are two *Erionata* spp. feeding on banana leaves in Southeast and South Asia *viz*., *Erionota thrax* L. and *E. torus* Evans. The early stages of both the species are cannot be distinguished due to their similar appearance and feeding behavior. The adult butterflies of these two species are usually distinguished by wing variations, with *E. thrax* having a straight outer margin and acute apex; whereas, *E. torus* on the other hand has a more convex outer margin and a rounded apex (Poorani *et al*., 2020).

Nature and Extent of Damage

It affects banana plant both during the vegetative and reproductive (flowering) stages. The main symptoms are incised and rolled-up leaves. The leaf roll can be extended to a length of 15 cm. The larvae are commonly found on both cultivated and wild bananas as well as various palm species such as coconut, oil palm, sugar palm (*Arenga pinnata*), sago palm (*Metroxylon* sp.) and rattan palms (*Calamus* spp). It prefers a variety of climatic conditions, including tropical rainforest, tropical monsoon climate, and tropical humid climate.

In Asia, the banana leaf roller is a minor pest. However, over the previous two decades, the leaf roller outbreak has spread and caused considerable defoliation. The skipper larva's feeding activity causes significant harm to the banana leaves by rolling the leaf while feeding on it. Although banana plants can withstand up to 20% defoliation, a high infestation can cause the entire banana leaf to be damaged, leaving only the midrib intact. Defoliation by leaf roller larva will result in roughly 28% yield losses at a 50% defoliation rate (Cock, 2015). The skipper Infected banana yields are decreased due to delayed fruit development and smaller bunch sizes.

Life Cycle

Adult skipper lay eggs on the food plant alone or in small groups (Figure 1). The newly enclosed larvae immediately construct a leaf roll shelter, which can be extended all the way through pupation or one or more new shelters can be constructed during larval development. A fully-grown caterpillar's leaf roll shelter is large, noticeable and distinct. Due to much more leaf material is incorporated into the shelter than is eaten; the defoliation of the host plant is disproportionate. The caterpillar has a dark head and is covered in white, waxy powder. The pupa, which develops in a pouch within the leaf roll shelter, lacks any distinguishing structures or markings. At dusk, the adult butterfly shows its flight activity.

a) Egg b) Larva c) Pupa d) Adult

Figure 1: Different life stages of banana skipper, *Erionota torus* Evans (Images captured by: Suresh R. Jambagi)

Management Practices

In terms of biological control, natural enemies generally keep skipper population under control, even in areas where it does not occur naturally. There are several predators and parasitoids recorded on skipper which include egg parasitoids like *Ooencyrtus erionotae*, *Agiommatus* sp., and *Anastatus* sp., as well as larval parasitoids like *Cotesia erionatae* and *Elasmus brevicornis*. Besides these, birds (House crow and crow pheasant) are the major predators to devour the skipper larvae in banana orchards.However, some of the most efficient pest management strategies include: i) collection and destruction of leaf rolls having skipper larva; ii) growers can prevent the pest from spreading by sprinkling 1 ml of dichlorvos (DDVP) with 1 litre of water; iii) Growers should take all precautions and properly inspect the plants before planting new saplings; iv) Spraying insecticides such as Chloropyriphas 20 EC @ 2 ml, Quinolphos 25 EC @ 2 ml, Immidaclopried 17.8 SL @ 0.5 ml and Dimethoate 20 EC @ 1.7 ml per litre of water can successfully control the pest havoc.

Conclusion

The present observation provided the vital information about the current scenario of this introduced insect pest in banana plantation. Even though its incidence was higher, diverse natural enemies were able to keep skipper population below the threshold limit. So, it might help the farmers to reduce their input costs by avoiding chemical applications.

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