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GRASSHOPPERS INJURIOUS TO BANANAS AND PLANTAINS

J Poorani[1]* and R Thanigairaj[1]

[1]ICAR-National Research Centre for Banana, Thogamalai Road,
Thayanur Post, Tiruchirappalli 620102, Tamil Nadu, India
*Email: pooranij@gmail.com (corresponding author): ORCID ID 0000-0003-3879-3264

ABSTRACT

Grasshoppers are considered as minor pests of bananas and plantains in India. The symptoms of damage caused by grasshoppers on bananas are variable and sometimes difficult to distinguish from those caused by lepidopteran pests, depending on the species involved. Based on our extensive surveys, here we report three species of grasshoppers, namely *Atractomorpha crenulata* (Fabricius), *Gesonula punctifrons* (Stål) and *Neorthacris* spp. as common but minor pests of banana in Tamil Nadu, south India. Brief diagnostic notes and symptoms of damage caused by these grasshoppers and spotted coffee grasshopper, *Aularches miliaris* (Linnaeus), an occasional pest of banana, are given with illustrations.

Key words: *Atractomorpha crenulata*, *Gesonula punctifrons*, *Neorthacris acuticeps*, Pyrgomorphidae, Acrididae, India, Tamil Nadu, pest, symptoms of damage, host plants, diagnosis, seasonal incidence

Grasshoppers are usually minor pests and generalist feeders on various host plants, including bananas and plantains in India. Recently, *Aularches miliaris* (Linnaeus), commonly known as the spotted locust, spotted coffee grasshopper and coffee locust, was reported as a pest of banana from parts of Kerala, particularly the Wayanad region and large swarms were reported causing alarm (Mathew et al. 2021). Areas of Tamil Nadu adjoining the Western Ghats region in the Kanyakumari district were also affected. This created a minor scare in view of the recent outbreaks of desert locust *Schistocerca gregaria* (Forskål) in ten states of north-western and northern India, particularly Gujarat, Rajasthan, and Madhya Pradesh, in 2019-2020 (Wikipedia, 2022). Damage by grasshoppers on banana is usually manifested in the form of irregular marginal feeding on the leaf lamina, but occasionally the damage symptoms resemble those caused by hairy caterpillars and bagworms and hence are not easily recognizable. In our surveys for pests of bananas and plantains in India, we documented at least three species of grasshoppers besides *A. miliaris* that are regular visitors of banana crop and the details are given here with brief diagnosis and symptoms of damage.

MATERIALS AND METHODS

Seasonal incidence of grasshoppers infesting banana was monitored in the field banana germplasm bank maintained in the research farm of the National Research Centre for Banana (NRCB), Trichy, Tamil Nadu, during 2018-21 and in nearby localities. Grasshoppers infesting banana were collected and identified and the voucher specimens are maintained in the banana insect collection at the NRCB. Symptoms of damage and life stages of the grasshoppers were observed and photographed with a Nikon D7000 DSLR camera.

RESULTS AND DISCUSSION

Totally three species of grasshoppers, namely *Atractomorpha crenulata* (Fabricius), *Gesonula punctifrons* (Stål) and *Neorthacris acuticeps* (Bolívar), were observed on various cultivars of banana during the period of survey in addition to *Aularches miliaris,* reported from elsewhere. Of these, *A. crenulata* and *A. miliaris* belong to Pyrgomorphidae and the other two belong to Acrididae. A brief account of these grasshoppers associated with bananas and plantains in South India is given below. *Aularches miliaris,* a species not observed in the present study, is also included in view of its association with banana in the Western Ghats region including Kerala, districts on Tamil Nadu-Kerala border and Karnataka.

A. Family Pyrgomorphidae

1. *Aularches miliaris* (Linnaeus) (Fig. 1a, b): It is a large, greyish-blackish grasshopper with whitish cheeks and pronotal flanks, yellow spots on the wings and the abdomen has red and black bands (Fig. 1b). The nymphs are black with yellowish spots and stripes (Fig. 1a). It is a generalist feeder and is highly polyphagous on green vegetation in plantations and does not show any host specificity. It is univoltine and it has been

Fig. 1. Grasshopper pests of banana: a, b. *Aularches miliaris*; c, d. symptoms of damage caused by *Neorthacris acuticeps*; e, f. *Neorthacris acuticeps* feeding on banana

reported as a minor pest of banana, coconut, coffee, arecanut, teak, cardamom, cassava, mango, rubber, mulberry, and many other plants (Josephrajkumar et al., 2011). Josephrajkumar et al. (2011) reviewed it in detail and found the highest nymphal feeding damage on *Erythrina indica*, apparently a preferred host and a common live-standard used for trailing black pepper in Kerala. Mathew *et al.* (2021) reported its recent outbreak in Kerala on various host plants.

2. *Atractomorpha crenulata* (Fabricius) (Fig. 2): It is commonly known as vegetable grasshopper or tobacco grasshopper. It can be identified by the greenish body with a narrowly conical head, short antennae, head and pronotum with sloping sides, and the presence of a row of pinkish white crenulations behind the eyes on the lateral side. Two popular banana cultivars, Nendran and Ney Poovan, were found to suffer moderate damage by the vegetable grasshopper in all the localities surveyed. The damage was particularly severe on the early stage crop (up to 3-month-old). The activity was observed from the last week of July to the first week of November 2021. Infestation was observed up to the 11–14th leaf stage and most of the feeding was seen up to the 9th leaf stage. The grasshopper population was 1–2/ leaf. The pest incidence was observed on 55–60% of the total plants surveyed. The affected plants show irregular marginal cuts and the lamina has small to large holes and in severe cases, only the midribs of the leaves are left behind. The presence of large holes on the leaf lamina is also seen in the case of infestation by *Spodoptera litura* (F.) and bagworm, *Manatha albipes* Moore. Srivastava (1957) reported it as an important pest of tobacco with many generations in a year and studied its breeding habits. Senthamizhselvan and Murugan (1988) studied its feeding and utilization efficiency on castor, groundnut and guinea grass.

B. Family Acrididae

1. *Neorthacris* spp. (Fig. 1c-f): It is a wingless grasshopper and the adults and nymphs are greyish olive brown with characteristic yellow, white and

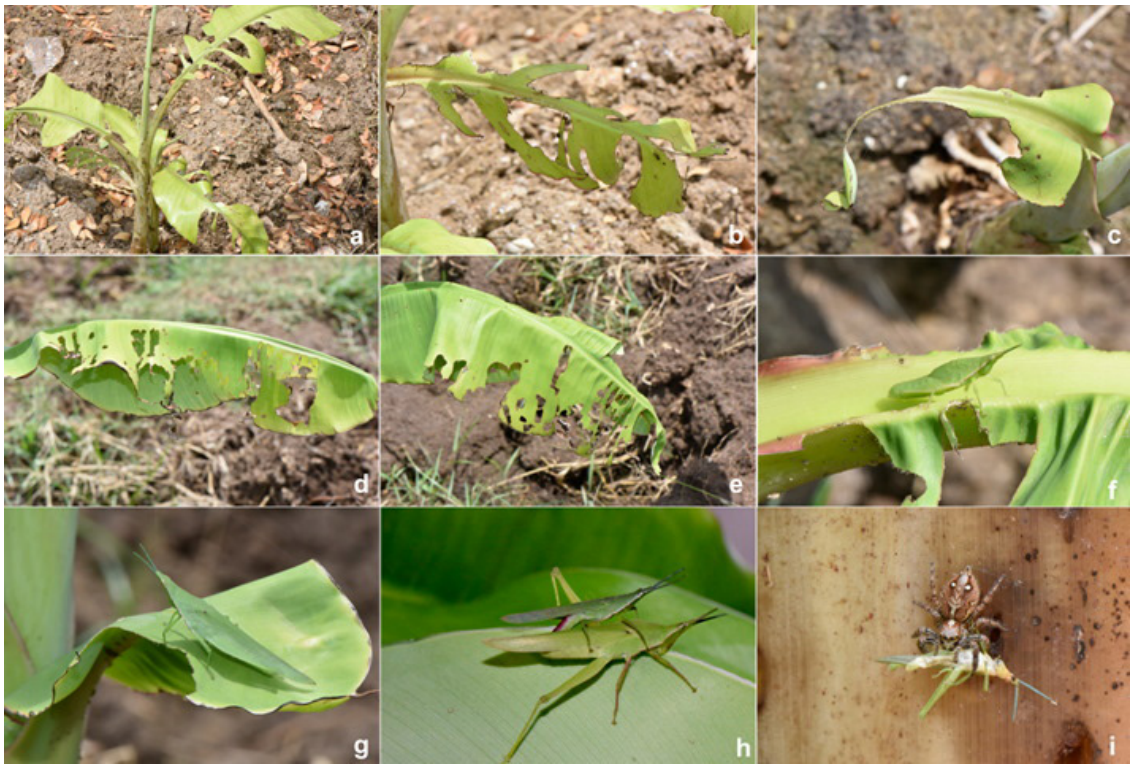

Fig. 2. Damage caused by *Atractomorpha crenulata* on banana: a-e. symptoms of damage; f. nymph feeding on banana; g, h. adult on banana; i. spider predator of *A. crenulata*

reddish spots and maculae on the sides (Fig. 1e, f). Two species, *Neorthacris acuticeps* (Bolívar) and *N. simulans* (Bolívar) were found on nearly all the ruling cultivars of banana in and around Trichy and appear to be the most common grasshoppers in the banana ecosystem. The damage symptoms were characteristic of the type of grasshopper damage usually observed with the affected leaves having irregular feeding cuts on the margins (Fig. 1c, d). This was found to be the only grasshopper pest of banana fruits (cv. Matti) and peduncle (cv. Grand Nain), besides leaves.

2. *Gesonula punctifrons* (Stål) (Fig. 3): This species was observed to be by far the most serious grasshopper pest of banana and up to 75% of the plants surveyed were found to show feeding damage by all stages. The damage was observed during December–March in plants from the 2-leaf stage up to 6-leaf stage and the grasshopper population ranged from 2 to 5 / leaf. Ornamental banana hybrids (*Musa laterita* x *Musa ornata*) maintained at the NRCB research farm and cv. Kaveri Saba in the nearby localities were found to be most severely affected.

The nymphs tend to feed from inside the leaf whorls by scraping the epidermis. The feeding damage is mainly seen in the form of skeletonization of leaves. Hairy caterpillars (*Pericallia* spp., *Olene mendosa* Hübner, and *Somena scintillans* Walker) and early stage larvae of leaf caterpillar (*Spodoptera litura*) also cause skeletonization of leaves in banana from which the damage inflicted by grasshoppers is easily not distinguishable (Fig. 3f-i, k). Leaves fed by *S. litura* also show rows of holes on the lamina similar to the damage shown in Fig. 3j. Dry, skeletonized patches on leaves (Fig. 3i) are also caused by bagworms feeding on banana. Hence, it is required to ascertain the identity of the pest causing these symptoms with due care as more than one pest can cause such damage.

Sankaran et al. (1966) reported it as feeding on water hyacinth in several parts of India. They reported that it is adapted to an aquatic or semi-aquatic habitat and in our observations also, plants close to the irrigation channels were more severely damaged. They studied its life cycle and found it caused light to moderate damage on 43 other plants of economic interest.

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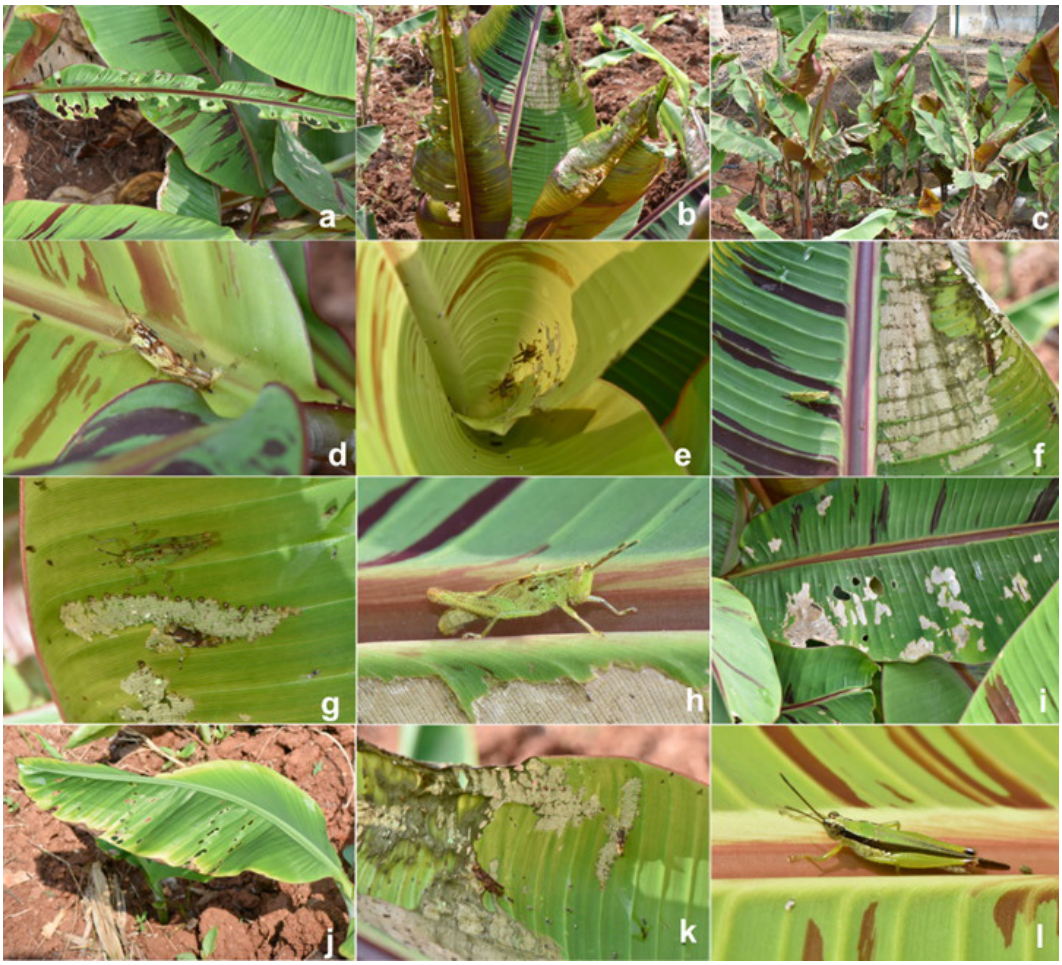

Fig. 3. Symptoms of damage and life stages of *Gesonula punctifrons* on banana

AUTHOR CONTRIBUTION STATEMENT

JP: Identification, imaging, manuscript preparation; RT: Field work.

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CONFLICT OF INTEREST

No conflict of interest.

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