



RESEARCH NOTE

Outbreak of spotted coffee locust, *Aularches miliaris* Linnaeus (Orthoptera: Pyrgomorphidae) in Kerala

MILU MATHEW, D. K. NAGARAJU*, TOM CHERIAN, GAVAS RAGESH¹, OM PRAKASH VERMA and RAVI PRAKASH

Directorate of Plant Protection, Quarantine and Storage, NH-IV, Faridabad-121 001, India

¹Banana Research Station, Kannara, Kerala Agricultural University, Kerala-680 652, India

*E-mail: dkn.raju@gov.in

ABSTRACT: This paper reports an outbreak of spotted Coffee locust, *Aularches miliaris* Linnaeus (Orthoptera: Pyrgomorphidae) in Kerala, a plantation rich state in the southern part of India during during 2020 and 2021. Outbreaks were observed in four districts viz., Thrissur, Malappuram, Idukki and Wayanad in Kerala. The nymphs and adults were observed feeding on several crop plants like black pepper, coffee, areca nut, banana and coconut etc. Nymph bands of 800 to 1000 with a density of up to 25/m² were found. Outbreaks occurred in areas where high value cash crops are grown and farmers tend to spray insecticides.

Keywords: Spotted coffee locust, outbreak, Kerala, plantation crops, banana

Spotted Coffee locust, *Aularches miliaris* Linnaeus (Orthoptera: Pyrgomorphidae) is a south Asian species, distributed across much of India and adjacent countries such as Bangladesh, Cambodia, Sri Lanka, Malaysia, Thailand, Myanmar and Java, and parts of Pakistan, Tibet, Nepal and China. *Aularches miliaris* is subdivided into two subspecies *A. miliaris miliaris* (Linnaeus) and *A. miliaris pseudopunctatus* Kevan. The former subspecies is found in India and countries to north and east of India whereas, the latter is found to the west of India in Pakistan (Hsiung, 1987; Lever, 1969 and Roffey, 1979). It is categorised as a Lower Risk Near-Threatened taxon in south India by the International Union for Conservation of Nature and Natural Resources (IUCN) and is kept under close monitoring.

The Central Integrated Pest Management Centre (CIPMC), Ernakulam, Kerala under the Directorate of Plant Protection, Quarantine and Storage, Faridabad is conducting regular rapid roving surveys for pests of crops in Kerala. During course of observations, an outbreak of *A. miliaris* was recorded at different locations and crops infested were observed (Table 1).

During April and May of 2020 and 2021, outbreaks of *A. miliaris* were observed in four districts viz., Thrissur, Malappuram, Idukki and Wayanad in Kerala. The nymphs and adults were observed feeding on many crops plants. Nymph bands of 800–1000 with a density of up to 25/m² were found. Egg laying by *A. miliaris* begins in September and continues up to November. Uncultivated

land around cropped area is preferred for egg laying. Eggs are inserted into soil in egg pods of 5-7 cm and each female can lay up to 80 eggs. Incubation period is five months. Egg hatching begins in the month of February and continue up to March, which coincides with the beginning of summer months. Nymphs are blackish with three yellowish stripes on the dorsum and undergo six instars. Nymphs become adults in three months. Adults are bulky and brightly coloured, male measure 37-55 mm and females 47-69 mm in length. Adults are aposematically coloured with a black head, thorax tuberculate and yellow. Forewings are green with yellow spots. Abdomen is black with red stripes. Both nymphs and adults have a tendency to aggregate and form bands reaching up to 300,000 individuals. The bright warning colours keep away predators. They also eject toxic foam when disturbed (Katiyar, 1955; Lever, 1969; Nair, 1990; Nigam, 1959; Roffey, 1979 and Whitman, 1990).

Banana plants were the most damaged. Leaves were eaten down to mid rib. The infestation on other crops such as areca nut, black pepper, coconut, mango, Coffee and teak was comparatively low. Nutmeg, turmeric, ginger, cocoa and tapioca were not damaged. Individuals attaining adult stage early reached canopy of tall trees, faecal matter dropped on to the plants and persons beneath. The noise created by falling faecal matter on plants could be heard from a distance. The pest generally remained off the ground, inhabiting plants from near ground level to the tops of trees (Figure 1).

Table 1. Outbreak of *A. miliaris* in Kerala during 2020 and 2021

Location	MSL	Area infested	Crops infested	Crops not-infested
Kodakara, Thrissur, 10.3723°N, 76.3053°E.	14 m	2 Acre	Areca nut, Banana, Black Pepper Coconut and Mango	Ginger, Nutmeg and Turmeric.
Kamakshi, Idukki, 9.8327°N, 77.0471°E.	784 m	1 Acre	Banana	Black Pepper and Cocoa.
Karuvarakundu, Malappuram, 11.1216°N, 76.3435°E.	88 m	1 Acre	Banana	Ginger, Tapioca and Turmeric.
Aliparambu, Malappuram, 10.9219°N, 76.2653°E.	40 m	1 Acre	Banana	Ginger, Tapioca and Turmeric.
Pulpally, Wayanad, 11.7923°N, 76.1663°E.	797 m	1 Acre	Banana, Cocoa, Coffee, Dadap tree Mango, Black Pepper and Teak	Ginger, Tapioca and Turmeric.
Mullenkolly, Wayanad, 11.8176°N, 76.1639° E.	789 m	2 Acre	Banana, Black Pepper and Coffee	Ginger, Tapioca, Turmeric and Rubber.

Table 2. Host plants of *A. miliaris*

Group	Host plants
Cereals	Maize, <i>Zea mays</i> (Poaceae); Rice, <i>Oryza sativa</i> (Poaceae); Sorghum, <i>Sorghum bicolor</i> (Poaceae).
Fibre crops	Cotton, <i>Gossypium</i> sp. (Malvaceae); Jute, <i>Corchorus</i> sp. (Tiliaceae).
Fodder crops	Dadap, <i>Erythrina lithosperma</i> (Fabaceae); Indian coral tree, <i>Erythrina indica</i> (Fabaceae).
Forest Trees	Pine, <i>Pinus</i> spp. (Pinaceae); Teak, <i>Tectona grandis</i> (Verbenaceae).
Fruit crops	Banana, <i>Musa</i> sp. (Musaceae); Custard apple, <i>Annona reticulate</i> (Annonaceae); Durian, <i>Durio</i> spp. (Malvaceae); Jack fruit, <i>Artocarpus heterophyllus</i> (Moraceae); Guava, <i>Psidium guajava</i> (Myrtaceae); Mango, <i>Mangifera indica</i> (Anacardiaceae); Mulberry, <i>Morus</i> spp. (Moraceae).
Oil seed crops	Castor, <i>Ricinus communis</i> (Euphorbiaceae); Oil palm, <i>Elaeis guineensis</i> (Arecaceae); Sesame, <i>Sesamum indicum</i> (Pedaliaceae).
Plantation crops	Areca nut, <i>Areca catechu</i> (Arecaceae); Cardamom, <i>Elettaria cardamomum</i> (Zingiberaceae); Cocoa, <i>Theobroma cacao</i> (Malvaceae); Coconut, <i>Cocos nucifera</i> (Arecaceae); Coffee, <i>Coffea</i> spp. (Rubiaceae); Rubber, <i>Hevea brasiliensis</i> (Euphorbiaceae); Sugarcane, <i>Saccharum officinarum</i> (Poaceae).
Pulses	Pigeon Pea, <i>Cajanus cajan</i> (Fabaceae).
Tuber crops	Cassava, <i>Manihot esculenta</i> (Euphorbiaceae).
Vegetable crops	Chillies, <i>Capsicum</i> sp. (Solanaceae).
Weeds	Country mallow, <i>Abutilon indicum</i> (Malvaceae); <i>Clerodendron</i> sp. (Verbenaceae); <i>Macaranga indica</i> (Euphorbiaceae).

(Anon., 2006; Jones, 1940: Roffey, 1979; Nair, 1990; Rajmohana and Vidhupriya, 2003; Josephraj Kumar *et al.*, 2007 and 2010; Chandrasekhar *et al.*, 2008)



LEGEND		
Index	Location	Year
1	Pulpally, 11.7923°N,76.1663°E, 797 m MSL	2020, 2021
2	Mullenkolly, 11.8176°N,76.1639°E, 789 m MSL	2021
3	Koodaranji, 10.32°N,76.35°E, 164 m MSL	2005
4	Karuvarakundu, 11.1216°N,76.3435°E, 88 m MSL	2021
5	Aliparambu, 10.9219°N,76.2653°E, 40 m MSL	2021
6	Kodakara, 10.3723°N,76.3053°E, 14 m MSL	2021
7	Melekuppachampady, 9.765°N,77.116°E, 840 m MSL	2010
8	Kanjikuzhy, 9.85°N 76.94°E, 597 m MSL	2006
9	Kamakshi, 9.8327°N,77.0471°E, 784 m MSL	2021
10	Manimala, 9.29°N 76.44°E, 39 m MSL	1939
11	Kalanjoor, 9.7°N 76.51°E, 43 m MSL	1939
12	Konni, 9.2410°N 76.8783°E, 93 m MSL	2006, 2011, 2020

Fig. 1. Outbreaks of *A. miliaris* in Kerala from 1939 to till date

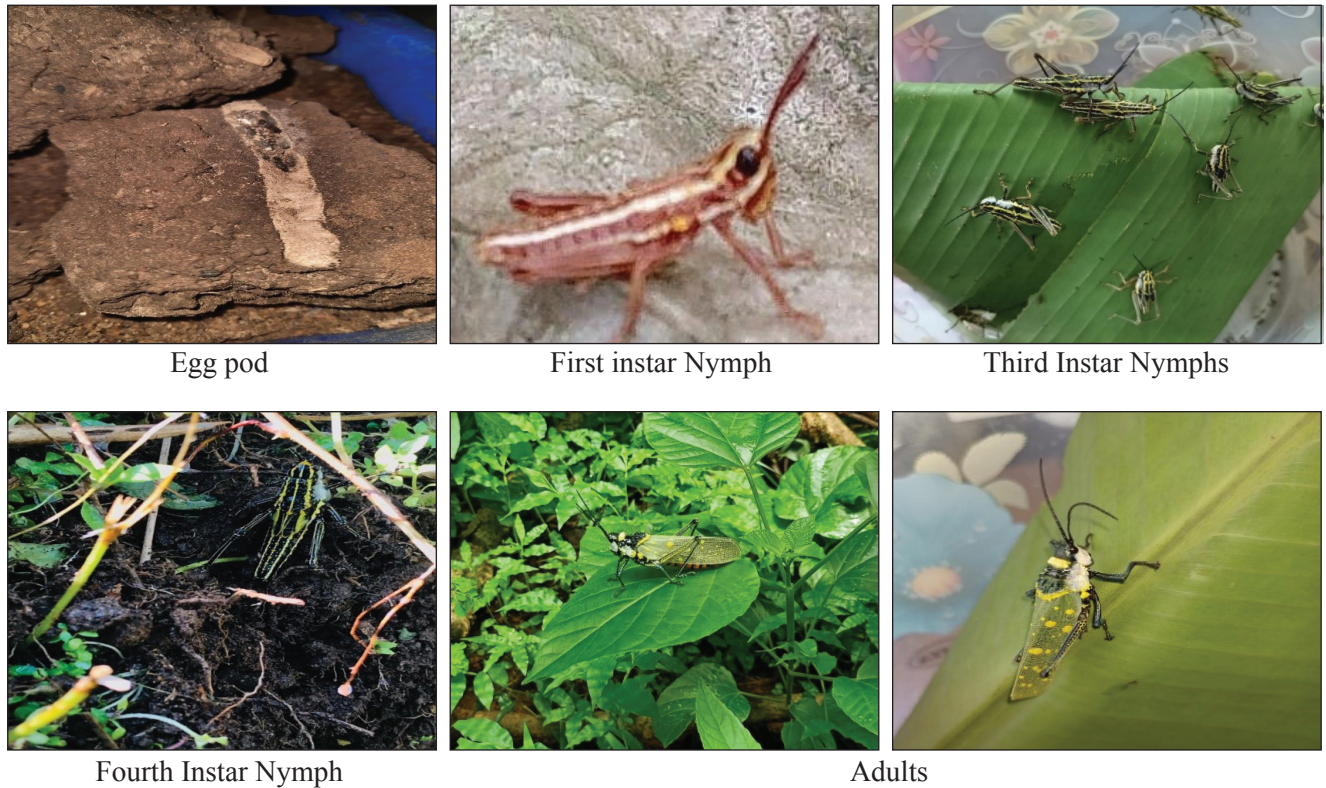


Fig. 2. Life stages of *A. miliaris*

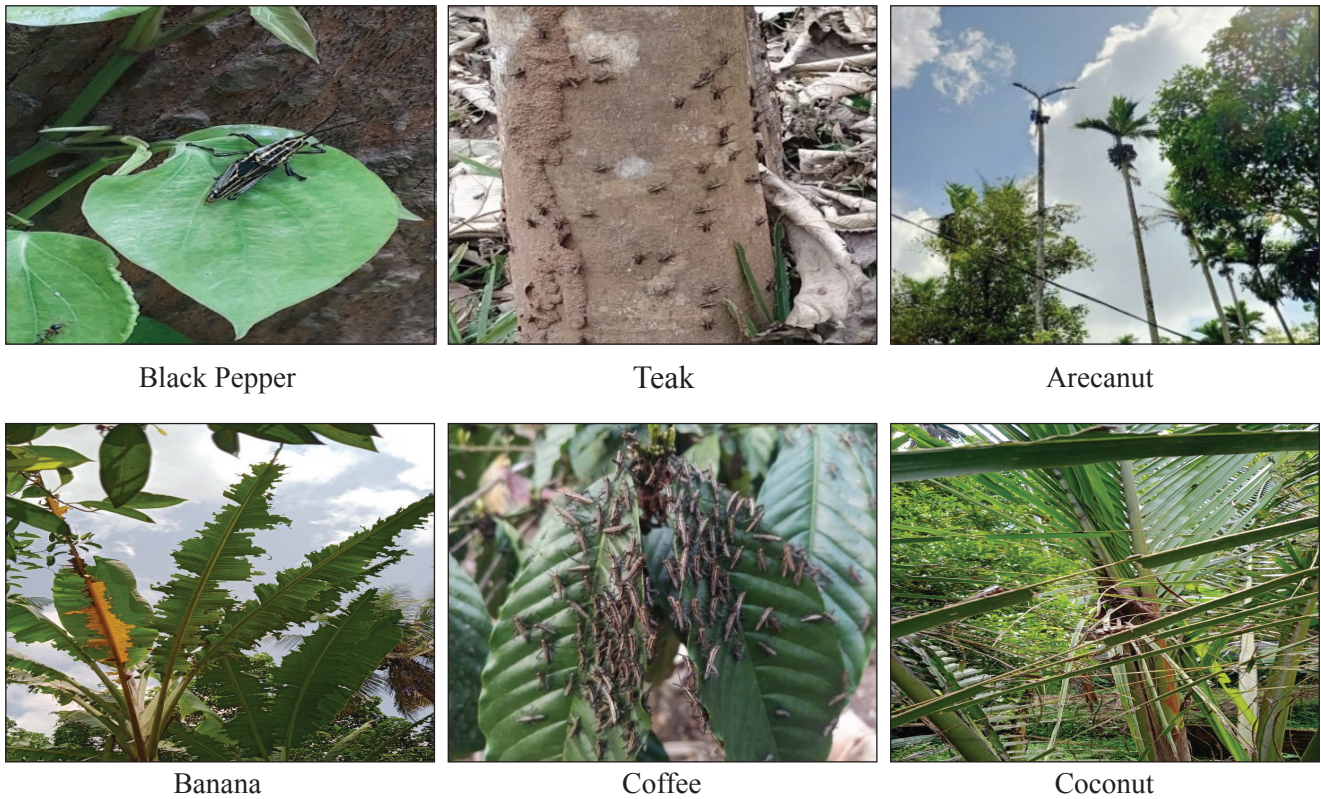


Fig. 3. Incidence of *A. miliaris* on different crops in Kerala during April - May, 2020- 21

In the last 80 years since 1940, nearly 15 outbreaks of *A. miliaris* have been documented at 12 locations in eight districts of Kerala by CIPMC, Ernakulam and other research workers. Crop plants of 19 families, number of other forest species and grasslands were damaged (Table 2; Figure 2).

Extreme climatic conditions are known to annihilate the natural enemies leading to outbreaks in locusts (Pradhan, 1969). However, *A. miliaris* appears to have low migratory potential. Though outbreaks occurred in many districts bordering Tamil Nadu and Karnataka, there are no reports of interstate migration. The pest has never attained a major status on any of the crops. Adults are bulky, and nymphs and adults land on plants in large numbers, which is scary to farmers. Outbreaks occurred in areas where high value cash crops are grown and farmers tend to spray insecticides. The outbreaks were localized and vanished to nearby forest after attaining adult stage. The pest population can be effectively brought down by just mechanical collection and destruction of egg pods and nymphs.

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