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Rajesh Kumar EkkaDepartment of Entomology,
COA, IGKV, Raipur,
Chhattisgarh, India**SS Shaw**Department of Entomology,
COA, IGKV, Raipur,
Chhattisgarh, India**Yogesh Meshram**Department of Entomology,
COA, Janjgir-Champa,
Chhattisgarh, India**SL Swamy**Dean, College of Agriculture and
Research Station, Katghora,
Korba, Chhattisgarh, India

Outbreak of *Poinciana looper* moth, *Pericyma cruegeri* (Butler) (Lepidoptera: Erebidae) in the Korba district of Chhattisgarh

Rajesh Kumar Ekka, SS Shaw, Yogesh Meshram and SL Swamy

Abstract

Poinciana looper, *Pericyma cruegeri* (Butler) (Lepidoptera: Erebidae) is an endemic Indian defoliator of Poinciana (*Delonix regia*) and yellow poinciana (*Peltophorum pterocarpum*) trees. Poinciana looper larvae cause extensive defoliation, reduced flowering, and become a nuisance to residents as caterpillars drop from trees. Morphology based taxonomic tools were used for the identification of this pest. Severe damage was noticed in Korba and Katghora region of Chhattisgarh during August 2020. The larvae feed on the foliage of Caesalpiniaceae species, including *Peltophorum pterocarpum* and *Delonix regia* and cause extensive damage. They feed communally at first but separate when grown older. Abiotic factors like heavy rain affected the looper incidence significantly and decreased the population to negligibility. The survey also revealed natural parasitism by pupal parasitoid *Exorista civiloides* (Diptera: Tachinidae). Generalist predators including preying mantids (*Hierodula patellifera*), pentatomid bugs (*Eocanthecona furcellata*) and predatory wasps (*Brachymeria albotibialis*)- as well as chickens - are also recorded attacking *P. cruegeri* larvae.

Keywords: New pest, Korba, *Poinciana looper* moth

Introduction

Delonix, a genus of tribe Eucaesalpiniea consists of two species growing India *Delonix elata* and *Delonix regia* belongs to Caesalpiniaceae family but according to the phylogenetic classification it belongs to Fabaceae family (subfamily of Leguminosae). The tree is native to Madagascar and indeed the most important flowering ornamental tropical tree in the world (Vozzo, 2003) [2]. *Delonix regia* is also known as the Royal Poinciana or Flamboyant. This plant was previously placed in the genus poinciana, named after phillippede longvilliers de poincy (1583-1660), who is credited with introducing the plant to the america.

Peltophorum pterocarpum, is native to the Indo-Malayan region and it is spread over Andaman Islands, Sri Lanka, Malaysia, Papua New Guinea and northern Australia. It is widely cultivated throughout its natural range and also in the Bismarck Archipelago, India, tropical Africa, the Caribbean, Central America, Florida and Hawaii in the USA (Gilman and Watson, 1993) [1].

Pericyma cruegeri, the poinciana looper, is a moth of the family Erebidae. The species was first described by Arthur Gardiner Butler in 1886 (Butler, 1886) [3]. *P. cruegeri* has found the favourable tropical climate, availability of abundant host material and the absence of its natural enemies cause congenial for its multiplication and has become very destructive to the host trees.

***Pericyma cruegeri* (Butler, 1886) [3]**

1886. *Homoptera cruegeri* Butler, Trans. ent. Soc. London, 1886: 411.

Taxonomical Classification

Kingdom: Animalia
Phylum: Arthropoda
Class: Insecta
Order: Lepidoptera
Superfamily: Noctuoidea
Family: Erebidae
Genus: *Pericyma*
Species: *P. cruegeri*

Corresponding Author:

Rajesh Kumar Ekka
Department of Entomology,
COA, IGKV, Raipur,
Chhattisgarh, India

Distribution

India: Jharkhand, Chhattisgarh (New Record).

Elsewhere: It is found in south-east Asia including Hong Kong, Taiwan, Vietnam, Thailand, Sumatra, Peninsular Malaysia, Borneo, the Philippines, New Guinea, and in Australia, northern New South Wales and Queensland.

Remarks: The species is recorded first time from Chhattisgarh

Study area

The study was carried out in Korba district of the state Chhattisgarh, India, which is the part of central India (Fig. 1). The district lies between 22°01' to 23°01' North latitude and 82°07' to 83°07' East longitude. The District's total area is 7,14,544 hectare out of which 2,83,497 hectares is forest land. District falls under the hot temperate climate zone and hence the district experiences very hot and dry. Summer season starts from April to mid June. Rainy season due to the South-West Monsoon is from mid June till the end of September. The average rainfall in the district is 1506.7 mm. and normal rainfall is 1287.6 mm.

Host plant

Pericyma cruegeri is polyphagous (Robinson *et al.*, 2001) [6]. It had been reported to feed on *Delonix regia*, *Desmanthus virgatus*, *Peltophorum pterocarpum*, *Cassia fistula*, *Leucanea leucocephala*, *Caesalpinia regia*, *Nephelium lappaceum*, *Camellia sinensis* and *Acacia catechu* (Muniappan, 1974; Holloway, 1989; Robinson *et al.*, 2010) [4, 8, 7]. However, in Korba, the larvae of *P. cruegeri* were observed feeding on young leaves of *Delonix regia*, *Peltophorum pterocarpum*, and *Leucanea leucocephala*.

Biology and morphological characterization of *P. Cruegeri*

A general life cycle of *P. cruegeri* in the Philippines was reported by Roxas (1927) [5].

Egg laying took place during the night and eggs were laid singly on the leaflets. Rarely, two or three eggs were laid close to each other on a single leaflet. Eggs were semispherical, yellowish-green to bluish-green with longitudinal lines on the outside. The diameter of the egg was 0.7 mm. The incubation period averaged 2.5 days with a range of 2 to 3 days.

The larva that emerged from the egg was yellow and 3.1 mm in length. Because of the atrophied nature of the first two pairs of the abdominal legs, the larva moved by looping. However, it readily started feeding by scraping the flame tree leaflets.

The duration of first instar was 5 to 6 days, with an average of 5.1 days. The width of the first instar head capsule was 0.6 mm. (The exuvia after each molting was used for measuring the width of head capsule).

The second instar larva was 12 to 14 mm in length; head capsule width was 0.9 mm. The second instar larva was dark greenish with black dots on the body. The head was yellowish-orange. Duration of the 2nd instar was 3 to 4 days with an average of 3.7 days.

The third instar larva was light green with grey and white longitudinal lines on the body. The head was orange with a dorso-median yellow patch. It was 17 to 19 mm in length, averaging 18.5 mm. The width of the head was 1.3 mm. Duration of the 3rd instar was 5 to 6 days with an average of 5.1 days.

The fourth instar larva was light green with five white dorsal and two black lateral longitudinal lines. Head was yellowish-green with 'V' shaped white line on the dorsal side. The fourth instar larva measured 36 to 37 mm in length. The width of the head capsule was 1.9 mm. Duration of the fourth instar was 4 to 5 days, with an average of 4.4 days.

The fifth instar larva was about 5.0 cm in length with a greenish head and a narrow, neck-like, region behind a large head (fig. 2). The body was green with five white dorsal and two yellow lateral longitudinal lines (fig.3). On the dorsal side of each spiracle, there was a black patch and below a snow white patch. The color of larvae also varies. Some had a yellowish-green head, but all the five white dorsal longitudinal lines were merged to form a white band on the dorsal side. Laterally, there was a wide prominent black band covering the spiracles. The general color of larvae varies depending upon the degree of prominence of the white and black longitudinal bands. Duration of the fifth instar varied from 9 to 11 days, averaging 9.9 days.

The prepupal stage lasted for 2 days. During this stage, the larva constructed a globular cocoon by binding the leaflets and rachises with the silken threads around it (fig. 4).

The pupa was chocolate colored, covered with a white waxy coating (fig. 5). At the posterior end of the pupa, there were eight small hooks (four large and four small). These were hooked to the silken threads inside the cocoon. The length of pupa varied from 14 to 20 mm depending upon the nutrition during the larval stage. The pupal period varied from 9 to 12 days with an average of 10.2 days.

On the average, the poinciana looper completed its life cycle in 40 days. In the absence of any drastic fluctuations of physical or biological factors that affect the population of this pest.

The adult moths (fig. 6 & 7) are dark grey in color and are about 3.5 to 4.0 cm in width with the wings extended. There is some degree of variation in color of the individuals even within the same sex. Adult males could be differentiated from the females by the following external morphological differences

Male: The basal 2/3 of the antenna is thicker than the distal 1/3. The femur and tibia of forelegs are thickly covered with long curly hair.

Female: Antenna fairly uniform in thickness and not dilated at the base. The femur and tibia of forelegs are covered with short hair.

Material examined: India: Chhattisgarh: Korba: CARS, Katghora; Feeding on *Delonix regia* & *Peltophorum pterocarpum*; 15.viii.2020; Coll. Rajesh Kumar Ekka; India: Chhattisgarh: Korba: CARS, Katghora; Feeding on *Peltophorum pterocarpum* and *Delonix regia*; 23.viii.2020; Coll. Rajesh Kumar Ekka. A detail notes on information of the collection of *Pericyma cruegeri* is given on fig. 8.

Nature of damage

Infestations of the poinciana looper caused complete defoliation of the host trees, leaving only the central midribs of the leaflets (fig. 8). The larvae were found feeding on the leaflets and left bare rachises (fig. 9). The mature larvae pupated in concretions covered with a greyish white web and leaflets on the rachises. If the host tree were defoliated before the larvae reached the stage when they were ready to pupate, they crawled down or dropped off the bare trees and crawled

around the surrounding areas (fig. 10). In the process, they crawled upon nearby plants.

In most cases, complete defoliation occurred whenever there was an infestation (fig. 11). Many times reinfestation occurred when the trees produced new foliage after initial defoliation.

Continuous defoliation of tree has caused (a) smaller leaves in the regrowth, (b) dying of small branches, (c) secondary infestations by bark borers and fungus diseases, (d) general reduction of vigour of the trees and (e) skipping of flowering seasons (Muniappan, 1974)^[4].

Biotic and abiotic factors affecting the Population of *P. Cruegeri*.

Abiotic factors (Rainfall)

The first outbreak of *P. Cruegeri* was noted during August 2020 from the Korba and Katghora regions of Chhattisgarh. Weather parameters were studied to observe the effect on the abundance of *P. Cruegeri* population (Table 1). The highest infestation was noted on 12 August – 15 August 2020 then after due to heavy rainfall on 16 August 2020 the population of *P. Cruegeri* were decreased drastically (fig. 12). From the observation it was noted that the rainfall affected the incidence of *P. Cruegeri* and checked the population.

Biotic factors (Natural enemies)

There is a several report on the occurrence of natural enemies on *P. cruegeri*. A tachinid, *Exorista civiloides* (Bar.) (fig. 13) was found parasitizing the pupae (Muniappan, 1974)^[4]. A preying mantis, *Hierodula patellifera* (Serville) (fig 14) has been noted in large numbers feeding on the larvae of *P. cruegeri* on most of the royal poinciana trees. During my survey I also found preying mantid feeding on the larvae. A predatory pentatomid bug, *Eocanthrona furcellata* (Wolff) (fig. 15 & 16) was noted feeding on the larvae of *P. cruegeri* (Muniappan, 1974; Ooi, 1996)^[4].

In addition, domestic chickens were found pecking on the larvae that crawled down the trees when the trees were completely defoliated.

Other methods for the management of *P. Cruegeri*

Recent strategies for managing *P. cruegeri* include clearing debris from around the trees, creating physical barriers, using Systemic pesticides, diatomaceous earth and *Bacillus thuringiensis* applications (Rennie, 2015; Taylor, 2016).

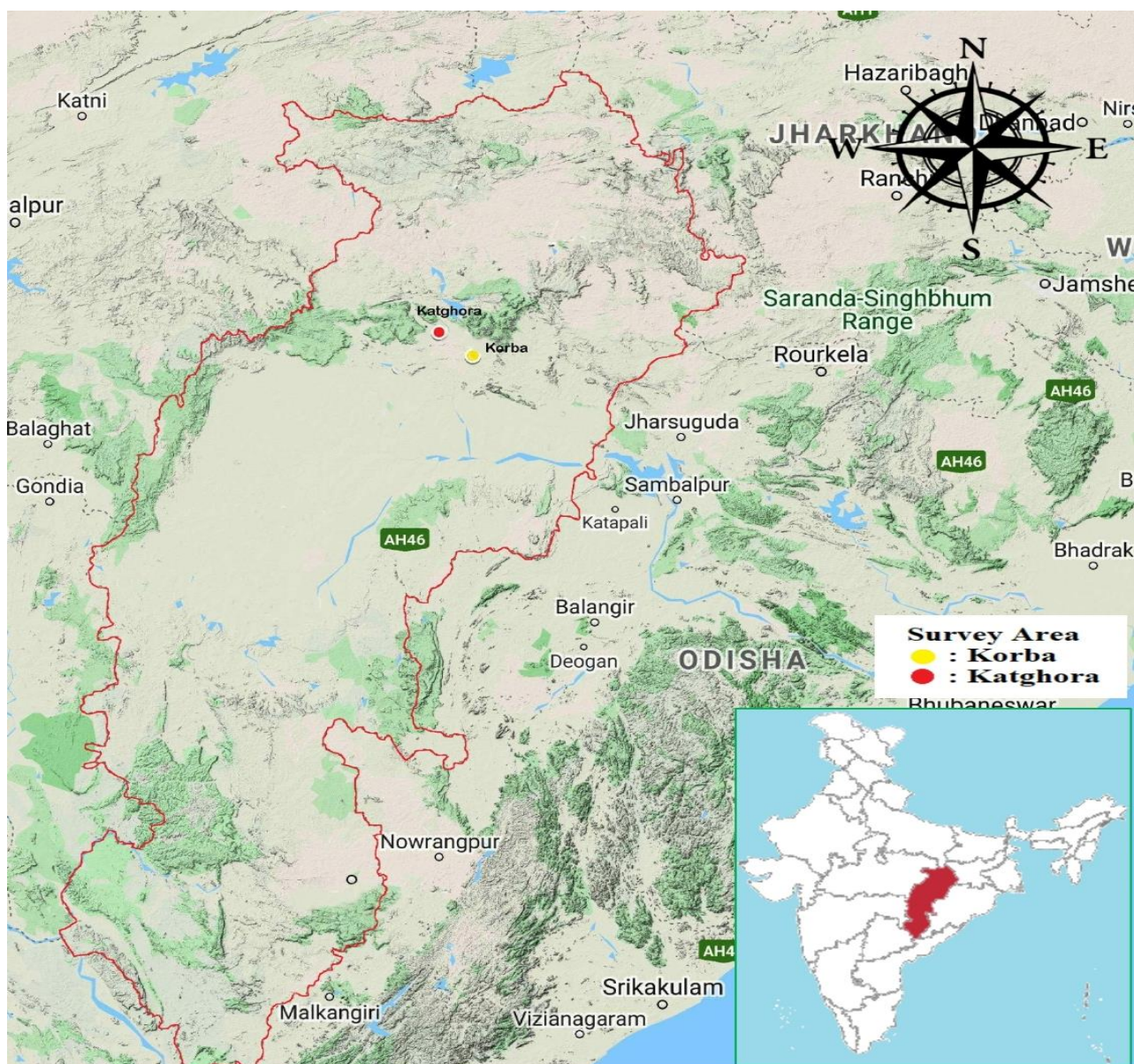


Fig 1: Map of Chhattisgarh representing outbreak of *Pericyma cruegeri*.



Fig 2: A narrow, neck-like, region behind a large head.



Fig 3: Five white dorsal and two yellow lateral longitudinal lines running the length of the body.



Fig 4: The larva constructed a globular cocoon by binding the leaflets and rachises with the silken threads around it



Fig 5: Collected pupae from the tree



Fig 6: Fig. Adult of *Pericyma cruegeri*

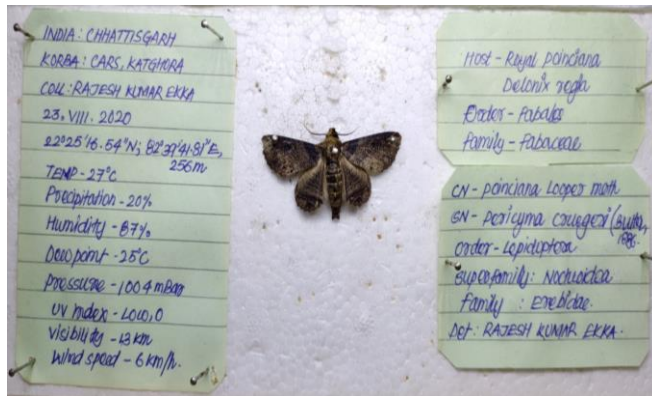


Fig 7: A detail notes on information of the collection of *Pericyma cruegeri*



Fig 8: Complete defoliation of the host trees, leaving only the central midribs of the leaflets



Fig 9: The larvae were found feeding on the leaflets and left bare rachises



Fig 10: Crawled down or dropped off larvae in search of pupation in surrounding area and plant



Fig 11: Complete defoliation occurred observed in Korba and katghora.

Table 1: Weather parameter of Korba (Katghora) district during the pest out break

SN	Date	Average Temperature	Average Relative Humidity	Rainfall
1	1/8/2020	29.25	80.5	0
2	2/8/2020	27.45	76.5	8
3	3/8/2020	30.6	70.5	20
4	4/8/2020	26.25	77.5	15
5	5/8/2020	28.5	80.5	12
6	6/8/2020	26.05	94.5	11
7	7/8/2020	24.75	87.5	25
8	8/8/2020	26	95	0
9	9/8/2020	25.2	86.5	26
10	10/8/2020	27.75	85.5	0
11	11/8/2020	26.4	78.5	2.8
12	12/8/2020	27.25	83.5	0
13	13/8/2020	28.35	80	9.5
14	14/8/2021	28.5	83.5	1
15	15/8/2021	28	92.5	2
16	16/8/2021	25.6	93	169.6
17	17/8/2021	24.75	93	62
18	18/8/2021	25.15	85.5	2
19	19/8/2022	26.75	81	0
20	20/8/2021	28.6	76	0
21	21/8/2021	26.65	78.5	32.8
22	22/8/2023	26.65	64.5	16.4
23	23/8/2021	25.85	81	80.2
24	24/8/2021	26.35	80.5	3

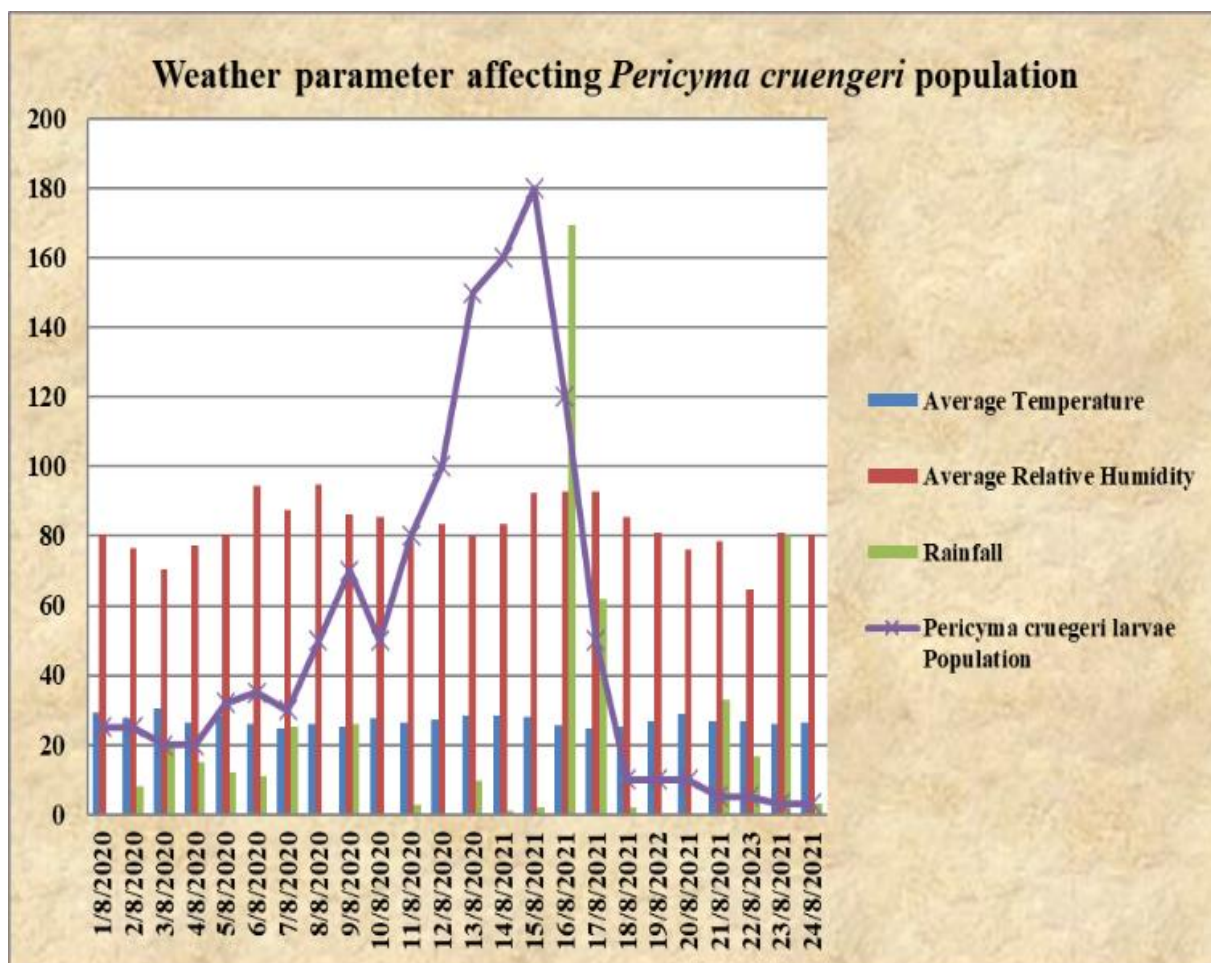


Fig 12: Chart representing the effect of weather on the population of *Pericyma cruengeri*



Fig 13: A tachinid fly, *Exorista civiloides* (Bar.) was found parasitizing the pupae



Fig 14: Preying mantis, *Hierodula patellifera* (Serville) found during survey



Fig 15: Nymph Pentatomid bug, *Eocanthrona furcellata* (Wolff) found predated *Pericyma cruegeri* larvae



Fig 16: Adult Pentatomid bug, *Eocanthrona furcellata* (Wolff) found predated *Pericyma cruegeri* larvae

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