ISSN 2230-7052
BUGS R ALL
#230
21 September 2025
Newsletter of the
Invertebrate Conservation & Information Network of South Asia (ICINSA)

Biological studies on Gmelina tree insect pest *Craspedonta leayana* (Colepotera: Chrysomelidae)

Coleoptera order belongs to the class Insecta (beetles) that comprises near about 3,50,000 species (Hammond 1992; Grove & Stork 2000) of which family Chrysomelidae is a major phytophagous group. It includes over 38,000 living species (Seeno & Wilcox 1982). *Craspedonta leayana* (Latreille) [previously known as *Calopepla leayana* (Latreille, 1807)] is a member of this Chrysomelidae family (and subfamily Cassidinae) and is eventually a serious insect pest of the economically important timber-wood *Gmelina* (*Gmelina arborea* (Roxb.). *Gmelina* is a deciduous tree belonging to family Verbenaceae (Choudhury 1953) which naturally occurs in more than 11 countries in Asia including India and in several other countries its plantation has been initiated (Dvorak 2004). Gmelina has multitude of utilities in agroforestry, industries and several others (Dvorak 2004; Seth 2004; Das & Das 2005; Swamy & Puri 2005). *C. leayana* causes immense depreciation to *Gmelina* by devouring upon leaves, young shoots, and buds thereby diminishing photosynthesizing capacity and growth of the plant. A subsequent second and third incursion is often fatal for the plant (Beeson 1941).

Life cycle of *C. leayana* involves five instar larval stages. They mostly feed on undersurfaces of leaf. Last two larval instars devour upon foliage leaving only the midrib and veins. Adults lie dormant for about 8-10 months and recur with commencement of rain and emergence of new leaf, shoot and buds. They lay eggs in conspicuous casings called 'ootheca' and are observable underneath stem-branches. Egg fertilizes giving rise to first instar larva. Larva undergoes ecdysis through five instars and becomes adult (Garthwaite 1939; Browne 1968; Ahmad & Sen-Sarma 1990). This plant is economically important for Muga silkworms in addition to medicinal properties for human being considered as tertiary host plant for Muga silkworms and distributed in Northeast India, Deccan Peninsula, Northwest Himalayan foothills, Chittagong, Sri Lanka, Malaysia, Philippines (Srivastava & Thangavelu 2005; Bindroo et al. 2006).

Materials and methods

Life cycle of *C. leayana* was observed from 2020-21 to 2023-24 in natural habitat of Rajaram College campus (16.6862666 N 74.2569966 E), Kolhapur (MS) India. Photography of life stages were done in laboratory as well as in filed by using camera (CANON 760D), Daily observations in each cycle was recorded.

Results

Craspedonta leayana (Latreille)

Some stages of the defoliator can be seen in the plate 1 that was taken during the study period inside the college campus.

Common name: Defoliator

Life Cycle: The beetles were found in group of 4-6 full grown adults feeding on the trunk of the plant. The female was larger than the male. The observation of biology and life cycle of *C. leayana* reveal that the beetles come out from hibernation. The mating period was observed for 20 to 30 minutes in the field condition and

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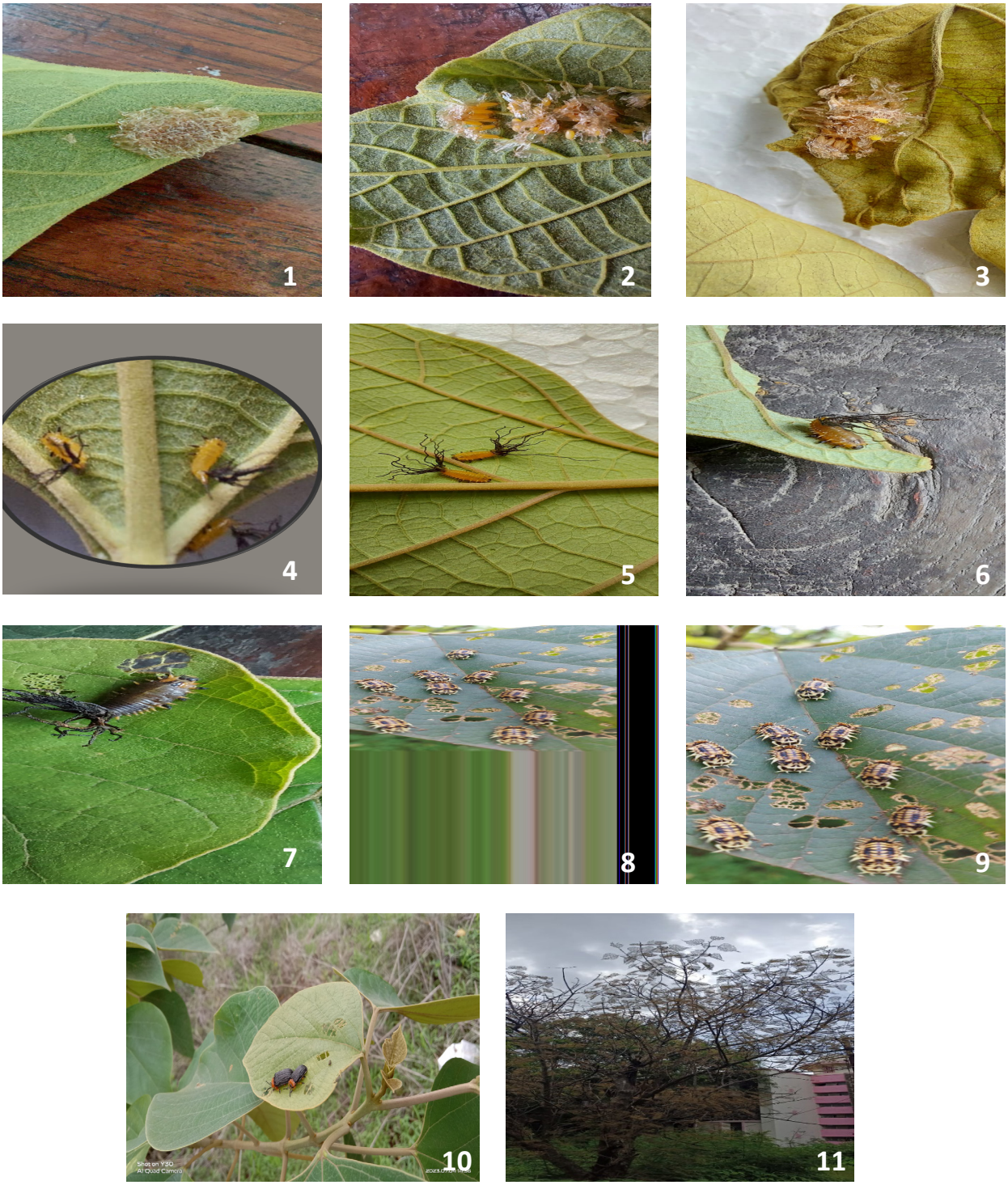
PLATE -1



Images showing different stages of *C. leayana* life-cycle that were taken during the study.
1. Distinct casings called "oothecae" where the adult C. leayana lays eggs on lower surface of leaf.
2. Embryonic development observed in eggs; 3, 4, 5, 6, 7. First to Last instar larval stage (of the total five instars).
8. Pupal stage of *C. leayana*; 9. Number of pupa on single leaf, generally pupation takes place on the leaf itself.
10. Adult *C. leayana* before it prepares for mating and subsequent events of life-cycle.
11. *Gmelina arborea* Roxb. trees with severe infestation of *C. leayana*.

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eggs were laid on upper or lower surface of leaves and on small twigs also of *G. arborea* plant as an ootheca. One female lays up to 15-20 ootheca containing 30-70 eggs. Total five instars were observed in field. The pupae were observed in the field condition and found that pupae turned into cream yellow and blackish brown bands. Adults lie dormant for about 8-10 months and recur with commencement of rain and emergence of new leaf, shoot and buds. Single life cycle was observed in one year.

Feeding behaviour: The beetle and grubs feed voraciously on the leaves and leave behind veins intact.

Discussion

The insect is a serious pest in pure *Gmelina arborea* plantations in India, Myanmar (Garthwaite 1939; Beeson 1941), and Bangladesh (Baksha 1997). Major pest, *Calopepla leayana* Latr. (Coleoptera: Chrysomelidae) of *Gmelina arborea* (Roxb.) from Meghalaya and Assam (India) with emphasis on illustrated biology was also studied by Kumar et al. (2016).

A brief perspective on *Gmelina* tree insect pest *Craspedonta leayana* was previously reported by Barman (2014). The pest normally causes damage to about one-third of the leaf surface area in natural conditions and in small plantations. In certain places, for example pure plantations at Namtu, Myanmar where the insect appeared as epidemic, whole plantations had to be disregarded and abandoned despite vigorous control measures adopted by way of hand-picking and trapping operations (Garthwaite 1939). A similar case in monoculture plantations of *G. arborea* over a large area, abandoned because of serious defoliation by this beetle, has been reported from north-east India. In the present study, the detailed photographic illustrated diagnostic feature with biology has been reported. Single life cycle was observed in one year in present study. But Three generation has been observed in one year by Kumar et al. (2016) in Jorhat region of Asam. The difference in the number of cycles in one year in two diverse geographical regions might be result of difference in surrounding climatic conditions. Therefore, exact effect of climatic condition on longevity of life cycle stages of *C. leayana* is

Acknowledgement

The authors are thankful to Dr. Y. C. Attar, Principal, Rajaram College, Kolhapur, MS, India, for the permission to do this work in the campus.

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ISSN 2230-7052

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Citation: Chavan, J.A. S.S. Taware, L.P. Bhopale (2025). Biological studies on Gmelina tree insect pest *Craspedonta leayana* (Colepotera: Chrysomelidae). Bugs R All #230, In: *Zoo's Print* 40(9): 31–34.

Bugs R All is a newsletter of the Invertebrate Conservation and Information Network of South Asia (ICINSA)