International Journal of Entomology Research
www.entomologyjournals.com
ISSN: 2455-4758
Received: 12-11-2025, Accepted: 11-12-2025, Published: 26-12-2025
Volume 10, Issue 12, 2025, Page No. 135-138

Ontogeny of stink bug *Bathycoelia indica* Dallas, 1851(Hemiptera: Pentatomidae) on *Carissa carandas* L. under laboratory conditions

S H Waghmare[1], S M Gaikwad[2]
[1] Department of Zoology, Arts, Commerce and Science College, Dharangaon, Jalgoan, Maharashtra, India
[2] Department of Zoology, Shivaji University, Kolhapur, Maharashtra, India

Abstract
The life history of the stink bug *Bathycoelia indica* was investigated under laboratory conditions. A mated female was used for rearing, collected from the plant *Carissa carandas* at Talaye, Gaganbawda (Kolhapur district, Maharashtra). After one day of collection, the female laid 14-20 eggs at an interval of one day. Eggs were incubated for 5–7 days, and hatchability was only 60%. Five nymphal instars were observed; first instar nymphs were non-feeding, whereas subsequent instars fed actively on *C. carandas* fruits. Nymphal development was completed in 47 days. Mortality of early instars was 70% while 30% mortality was seen in second, third, and fourth instars. Only one nymph can go to the final instar stage to become an adult with fully developed wings and high mobility. There is no report on the life cycle of *B. indica.*

Keywords: Stink bug, *Bathycoelia indica*, life history, nymphal instars, *Carissa carandas*

Introduction

Pentatomidae, generally referred to as stink bugs or shield bugs, comprises a diverse group of phytophagous insects. Most of them are of considerable agricultural significance due to their pest status on economically important crops. Members of this family exhibit piercing and sucking mouthparts feeding on plant sap, which often results in direct tissue damage, reduced crop quality, and significant yield loss (Panizzi, 2015) [9]. Within this family, the genus *Bathycoelia* Dallas is relatively less studied, although certain species have been recognized as fruit crop pests in Asia and Africa (Salini & Viraktamath, 2015) [10].

Bathycoelia indica (Dallas, 1851) [3] is a native pentatomid bug distributed through various regions of India, including Maharashtra, Karnataka, Tamil Nadu, Andhra Pradesh, and the Andaman Islands (Atkinson, 1887[1]; Distant, 1902[4]; Chatterjee, 1934[2]; Salini & Viraktamath, 2015) [10]. *B. indica* causes damage to fruits, leading to stains and reduced market value.

The pests' buried nature and limited prior research make it a challenge for integrated pest management programs. A comprehensive understanding of life history, morphology, and host interactions is consequently essential for formulating effective management strategies. Morphologically, this species is characterized by a truncated head, smooth pronotal margins, and distinctive violet coloration on the lateral margins of the head and pronotum. Despite an early description more than a century ago, its biological aspects remain poorly documented, with fragmented information on its development and host associations (ICAR-NBAIR) [5]. Recent field observations have highlighted its cumulative significance as a pest of pomegranate (*Punica granatum* L.), an emerging fruit crop in India valued for its nutritional and economic importance (Kudnar et al., 2024) [6].

The present study aims to document the life history of *Bathycoelia indica* under laboratory conditions, thus contributing to the knowledge base on its taxonomy, distribution, and agricultural relevance.

Material and Methods

The life history of *Bathycoelia indica* was studied under laboratory conditions at 25^{0}C to 30^{0}C and 60 to 70% RH. The mated female was originally collected from Talaye, Gaganbawda, Kolhapur, on the plant *Carrisa carandas,* dated 14th May 2014. The first instar nymphs were reared in aluminum meshed cages (15cm×15cm×22cm) (Fig.1), and observations were made. Early instars, i.e., first instar, did not feed; they moved around the egg mass. Feeding starts from the second instar, and they were fed on the fruits of *Carissa carandas*. They suck the juice from fruits. The measurements of the egg, each nymphal instar, and adult female were recorded by a vernier caliper along with photography. First and second instars were anaesthetized with chloroform and measured, while other instars and adults were measured without anesthesia.

Results

In the present study, the life history of *Bathycoelia indica* is examined, along with the various observations including oviposition, hatching, nymphal development, food, and color variation. Only one nymph could go to the final instar stage; therefore, the duration of the complete life cycle and mating of adults could not be recorded. There is no report on the life cycle of *B. indica.*

Oviposition and Hatching

After one day of collection, the female laid 14-20 eggs in the plastic container at an interval of one day. Eggs were creamy white, barrel-shaped shaped and measured about 1mm in diameter (Fig. 2a). The egg incubation period was 5-7 days. Few eggs were hatched, and early instars were moving around the egg mass. In laboratory condition hatching percentage was 60% and the mortality of early instars was 70%.

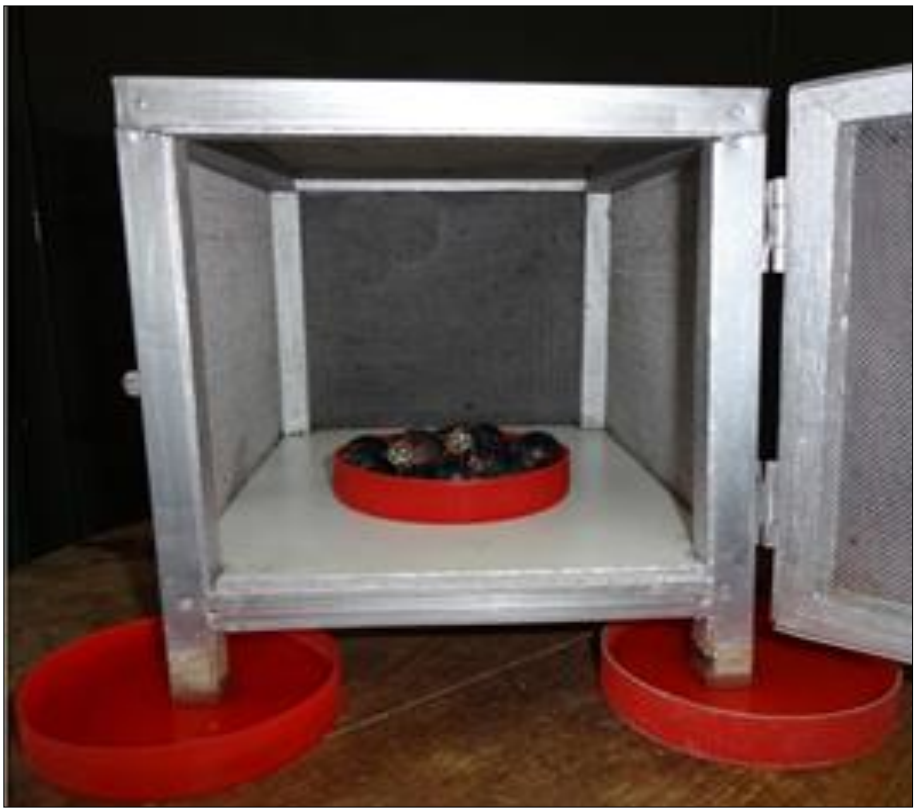

Fig 1: Rearing cage (showing feeding of second instar nymphs on fruits nymphs on fruits of carandas)

Nymphal Development

The life cycle of *Bathycoelia indica* was completed within three stages i.e., egg, nymph, and adult. There were 5 nymphal instars. Nymphs molt 4 times and finally become the adult stage. The average size of nymphs from first instar to fifth instar ranges between 1.9 mm to 11.7 mm in length. There was a 30% mortality of second, third, and fourth instars. Only two instars pass the fourth molt, but one dies, and one remains alive. Nymphs were very active except for the first instar. Nymphal development is completed within 47 days.

First instar: It takes 4-7 days to hatch from eggs. Body oval, orangish-white with black stripes; head broader than long, margins orange; tylus prominent, slightly longer than juga; eyes black, antennae orange; pronotum, scutellum not well developed; connexiva alternately black and white; abdomen dorsally with black stripes and ventrally orangish; legs orange in color. They were not very active, did not feed and move around the egg mass (Fig.2-b). They are about 1.9 mm to 2.1 mm in length and 1.7 mm to 1.8 mm in width. They last for 3-7 days.

Second instar: Second instar nymphs were very active, and they started feeding on the fruits of *Carissa carandas.* Morphologically, these instars were not like early instars; they differed in size, shape, and body color. Body whitish with black stripes; head broad with orange apex, base with three black stripes; tylus longer than juga; eyes brownish black; antennae orange, fourth and fifth segment black; pronotum, scutellum not well developed; connexiva alternately black and white; dorsally abdomen with black stripes, ventrally whitish orange; legs dark orange (Fig.2-c). The size was about 3.1 to 3.3 mm in length and width, was between 2.4 to 2.6 mm. They last for 7-8 days.

Third instar: Morphologically, these instars were like the second instar except in size and color. Head whitish black with apex yellowish orange; apex of fourth and fifth segments of antennae black; legs were luteous (Fig.2-d). They have a size of about 5.1 mm to 5.4 mm in length and a width of 3.5 mm to 3.7 mm. Like the second instar nymph, these instars have black stripes on the body. They last for 6-7 days.

Fourth instar: These instars were bigger and more active than the third instars. They have a size of about 7.9 mm to 8.3 mm in length and a width of 4.5 mm to 4.8 mm. Head orangish with lateral margins black; tylus prominent, equal in length to juga; eyes orangish black; antennae with basal segment short; first, second and third segment orange, fourth and apex of fifth segment; pronotum, scutellum not well developed; orangish- yellow; connexiva alternately banded with black color; abdomen orangish-yellow; legs orange (Fig.2-e). They last for 8-13 days

Fifth instar: This is the final instar, bigger than all previous instar nymphs. The body measures about 11.7 mm in length and 6.3 mm in width. Body yellowish-orange; head orange with lateral margins black; juga longer than tylus; eye reddish black; ocelli black; antennae with basal segment short; first, second, and third segment orange, base of fourth and fifth segment white with black apex; pronotum, scutellum not well developed; anterior lateral margins of pronotum green; connexiva alternately banded with linear black stripes; abdomen yellowish; legs orange. The wing pads were developed, but they lack wings (Fig.2-f). Only one fifth instar remains and takes 11 days to final molt.

Adult

The fifth instar nymph molts and finally becomes to adult (female) stage. The adult was fully developed and measured

about 19.26 mm in body length and 9.84 mm in width. Morphologically, the adult was very different than nymphs. The adult female had well-developed wings, and she was able to fly. Body pale green, thickly and minutely punctuate; head somewhat triangular; margins of head violaceous; juga smaller than tylus; eyes compound, black; ocelli red; rostrum long, 4 segmented, third segment larger than others, just reaching at the third abdominal segment; pronotum broad, long, minutely punctuate; humeral angles slightly pointed; scutellum triangular, a subfoveate black spot with a pale levigate margin in each basal angle; clavus concolorous to corium, corium thickly punctuate; connexiva pale green to yellowish color at margin, dorsally banded with yellow color; membrane transparent, colorless; abdomen impunctate; legs are greenish, tibia hairy. They are very active and capable of flight due to well-developed wings (Fig.2 g-h). Females die after 4 days due to unfavorable laboratory conditions.

Food

First instar did not feed; they are just moving around the egg mass. Feeding starts from the second instars (Fig.1). Both nymphs and adults were fed on the fruits of *Carissa carandas*. The feeding capacity of adults was higher than nymphs.

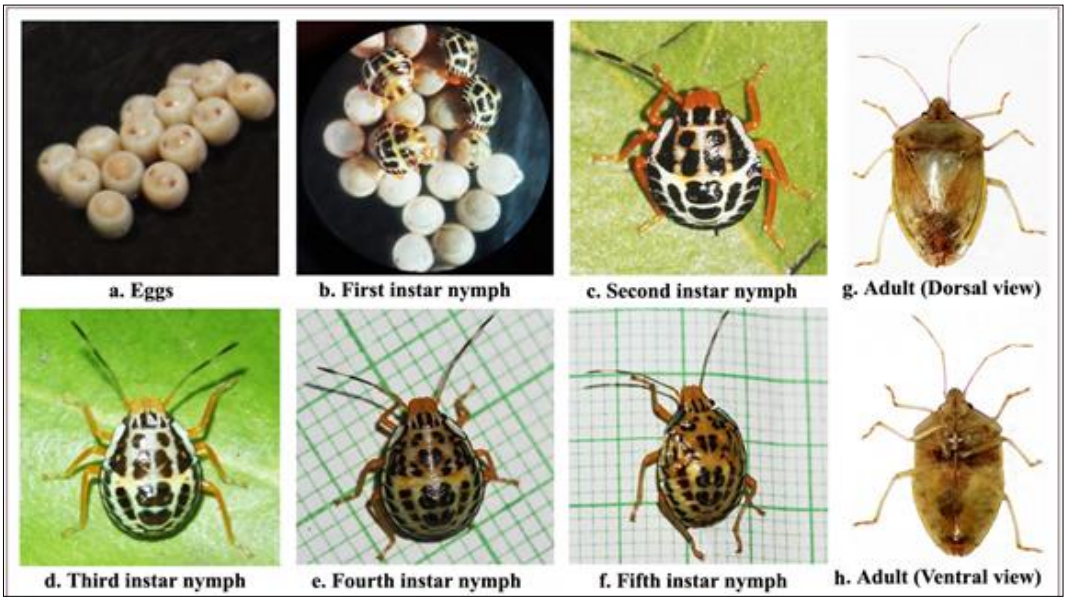

Fig 2: Life cycle stage of bathycelio indica dallas, 1851

Discussion

The present study confirms that *Bathycoelia indica* Dallas can complete its life cycle on *Carissa carandas* L., indicating its role as a feeding plant. *B. indica* is a poorly studied stink bug with potential pest status. Like other pentatomids, this species follows a hemimetabolous life cycle with distinct morphological changes across instars (Panizzi & Grazia, 2015) [8]. Adult females laid 14–20 eggs per batch with about 60% hatchability. High mortality ~70 % observed in first instars, was associated with non-feeding behaviour, failure to establish on host plants. Feeding starts from the second instar onward, which aligns with typical stink bug biology, reflecting a developmental shift from aggregation performance to active host exploitation (McPherson, 2018) [7]. Development across nymphs lasted about 47 days, indicating that relatively slow growth leads to affect seasonal abundance. Adults were pale green with well-developed functional wings and showed higher feeding efficiency than nymphs, resembling other fruit-feeding stink bugs. Previous reports have highlighted its association with pomegranate (*Punica granatum* L.) in Maharashtra, India (Kudnar et al. 2024) [6], and their laboratory studies further confirmed its reproductive behaviour; however, high nymphal mortality hindered the completion of its life cycle.

Overall, documenting *C. carandas* as a new developmental host contributes to the ecological understanding of *B. indica* and underscores the role of wild hosts in population dynamics and outbreak risk in western India.

Conclusion

The present study elucidates the biology of *Bathycoelia indica* on *Carissa carandas* under laboratory conditions, providing baseline data on its oviposition, incubation, instar-wise development, mortality, and adult morphology. These detailed descriptions not only aid in species identification but also provide a foundation for understanding host association and pest management strategies to mitigate its potential impact on fruit crops.

Acknowledgements

The authors are grateful to the Head, Department of Zoology, Shivaji University, Kolhapur for providing necessary facilities for this work.

References

1. Atkinson ET. Notes on Indian Rhynchota, Heteroptera No. 2. Journal of the Asiatic Society of Bengal,1887:56:145–205.
2. Chatterjee, S. N. Notes on some Indian Pentatomidae (Hemiptera: Heteroptera). *Records of the Indian Museum*,1934:36:331–342.
3. Dallas, W. S. List of the specimens of hemipterous insects in the collection of the British Museum. Part 1. Trustees of the British Museum, London,1851:1-368:1-11.
4. Distant W. L. the Fauna of British India, including Ceylon and Burma. London,1902:2(17):1-242.

5. ICAR-NBAIR. *Bathycoelia indica* Dallas, *Pentatomidae fauna of India* (factsheet: host plants, distribution, diagnostic notes). databases.nbair.res.in, 1851.
6. Kudnar PS, Gowande GG, Ghate HV. Report of *Bathycoelia indica* as a pest of pomegranate in Maharashtra State, India. *Journal of Threatened Taxa*,2024:16(1):24485–24495.
7. McPherson, John Edwin, ed. Invasive stink bugs and related species (Pentatomoidea): biology, higher systematics, semiochemistry, and management. CRC Press, 2018.
8. Panizzi AR, Grazia J. True Bugs (Heteroptera) of the Neotropics. Springer, Dordrecht, 2015.
9. Panizzi AR. Growing problems with stink bugs (Hemiptera: Heteroptera: Pentatomidae): species complexes and invasive species in the Neotropics. *Neotropical Entomology*,2015:44(6):635–641.
10. Salini S. Viraktamath CA. Genera of Pentatomidae (Hemiptera: Pentatomoidea) from south India–an illustrated key to genera and checklist of species. Zootaxa,2015:3924(1):1–76. https://doi.org/10.11646/zootaxa.3924.1.1