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First record of *Mesomorphus latiusculus* Chatanay (Coleoptera: Tenebrionidae) from India and its association with the ant *Chronoxenusdalyi* Forel (Hymenoptera: Formicidae)

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Abstract

Association between a Tenebrionid beetle, *Mesomorphus latiusculus* Chatanay and an ant *Chronoxenusdalyi* Forel, is reported from Satkosia Tiger Reserve, Odisha, India. *Mesomorphus latiusculus* is reported for the first time not only from Odisha but also from India. Both species are rarely distributed and their biology is not known so far.

Keywords: Coleoptera, Hymenoptera, Myrmecophily, ant, beetle, Tenebrionidae, first record, India

Introduction

Myrmecophily is a charismatic biological phenomenon that defines the associations, whether casual or intimate of various organisms with ants. In particular, a large number of insects establish relationships with ants for a considerable part of their life cycle [1]. Insect-ant interactions range from commensalism to specialized predation, parasitism and mutualism. Ant nests are considered to be well protected environment with storage of food items and stable microclimatic conditions. Wilson (1971) [8] and Hölldobler (1972) [5] argued that the insect colony and its immediate environment can be compared to an ecological island, partitioned into many microhabitats that symbiotic organisms are continuously attempting to colonize. Several myrmecophilous organisms are known to profit from these assets by inhabiting them [3]. In fact, more than 10,000 social parasite species have been reported in ant nests [4]. The exploitation of ant nests presents some formidable challenges. Finding the host ants, especially the nest, is the first challenge. But entering the fortress of these aggressive and hostile animals requires behavioural, morphological, and chemical changes to fool the host. A myrmecophile can live outside the nest, being associated with ant trails and even migrating with the ants as they move. The host ant can be tricked into carrying invaders inside the nest, and even into feeding them. Once accepted inside the ant nest, the 'uninvited guest' insect has some trophic options such as being predators of ants or other arthropod inhabitants, or being scavengers feeding on nest refuse and dead bodies, or being fungivores, eating the stored grain and leaves, and thieves, feeding on the regurgitated foods. An invading insect can also choose from a variety of places or niches to live, such as refuse piles, storage chambers and brood chambers.

This observation was made during our studies on the Formicidae of the Satkosia Tiger Reserve, Odisha, India. Even though the study was aimed at the diversity and distribution of Formicidae of the protected area, this unique association was found interesting and as no such report was seen before.

Materials and Methods

Specimens were collected by hand picking and killed in ethyl acetate fumes and stored in 70% ethyl alcohol. The specimens were photographed by Leica M205A stereo zoom microscope. Specimens have been deposited in the National Zoological Collections (NZC), Zoological Survey of India, Kolkata, India.

Abbreviations: NZC- National Zoological Collection, Zoological Survey of India, Kolkata, India.

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Results and Discussion

The present study was based on collection of the specimens from Satkosia Tiger Reserve, Odisha, India. Satkosia is the meeting point of two bio-geographic regions of India, the Deccan Peninsula and the Eastern Ghats, contributing immense biodiversity. Beetles are often the most easily recognized and morphologically distinct myrmecophiles. The huge species richness, their ecological predisposition to encounter and explore ant colonies and their possession of a major defensive pre-adaptation in the form of elytra has synergised to make beetles exceptionally prone to evolving myrmecophily. While documenting the fauna of Satkosia Tiger Reserve, the first author came across the unusual association between these two rare insects: *Chronoxenusdalyi* (Forel, 1895) and *Mesomorphus latiusculus* Chatanay, 1917. *Mesomorphus latiusculus* Chatanay, 1917 belongs to the family Tenebrionidae of the insect order Coleoptera. Tenebrionids or Darkling beetles are much similar to Scarabaeidae or Scarab beetles, in terms of both diet and prevalence of myrmecophily. As pointed out by Kistner (1982)^[6], the recurrence of myrmecophily in Tenebrionidae is relatively modest given the size of the family. Scattered instances are known from 13 of the 97 Tenebrionid tribes^[7]. The biology of these myrmecophiles is practically unknown, but all are presumed to be saprophagous, and a number of other tenebrionid species have been recorded to be engaged in facultative associations with ant colonies. During the survey, by the first author it was observed that, *Mesomorphus latiusculus* were seen clustered below a piece of rock in large numbers. Once the beetles, completely moved out, the ants (*Chronoxenusdalyi*) were traced from below the surface soil. Neither the ants nor the beetles were seen outside the rock before it was located. Biology of the beetle or the ant is practically unknown. *Chronoxenusdalyi* is distributed in India, Bangladesh, China and Nepal. In India, it is reported from Andaman and Nicobar Islands, Arunachal Pradesh, Assam, Jammu and Kashmir, Karnataka, Maharashtra, Sikkim, Tamil Nadu, Odisha and West Bengal^[2]. *Mesomorphus latiusculus* earlier known from Annám, Myanmar, Tenasserium and Yunnan; has been reported for the first time not only from Odisha but also from India. It is to be noted that both the species were engaged in a mutualistic niche sharing and the association between these two species is also reported for the first time in India.



Fig 1: Habitus



Fig 2: Specimen Collection



Fig 3: *Mesomorphus latiusculus* clustered below a piece of rock.



Fig 4: *Chronoxenusdalyi* (Forel, 1895)

Conclusion: Output of the present research will be useful for further research on myrmecophily of ants and beetles in India.

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