



Research Paper

First record of Bombardier Beetle *Pheropsophus sobrinus* (Dejean, 1826) (Insecta: Coleoptera: Carabidae: Brachininae) from Madhya Pradesh, India, with systematic account, distribution and other aspects

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Abstract: This communication deals with the first record of *Pheropsophus sobrinus* (Dejean, 1826), belonging to subfamily Brachininae under family Carabidae of order Coleoptera from Banda, Sagar district, Madhya Pradesh as well as the state, with its systematic account and distribution and other aspects, habitat, food & feeding, life-cycle and life-span, self-defense mechanism and biological pest controlling.

Keywords: First record, *Pheropsophus sobrinus*, Madhya Pradesh.

Introduction:

Bombardier Beetle diversity of India is very negligibly known as compared to world fauna.

The Bombardier Beetles of the genus *Pheropsophus* Solier, 1833, belonging to subfamily Brachininae under family Carabidae and order Coleoptera, from India

have been recorded by various workers during the past (Dejean, 1825; Chaudoir, 1876; Bates, 1891; Arrow, 1901; Andrewes, 1923a,b, 1924, 1930; Jedlicka, 1964; Maindron, 1898, 1906; Jedlicka, 1964; Mandal and Nandi, 1989; Saha, S. K. 1992; Saha et al., 1992; Saha and Halder, 2000; Kirschenhofer, 2010; Kushwaha & Hegde, 2015; Hrdlicka, 2017; Kushwaha et al., 2015, 2017; Venugopal and Thomas, 2018, 2019; Bhatti et al., 2021; Venugopal et al., 2022; Bhor et al., 2025; Lomte et al., 2025; Vasanthakumar et al., 2025) but Madhya Pradesh is very scantily worked out on this genus. Andrewes (1930), who worked on many states, recorded *Pheropsophus chaudiroidi* Arrow, 1901 from Mandla district, the only species from the state. Venugopal & Thomas (2018) listed 21 species and mentioned *P. chaudiroidi* from Mandla. Venugopal & Thomas (2019) listed 22 species, including *P. chaudiroidi* from

Mandla and two new from Kerala and Tamil Nadu, with their description and distribution from India and elsewhere. Recently, a beautiful specimen of *P. sobrinus* (Dejean, 1826) was found at Banda in Sagar district (M.P.) and recorded here as the first from the area as well as the state.

Study Site:: Banda, Sagar district, Madhya Pradesh (India)

Physiography: Banda (Lat. 24°2' 42 N and Long. 78°57'39 E; av. altitude 508 m) falls under Sagar district of Madhya Pradesh.

Climate: Humid-subtropical with usual hot summers, cool winters and rainy season in the district.

Flora: Belonging to families Acoraceae, Anacardiaceae, Apocynaceae, Asparagaceae, Asphodelaceae, Bixaceae, Burseraceae, Combretaceae, Convolvulaceae, Cyperaceae, Dioscoreaceae, Fabaceae, Gentianaceae, Hypoxidaceae, Lamiaceae, Lythraceae, Malvaceae, Meliaceae, Menispermaceae, Papaveraceae, Phyllanthaceae, Plumbaginaceae, Primulaceae, Rutaceae, Solanaceae, Zingiberaceae and Zygophyllaceae.

Systematic Account and Distribution:

***Pheropsophus sobrinus* (Dejean, 1826)**

Brachinus sobrinus Dejean, 1826. *Species general des coleopteres de la collection de M. le Comte. Dejean*. Tome second: 462 (type-locality: India Orient); Chaudoir, 1876: 25; Arrow, 1901. *Transactions of the Entomological Society of India*, 1901: 202; Andrewes, 1930. *Catalogue of Indian Insects*. Part 18. Carabidae: 273; Felix et al. 2012. *Insect Biodiversity of the Socotra Archipelago*. *Acta Entomologica Musei Nationalis Pragae*, 52 (Supplementum 2): 77; Hrdlička, 2017. *Catalogue of Palaearctic Coleoptera*. Volume 1.

Archostemata-Myxophaga- Adephaga: 480; Ullah et al. 2017. *Zootaxa*, 4243 (2): 180; Venugopal & Thomas, 2019. *Zootaxa*, 4608 (1): 81-82, 3 F, G, H and 5 G.

Pheropsophus desbordesii Maindron, 1899. *Bulletin de la Societe Entomologique de France*, 1899: 16; Maindron, 1905. *Bulletin de la Societe Entomologique de France*: 95; Arrow, 1901. *Transactions of the Entomological Society of India*, 1901: 202; Bedel, 1914. *Catalogue raisonne des coleopteres du nord de l'Afrique (Maroc, Algerie, Tunisie et Tripolitaine) avec notes sur la faune des iles Canaries et de Madere, premiere partie*: 310; Andrewes, 1930. *Catalogue of Indian Insects*. Part 18. Carabidae: 273.

Pheropsophus hilaris, Venugopal & Thomas, 2018 (partim). *Frontiers in Biological Research*:15. (included *Brachinus sobrinus* Dejean, 1826 [var.]).

Pheropsophus hilaris sobrinus, Liyaqat et al., 2023. *Pakistan Journal of Zoology*, 57 (2): 4, 5.

Common Name: Asian Bombardier Beetle.

Classification: Class Insecta, order Coleoptera, suborder Adephagan, superfamily Caraboidea, family Carabidae, subfamily Brachininae Bonelli, 1810, tribe Brachinini, genus *Pheropsophus* Solier, 1833.

Material Examined: 1 example; Banda, district Sagar, Madhya Pradesh. India; 04/03/ 2026; photo by 2nd author (AKD).

Diagnostic Features:

Head: Small, stout, smooth and pentagonal; eyes protruding.

Pronotum: Square-shaped, anterior and posterior margins straight, lateral margin with apical 2/3rd convex, basal 1/3rd straight; disc glabrous with deep puncture marks in basal part, median furrow shallow; lateral beads present but not prominent.

Elytra: Rectangular, lateral margins subparallel, basal margin straight, humerus pronounced, apical margin straight truncate; humeral spot minute and indistinct (indistinct in present specimen); median transverse band broad and roundish with serrated edges; apical band wide, narrow; elytral striations narrow.

Colouration: Head, pronotum, humeral spots, elytral median transverse bands, elytral apical band, femur and tibia reddish-yellow; pronotum reddish-yellow or mid-pronotum reddish-yellow with anterior and posterior margins black; a reddish-yellow line running along lateral sides of elytra, connecting median transverse and apical bands; antennal segments 1, 3, 4 with middle reddish-yellow and anterior and posterior margin reddish-brown, segments 2, 5-11 completely reddish-brown; elytra black; legs with apex of femur with small black spot, underside of head and thorax (including pro-sternum) reddish-yellow; meso-sternum and meta-sternum reddish-brown.

Size: Length 15.8 mm, maximum body width 6.8 mm (Venugopal & Thomas, 2019).

Distribution:

India:

Madhya Pradesh: Banda, Sagar district (first record).

Rest of India: Arunachhal Pradesh, Himachal Pradesh, Jammu & Kashmir UT, Uttarakhand and West Bengal [Darjeeling] (Hrdlicka, 2017); Kerala [Palakkad], Puducherry UT [Karaikal], Tamil Nadu [Annamalai Hills- Cinchona, 3,500 ft], Chennai/Madras, Coimbatore-1,400 ft and Tranquebar/Tharangambadi) and West Bengal [Kolkata] (Andrewes, 1930); Rajasthan [Jodhpur- Sardar Samand] (Venugopal et al., 2022).

Elsewhere: Bhutan, Nepal, Sri Lanka and Taiwan (Felix et al., 2012); Pakistan [Chakwal, Poonch and Rawalpindi] (Ullah et al., 2017) and Sialkot (Liyaaqat et al., 2023) and Yemen (Andrewes, 1930).

Habitat: moist place within woodlands or grasslands, agricultural landscapes, agroecosystems, riparian areas and forest ecosystems.

Food & Feeding: Insectivorous, feeding on small insects (aphids, grubs) and their larvae, rhinoceros beetles (*Oryctes rhinoceros*), butterflies, snails etc. The larvae generally act as parasitoids or predators on eggs of other insects, like mole crickets.

Life-cycle: Usual- passing through egg, larva, pupa and adult stages.

Life-span: No exact record is available. However, potentially survive for more than one season.

Self-defense Mechanism: Known as a bombardier beetle for their specialized unique defensive spray mechanism, which involves emitting/discharging a hot (100°C) noxious chemical spray (a mix of Hydrogen peroxide and Hydroquinone) from their abdomen, making a 'pop' sound when released, on predator, which can even allow them to escape from inside the predator's stomach.

Biological Pest Controller: Recognized as a potential natural biocontrol agent in farms, consuming on agricultural major pests, like aphids and mole cricket larvae.

Remarks: It (*P. sorbinus*) is closely related to *P. bimaculatus* (Linnaeus, 1771) but differs in smaller size, narrower pronotum and elytra, head without black spot, humeral spot small and indistinct (absent in present specimen) and wide elytral apical spot (Venugopal & Thomas, 2019). The specimen based on which *sorbinus* was described by Dejean (1826), is having

pronotum completely reddish-yellow. Specimens with middle of pronotum reddish-yellow and anterior and posterior margins black are also frequent in this species (Felix et al.,2012).

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Figure: *Pheropsophus sobrinus* (dorsal view)