

**On *Itamus castaneus* Schmidt-Goebel, 1846 (Carabidae: Paussinae: Ozaenini)  
New record for West Bengal, India, with description of the hitherto unknown  
female genitalia**

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**Female genitalia, morphometry, artificial rooftop garden, urban entomology, new record, Coleoptera,  
Carabidae, Paussinae, *Itamus*, India**

**Abstract.** This paper provides the new distributional data of the ground beetle species *Itamus castaneus* Schmidt-Goebel, 1846 (Carabidae: Paussinae: Ozaenini), which is recorded for the first time from the state of West Bengal from an artificial rooftop garden in an urbanised landscape. Morphometric analysis of the specimen has been conducted and the hitherto unknown female genitalia of the species has been described.

## INTRODUCTION

The members of the tribe Ozaenini Hope, 1838 can be distinguished by possession of two terminal protibial spur, a notch and groove on the lateral apical surface (one fifth) of the elytra, mesepimeron extended inward to outer edge of middle coxa and the mesosternum so narrow that the middle coxa are in almost contact (Hope 1838; Andrewes 1919; Thomas 2000; LeConte 1862). Phylogenetic analysis of Ozaenini establishes it as a paraphyletic group comprising of twenty six genera, viz-a-viz, *Afrozaena* Jeannel, 1946, *Anentmetus* Andrewes, 1924, *Crepidzoaena* Deuve, 2001, *Dhanya* Andrewes, 1919, *Entomoantyx* Ball & McCleve, 1990, *Eustra* Schmidt-Goebel, 1846, *Filicerozaena* Deuve, 2001, *Gibbozaena* Deuve, 2001, *Goniotropis* G.R.Gray, 1831, *Inflatozaena* Deuve, 2001, *Itamus* Schmidt-Goebel, 1846, *Microzaena* Fairmaire, 1901, *Mimozaena* Deuve, 2001, *Mystropomus* Chaudoir, 1848, *Ozaena* Olivier, 1812, *Ozaeniella* Kolbe, 1895, *Pachyteles* Perty, 1830, *Physeia* Brullé, 1835, *Physeomorpha* Ogueta, 1963, *Platycerozaena* Bänninger, 1927, *Proozaena* Deuve, 2001, *Pseudozaena* Laporte, 1834, *Serratozaena* Deuve, 2001, *Sphaerostylus* Chaudoir, 1848 *Tachypeles* Deuve, 2001 and *Tropopsis* Solier, 1849 (Geiselhardt *et al.* 2007). It must be noted that the tribe is not monophyletic and hence demands further investigation. The oriental genera include *Dhanya* Andrewes, 1919, *Eustra* Schmidt-Goebel, 1846, *Itamus* Schmidt-Goebel, 1846 and *Pseudozaena* Laporte, 1834 (Andrewes 1919). The ground beetle

genus, *Itamus* Schmidt-Göbel can be distinguished from other oriental members based on the following characters, paraglossae is glabrous and completely envelopes the bisetose ligula, gena not extending outwardly beyond eye-level, mandible with 2 -3 teeth (Andrewes 1919). It is distributed in China, Vietnam, Myanmar, Laos, Sri Lanka, India, Nepal and Pakistan, and is represented by four species, *Itamus castaneus* Schmidt-Göbel, 1846, *Itamus cavicola* (Moore, 1978), *Itamus dentatus* Andrewes, 1919 and *Itamus deuvei* Tian, 2011 (Andrewes 1919, Ming-yi 2011; Ahmed *et al.* 2014; Song *et al.* 2018; Nagel 2018). *Itamus kaszabi* Jedlicka, 1968 from Vietnam has been revised by Tian 2011 and was taxonomically reclassified as a member of Scaritinae. Of the four species, only *I. castaneus* is known to be distributed in India and has been collected from Assam, Chota Nagpur, Tamil Nadu, Karnataka and Andaman Islands (Andrewes 1930; Bänninger 1927).

## MATERIALS AND METHODS

The specimen was handpicked and captured in a vial, after which it was dry mounted and pinned. Later, it was removed from the pin and put on a cardboard point. The specimen was examined using Radical Stereo Zoom Trinocular Microscope -RSM-9F (180x magnification) with circular Led illuminator- Mfg. No. B201116 (Radical Scientific Equipments Pvt. Ltd., Ambala Cantonment, Haryana, India) and images were captured using Hayear 41 megapixels HDMI microscope camera with 0.5x trinocular adapter (Shenzhen Hayear Electronics Co. Ltd., China) and SONY alpha-58 (SLT-A58) camera with Cyruss 1.25" T adapter and T2/T ring adapter for SONY DSLR (SS enterprises, India). Images were analysed using original software provided by the manufacturer (HAYEAR USB microscope camera measure software, version x64, 4.10.17214.20200601). Images were captured at different layers having the sharpest focus and were then stacked to a single image using Helicon Focus 8 software. Measurements were calibrated using Erma Stage Micrometer (1mm -100 divisions) Model- Galaxy SMM101 (Erma Inc., Yushima, Bunkyo-ku, Tokyo, Japan). Standard morphometric techniques and terms have been used. The size of the beetles or of their body parts can be useful in species recognition and thus, the following measurements were made:

- TL : Total Length (HL+PL+EL).
- DBA : Linear distance between antenna (inner margin of antennal socket).
- DBE : Linear distance between the inner margin of eyes close to antennal socket.
- EW : Elytral Width.
- EL : Length of the elytra from the posterior margin of pronotum to the apex of elytra.
- HL : Length of the head from the anterior pronotal margin to the tip of labrum.
- LP<sub>ter</sub> : Terminal labial palpomere.
- LP<sub>pen</sub> : Penultimate labial palpomere.
- MP<sub>ter</sub> : Terminal maxillary palpomere.
- MP<sub>pen</sub> : Penultimate maxillary palpomere.
- PL : Pronotum Length, measured between the anterior and posterior margin of the pronotum along the middorsal line.

PWA : Pronotal width along the anterior margin.  
PWP : Pronotal width along the posterior margin.

## TAXONOMY

**Family: Carabidae Latreille, 1802**  
**Subfamily: Paussinae Latreille, 1807**  
**Tribe: Ozaenini Hope, 1838**  
**Genus: *Itamus* Schmidt-Goebel, 1846**

***Itamus castaneus* Schmidt-Göbel, 1846**  
(Figs. 1-4)

<https://zoobank.org/urn:lsid:zoobank.org:pub:AD63929D-E567-4FC4-ACC7-A1D3217FAADC>

**Material examined:** 1 ♀, Glued on cardboard point with labels as follows “INDIA, W. Bengal, Kolkata, iForNature rooftop garden [22°38'34.1''N & 88°25'47.6''E]” “alt. 10 m, Handpicked, Jun.2019, Arnob Chakrovorty” “Carabidae, Paussinae, Ozaenini” “*Itamus castaneus* Schmidt-Göbel, 1846, (♀)” [handwritten label] (iForNature - Nature Club Educational Collection).

**Description of female.** Measurements (mm): TL 11.64, HL 2.73, DBA 1.88, DBE 1.97, LP<sub>ter</sub> 0.56, LP<sub>pen</sub> 0.5, MP<sub>ter</sub> 0.26, MP<sub>pen</sub> 0.61, PL 2.07, PWA 2.71, PWP 2.15, EW 3.37, EL 6.84. Body: Body dark ferruginous brown, very sparsely covered with short pointed yellow seta (except elytra, which is majorly devoid of such structures), head and antenna darker than the body.

Head: Antenna 11 segmented, 1<sup>st</sup> antennomere is subequal to 3<sup>rd</sup> and 4<sup>th</sup> combined, antennomeres 1-4 nearly smooth with very few punctate marks and sparsely setose, whereas, antennomeres 5-11 densely punctate and setose, terminal antennomere (11<sup>th</sup>) almost twice the length of the 10<sup>th</sup> antennomere. Vertex with a median tuberosity, clypeus smooth, bisetose, anterior margin of the clypeus bends inwards, labrum finely punctate, anterior margin bears 8 seta, Mentum is W-shaped with median tooth, submentum prominent, ligula setose, paraglossae glabrous, apex of maxilla curves towards each other, inner margin with rows of seta, maxillary palpi 3 segmented.

Pronotum: Pronotum trapezoid with rugae like markings, anterior margin wider than the posterior, anterior angle acute, posterior angle slightly obtuse, pronotal disk slightly raised and separated by a dark median line, lateral margin with distinct curvature and slightly arches towards the dorsum (lateral depression), dorsal margin bears a single row of yellow pubescence pointing towards posterior, below the anterior margin lies a narrow belt of parallel etch-like marks. Prosternal lobe prominent and setose.

Scutellum: horseshoe shaped, very finely punctate.

Elytra: Each comprises of 8 stria, setiferous punctures on interval 1, 3, 5 and 7.

Abdomen: Mesosternum so narrow that the middle coxa are in almost contact. Sternum shiny and setose.

Legs: Tarsal formula 5-5-5. Legs setose, femur, trochanter and coxa lighter in coloration compared to tibia and tarsus. Protibia with two anterior spurs, tibia possess a distinct sickle shaped invagination margined with seta. Tarsal claw simple. Trochanter of the hindleg enlarged.

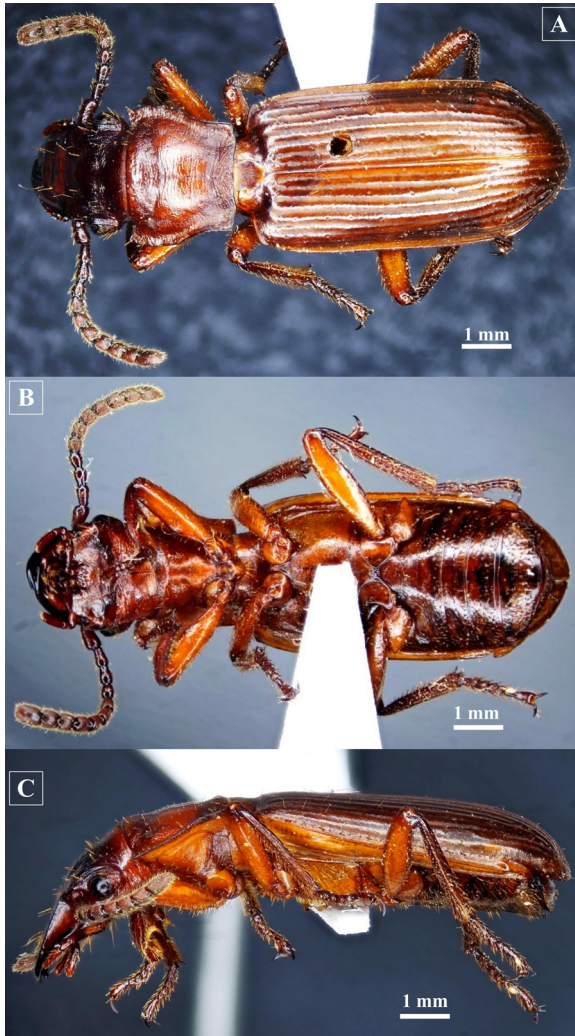


Fig.1. *Itamus castaneus* (♀): A- Dorsal habitus; B- Ventral habitus; C- Lateral habitus, (photo by Arnob Chakrovorty).

**Genitalia:** The last visible tergal segment is 0.96 mm in width, tongue-shaped with a distinct inward folding of the dorsal margin as in Fig. 4(A). The last visible ventral segment is 1.21 mm in width, comprises of two distinct notches near the lateral margin as in Fig. 4(B). Both the gastral segments are coarsely punctate and setose. External genitalia comprise of dimerous gonopods, each bearing a tuft of sensory seta at the sub-apical surface. The gonopods contact at position nearly one third from the tip. The epipleurites are connected to the sternal segments via membranous attachment. Rest of the structures as in Fig. 4(C).

**Note.** The specimen was collected from an artificial rooftop garden situated in a metropolitan urban area that has scanty discontinuous vegetation patches and is situated within 1 km from Netaji Subhas Chandra Bose International airport. A noteworthy fact, several novel interactions have been documented

from the same habitat. A new species of myrmecophilous dermestid beetle, *Thorictus bengalensis* Háva & Chakrovorty 2024 (Coleoptera: Dermestidae: Thorictinae: Thorictini), and a probable new species of Goblin spider (*Gamasomorpha* sp., Arachnida: Araneae: Araneomorphae: Oonopidae) has been discovered from the rooftop garden (Háva et al. 2024), and the digger wasp species, *Bembecinus proximus* Handlirsch (1892) (Crabronidae: Bembicinae; Bembicini) has been rediscovered after over three decades from Indian mainland and bipartite interaction and other community interaction of the species has been conducted from the same habitat (Chakrovorty et al. 2023). Despite being an artificial settlement and a fragmented habitat, the experimental rooftop garden has been found to harbour a significant portion of the local entomofauna. Urban entomofauna are under the

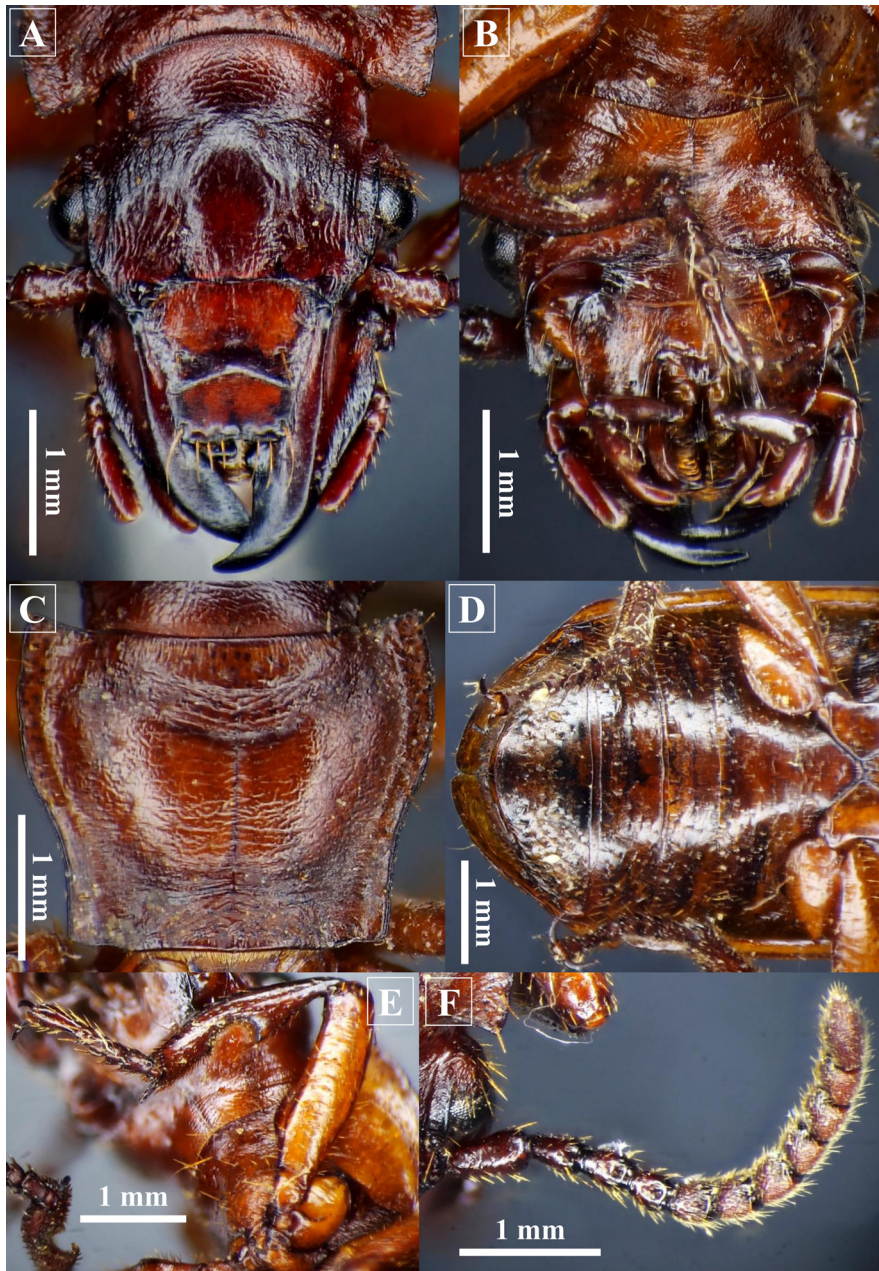


Fig. 2. *Itamus castaneus* (♀): A- Dorsal view of head; B- Ventral view of head; C- Dorsal view of pronotum; D- Ventral view of abdomen; E- Foreleg showing tibial modification; F- Dorsal view of antenna, (photo by Arnob Chakrovorty).

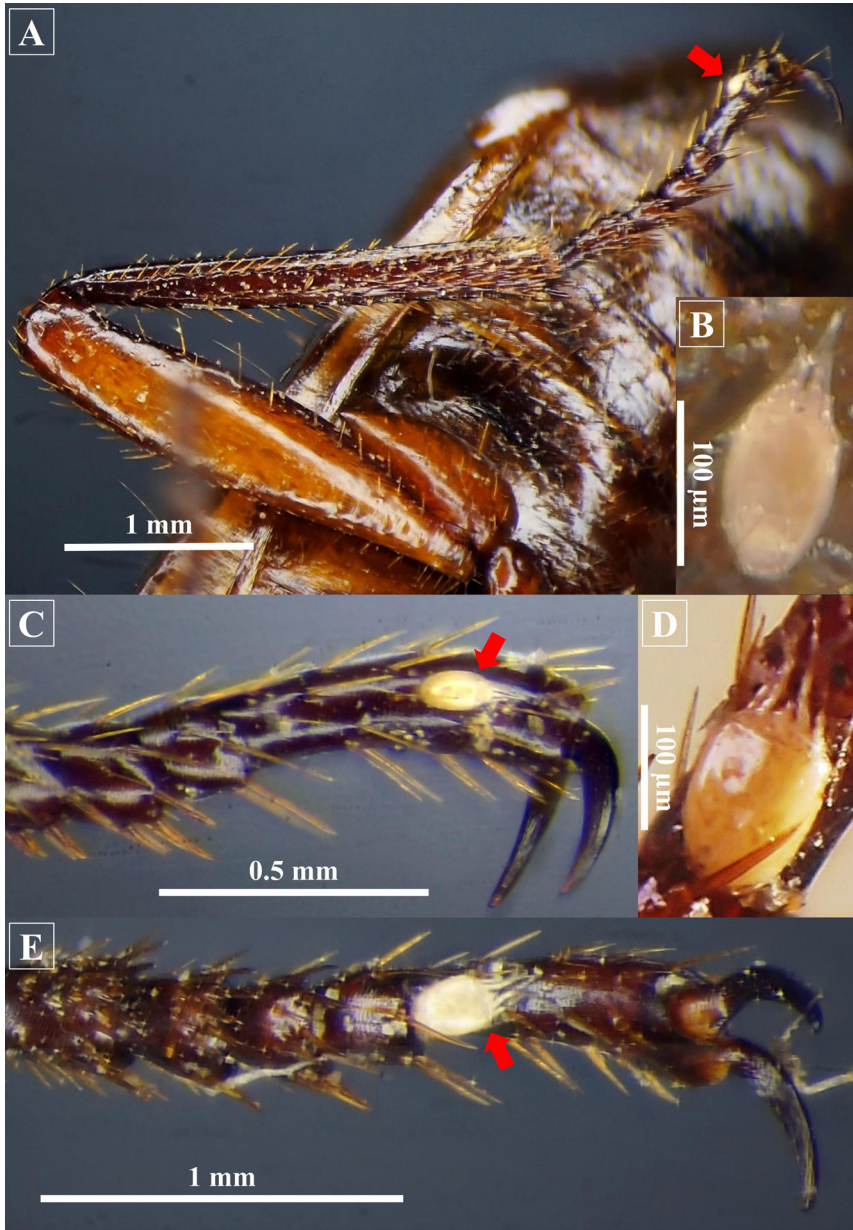


Fig. 3. *Itamus castaneus* (♀): A- Left hindleg; B- Mite on abdominal sternite; C- Left hindleg tarsomeres and claw; D- Right hindleg tarsomeres and claw; E- Astigmata mite attached on 5<sup>th</sup> tarsomere of right hindleg; A, C, E- Red arrow indicates attached mite, (photo by Arnob Chakrovorty).

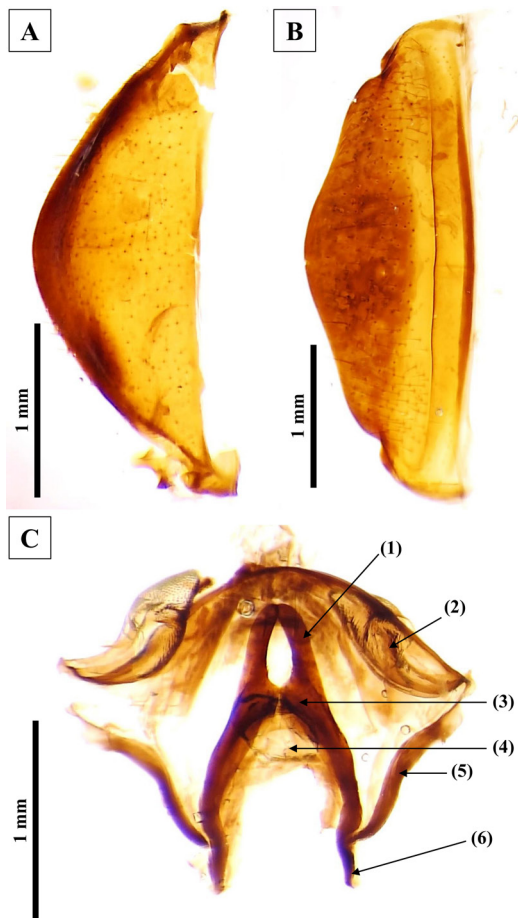


Fig. 4. *Itamus castaneus* (♀): A- Last visible tergite in dorsal view; B- Last visible sclerite in ventral view; C- Female genitalia in ventral view: (1) Gonopod, (2) Sac-like cavity, (3) Gonopods contact, (4) Part of internal genitalia that connects to the oviduct, (5) Part of the sternite that connects to the epipleurite through membranous projection, (6) Terminal projection of the gonopod, (photo by Arnob Chakrovorty).

strong influence of habitat destruction and homogenization, and in this context, research on urban entomofauna and these artificial habitat patches can turn out to be fundamentally important for entomological research. More importantly green patches constructed in a scientifically sound way in urban areas may provide some protection to the fast-depleting insect population. The specimen of *Itamus castaneus* was found to be associated with astigmata mites, sticking on the legs and abdominal sclerites, which presumably might be related with phoresies (Fig 3).

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