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Description of a New Species of *Panotrogus* Reitter, 1902 (Coleoptera: Scarabaeidae: Melolonthinae) from Uttarakhand, India

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ABSTRACT

Panotrogus Reitter, 1902 is genus of the Melolonthinae tribe Rhizotrogini (Scarabaeidae) that currently contains 21 species and 2 subspecies, of which 14 species have been recorded from Himalaya region of India. A new species *Panotrogus jagbiri* Kumar, Pandey & Keith, sp. nov. is described from Uttarakhand, India and illustrated. A key to Indian *Panotrogus* species has been prepared.

Keywords: Biodiversity, beetles, new taxa, light trap, taxonomy, Asia, Himalaya, key, Rhizotrogini.

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INTRODUCTION

India is a biodiversity rich nation sharing four biodiversity hotspots of the world, i.e., Himalaya, Indo-Burma, Sundaland and Western Ghats (Chandra *et al*., 2018). The Indian Himalaya biodiversity hotspot is divided into two biogeographic zones *i.e*., Trans Himalaya and Himalaya, in which Uttarakhand is part of the Himalaya, West Himalaya biotic province (Rodgers, Panwar, & Mathur, 2002). West Himalaya represents the second highest faunal diversity (12022 species/subspecies) after Central Himalaya (14183 species/subspecies) with arthropods representing approximately 86.9% of Indian Himalayan biodiversity. Among the arthropods, the Coleoptera are the most diverse insects with 43% species/subspecies from the Indian Himalaya in 107 families (Chandra & Sidhu, 2009). The Scarabaeidae is a highly diverse family with 10% of the reported species.

Panotrogus Reitter, 1902 (Scarabaeidae, Melolonthinae, Rhizotrogini) is a Palearctic genus of chafers. The species assigned to *Panotrogus* are characterized by antennae with 10 antennomeres, three of which form the antennal club, the shapes of the clypeus and maxillary palps, claws that are cleft at the base, and an aedeagus with slender parameres and a sclerotized inner piece (Keith, 2001, 2002). Currently, it contains 21 species, one of which is divided into two subspecies. Morphologically, it is close to *Pseudopanotrogus* Petrovitz, 1969 from which it differs most clearly by the cleft claws (Keith, 2001, 2002). The genitalia of *Pseudopanotrogus* spp. are usually of special complex structure, while in *Panotrogus* spp. they show a secondary branch.

Recently, MK examined an interesting specimen of *Panotrogus* from Uttarakhand, northwestern India and, after comparing it with all available material and with the literature (mainly Keith, 2001, 2002, 2005, 2009; Kumar et al, 2023), came to the conclusion that it represents an undescribed species that we describe below.

MATERIALS AND METHODS

Study Area

Adult beetles were collected in surveys in the Tehri district of Western Himalaya, Uttarakhand, northwestern India, during the summer of 2021 with the aim to collect undescribed species and determine their distribution patterns. The location of surveys lay between 30.3455°N Latitude and 78.3947°E Longitude (Fig.1). During May to September, when the adult beetles emerge from the soil during dusk and settle on the nearby trees to feed and mate, a mercury vapour lamp light trap (150 W) was run from 7:15 pm to 10:30 pm.

Along with the light trap collections, beetles were also searched for on their host plants with the help of powerful torch light since few species avoid light (Pal, 1977; Prathibha et al, 2018). Beetles were collected from light traps and host plants, were brought into the laboratory where they were killed with ethyl acetate and labelled, pinned and placed in insect cabinets for further identification.

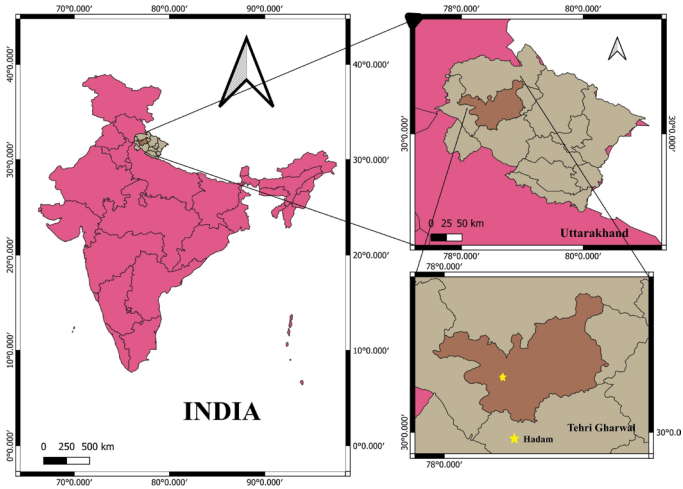

Figure 1. Collection locality of *Panotrogus jagbiri* sp. nov. Yellow star (Hadam).

Specimen preparation

The undescribed *Panotrogus* specimen was collected from light trap, during 2021 from the Hadam village of Chamba locality. Other specimens belonging to the same genus were also examined for species confirmation by comparison with specimens in KDCC and the literature (Keith, 2002, 2005, 2009; Kumar et al, 2023). The abdomen was removed with the help of pointed needle from the specimen's body. The genitalia and speculum gastrale were carefully extracted with forceps from the abdomen and placed in a watch glass under 10% KOH for the removal of muscle and then glued on a pointed card and pinned along with the adult male specimen and label. The external morphological characters of the genitalia were observed through Nikon SMZ745T stereo zoom microscope. Images of the entire beetle were obtained with Nikon D5600 digital camera, while images of the genitalia were compiled using Leica auto montage software. Terminology for the aedeagal structures follows that of D'Hotman and Scholtz (1990). Length was measured from the anterior margin of the clypeus to the apices of the elytra. Data in faunal series of India, zoological records, bulletins, state fauna series, conservation area series, ecosystem series etc., pertaining to *Panotrogus* spp. and its distribution were searched for thoroughly.

RESULTS

Panotrogus jagbiri sp. nov. (Figs 2-3)

Type series: Holotype ♂**,** India; Uttarakhand, Tehri, Chamba, Hadam, 1587m, 30.3455°N, 78.3947°E, 22.vi.2021, Mayank Kumar leg. (in National Pusa Collection, Delhi, India).

Description: Male: Body 10 mm long; reddish brown, venter partially lighter; covered with equally distant, short, light-coloured setae (Fig. 2).

Clypeus transverse, lateral margins converging towards base, anteriorly angles rounded and margin strongly raised and poorly incised; anterior margin weakly sinuate; punctuation regular medium and condensed in the margins. Clypeo-frontal suture sinuate and clearly visible. Frons with larger punctures than on the clypeus; vertex with dense punctuation bearing setae sloping backwards. Eyes each with a long thick canthus set with brownish setae. Labrum thick; pilosity restricted to lateral parts. Last maxillary palpomere elongated, with a slightly depressed frosted basal area. Antenna with 10 antennomeres, club of three antennomeres and almost equal in length to antennomeres 1-7 combined. (Fig. 2).

Pronotum transverse, widest in the middle, lateral margins converging more clearly anteriorly than posteriorly as an arc of a circle; anterior angles invisible, posterior angles very obtuse not marked; anterior and posterior margins rimmed; lateral margins crenated, with short, brownish, erect setae emerging from between the indentations; surface with uniform punctuation with fine yellow setae directed backwards. Scutellum triangular with disc smooth and punctuation limited to lateral margins.

Elytra elongated, slightly widened posteriorly from the middle; punctation uniform as on pronotum with uniform backward-tilted small setae; humeral callus strong and punctuated like surrounding integument; apical callus wide, punctuated like humeral callus; epipleural margins not wide under the humerus, tapering at least to the rounded elytral apices, bearing long brownish setae. Presence of micro-pilosity emerging from the punctures as on pronotum. Pygidium triangular, covered with large punctures, long pilosity limited to the apical margins.

Mesosternum and metasternum with dense fine punctuation, bearing long pilosity partially obliterating the integument. Protarsi I, II, III and IV of slightly increasing length with apical inner accessory denticles. Protibiae tridentate on the outer margin, the teeth equidistant, the inner apical spur at the level of middle tooth. All the Claws elongated, slightly curved, with a basal denticle in a neat triangle. Mesofemur with scattered punctures each bearing a very long erect seta. Mesotibia elongated, almost equal in length to the mesofemur, with setose notches in the basal and apical thirds. Metafemur with some punctures scattered on the disc and two piliferous rows bearing long thick erect bristles. Metatibial length about equal to the metafemora with piliferous notches in the apical quarter. Ventral sternites fused in the middle and each segment provided with rows of short bristle located in the middle.

Aedeagus: Endophallus smaller than parameres. Secondary branch of parameres very small, bud like, inserted near the emargination of the parameres (Figs. 3a, b).

Diagnosis: This new species belongs to *the heinzi* group and can be separated from the other species by its secondary bud-like branch and the maxillary palpi which is small and comparatively partially depressed as compared to both *P. heinzi* Keith, 2001 (northern Pakistan and northern Afghanistan) and *P. grossopunctatus* Keith, 2006 (Pakistan).

Etymology: Adjective in the nominative singular. This species is dedicated to MK's grandfather (Jagbir Singh).

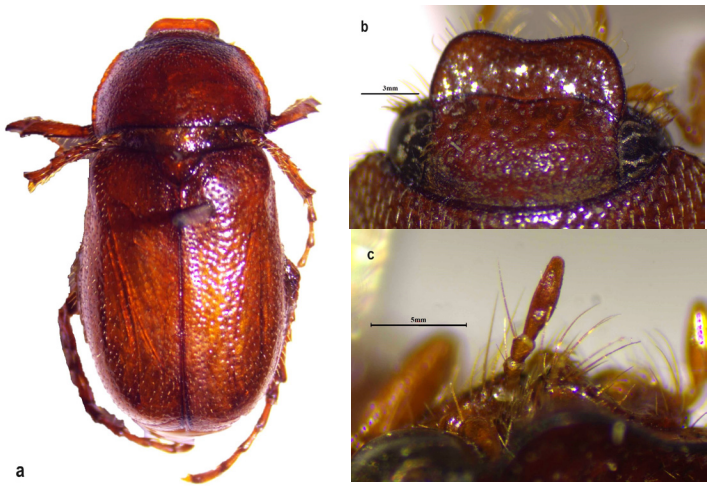

Figure 2. *Panotrogus jagbiri* sp. nov. Holotype. a) adut (male) b) clypeus c) maxillary palp

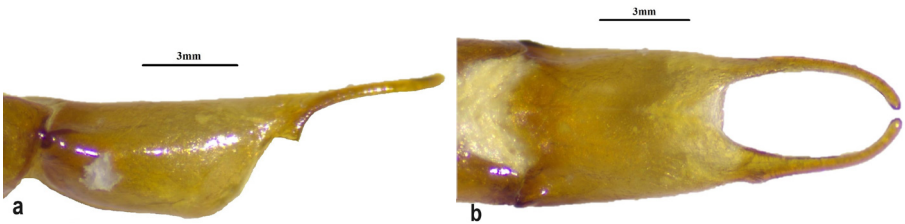

Figure 3. *Panotrogus jagbiri* sp. nov. Holotype. Male parameres: a) lateral, b) ventral.

Key For Indian *Panotrogus* species

1. Parameres with convoluted apices, not straight, without secondary branch at base or near middle …. ……. 2

1'. Parameres elongate with a distinct secondary branch at base or near middle …. 3

2. Parameres convoluted into a swan neck with an acicular expansion on their dorsal side. Clypeus with obsolete external angles. Pilosity on pronotal and elytral disc more or less erect and conspicuous ..... *P. hirsutus* Moser, 1913

2'. Parameres thickly S-shaped at apex without dorsal acicular expansion. Clypeus with sharp external angles. Pilosity on pronotal and elytral disc very short and inconspicuous …… *P. schmidti* Keith, 2006

3. Secondary branch of parameres very small or minute, triangular, inserted near emargination of parameres; anterior margin of clypeus emarginate …… 4

3'. Secondary branch of parameres thin and distinct, inserted farther ……..5

4. Main branch of parameres thin and elongate, secondary branch of parameres bud like, anterior margin of clypeus weakly sinuate; last joint of maxillary palpi weakly fusiform ……..... *P. jagbiri* Kumar, Pandey & Keith, 2023

4'. Main branch of parameres evidently flattened near apex, secondary branch of parameres not perpendicular to the axe of parameres, anterior margin of clypeus sinuate; last joint of maxillary palpi fusiform ……. *P. expansus* Keith, 2003

5. Last joint of maxillary palpi fusiform flattened and dull on upper side 6

5'. Last joint of maxillar palpi fusiform depressed on upper side. Anterior margin of clypeus very weakly emarginate; antennal joint VI not very transverse..... ..... *P. inexpectatus* Keith, 2001

6. Main branch of parameres two times longer than secondary branch, which is directed upwards …….....*P. pakistanus* Keith 2002

6'. Main branch of parameres three to four times longer than secondary branch, which is perpendicular …….... *P. batillinus* Bates,1891

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