

New Genus of the Subfamily Geotrupinae (Coleoptera: Scarabaeoidea: Geotrupidae) from the Jehol Biota

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Abstract: *Parageotrupes incanus* gen. et sp. nov. (Scarabaeoidea: Geotrupidae: Geotrupinae) is described and illustrated from the Yixian Formation of western Liaoning province, China.

Key words: Coleoptera, fossil, Scarabaeoidea, Geotrupidae, Geotrupinae, new genus, new species, Yixian Formation, China

1 Introduction

The Geotrupidae is not a large family, with approximately 1000 species in five subfamilies (Smith, 2006). Members of this family have worldwide distribution, with the exception of Madagascar and New Zealand. Up to now, four extant subfamilies have been established within the Geotrupidae. The nominotypical subfamily (Geotrupinae) includes taxa, the majority of which live in the Holarctic. The subfamily Taurocerastinae Germain, 1897 includes three species from two genera in the Patagonian (Zunino, 1984a, b). The monobasic subfamily Lethrinae Mulsant et Rey, 1871 includes more than 110 apterous species, mainly in central Asia (Nikolajev, 2003). The subfamily Bolboceratinae includes taxa of which the majority is present in all areas of distribution of this family. Elevating Bolboceratinae to the rank of family was proposed by Scholtz and Brown (1996), but was not generally accepted. The majority of authors treat the latter taxon only as a subfamily within Geotrupidae (Jameson, 2002; Verdú et al., 2004; Smith, 2006), while others, as a sister group to all others in Geotrupidae (Scholtz and Grebennikov, 2005; Král et al., 2006). In the present article, Geotrupidae are considered in a narrow sense, that is, without species of the Bolboceratidae. Among the beetle specimens recently collected from Chaomidian village, Liaoning province is one imprint belonging to species of the subfamily of Geotrupinae. It is a well-preserved, almost complete specimen (Fig. 1a and Fig. 2).

2 Materials and Methods

The specimens were collected from Chaomidian village, Liaoning province, and stratigraphically belong to the Yixian Formation consisting mainly of lacustrine sediments intercalated with volcanoclastics (Ren et al., 1995). Paleobotanical data from fossil spores, pollen, and plants indicate a rather warm and

humid climate at that time (Ding et al., 2001). The exact age of this formation is still uncertain, as different opinions about the age have been proposed based on biostratigraphical and radiometric geochronology (Wang et al., 2005). At present, the age of the strata is regarded as Late Jurassic–Early Cretaceous.

The specimens were examined using a Leica MZ12.5 stereomicroscope (Heerburg, Switzerland). All photographs were taken with a Nikon Digital Camera DXM1200C (Tokyo, Japan). All materials are deposited at the Capital Normal University, Beijing, China.

3 Systematic Paleontology

Superfamily: Scarabaeoidea Latreille, 1802

Family: Geotrupidae Latreille, 1802

Subfamily: Geotrupinae Latreille, 1802

Tribe: Incertae.

Based on the following features of this fossil beetle, it is placed in the family Geotrupidae. It has a relatively big and oval body, mandibles not hidden by the clypeus, eyes divided by canthus, and pygidium largely hidden by the elytra. Moreover, its clypeus has a tubercle and is sharply delimited from the vertex, thereby differentiated it from other subfamilies in the family, except for the genera of the subfamily Geotrupinae by elytra denticulated distinctly at the shoulder, and by the location of transverse carina of the middle and hindtibiae.

Genus *Parageotrupes* Nikolajev et Ren, gen. nov.

Type species: *Parageotrupes incanus* sp. nov.; China; Yixian Formation. Gender: male.,

Etymology: From “para” (Greek), meaning “near”, and type genus of the family.

Diagnosis: Clypeus with tubercle; frontoclypeal suture V-shaped; small eye tubercle present; pronotum with leathery margin anteriorly, not armed; elytron distinctly denticulate at

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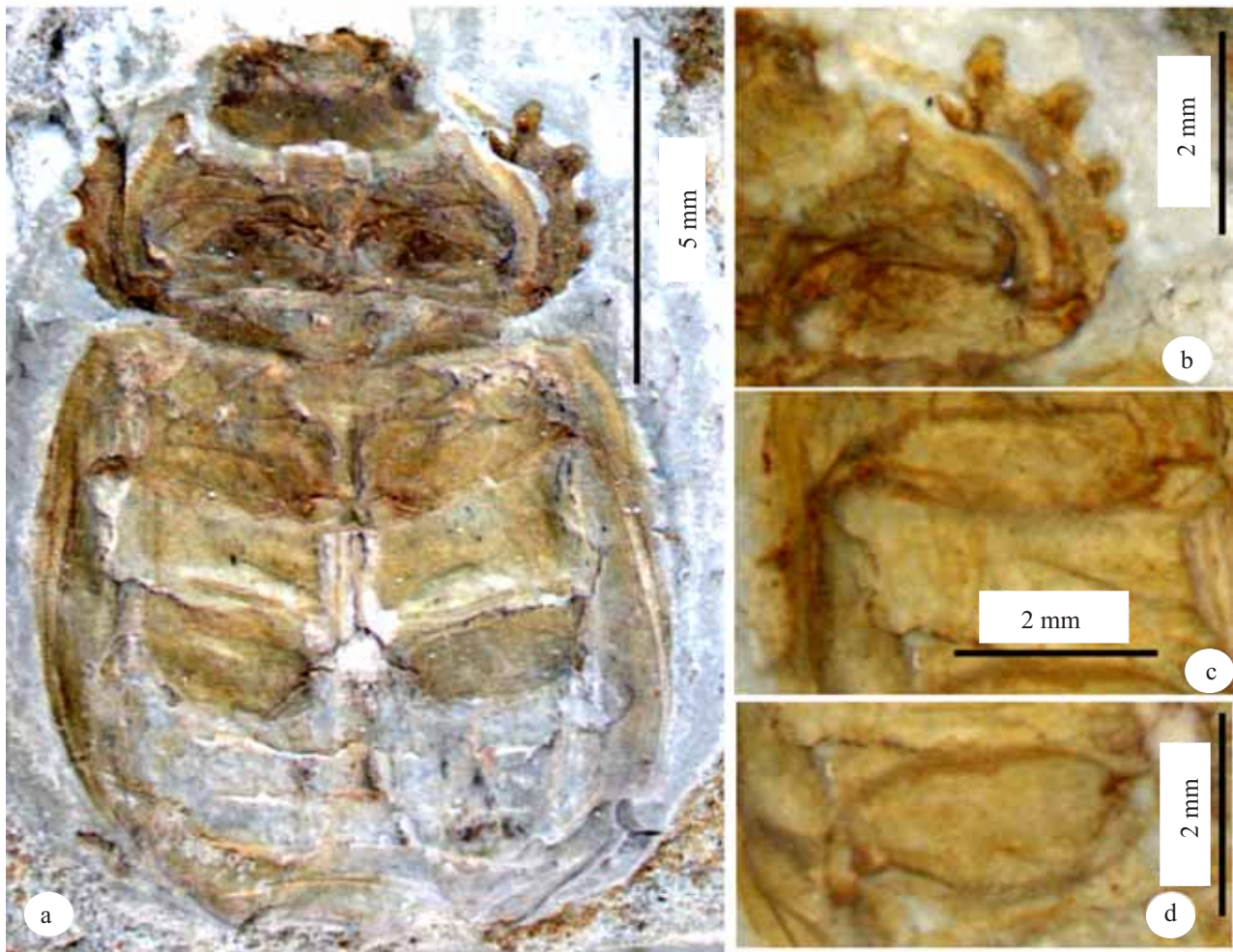


Fig. 1. Holotype of *Parageotrupes incanus* sp. nov. (No. CNU-COL-LB2009751). a, habitus; b, foreleg; c, middle leg; d, metafemur.

shoulder; male profemur armed with small denticle anteriorly (Fig. 1b); protibiae with numerous denticles on outer margin; apical tooth of male protibiae unmodified (Fig. 1b); mesotibiae and metatibiae transversely uncarinate, with single transverse carina near mid-length (Fig. 1c); male metafemur not armed posteriorly (Fig. 1d).

Species composition: Only type species.

Comparison: Distinct from other genera of the subfamily by the elytra denticulated distinctly at the shoulder, and the location of single transverse carina on middle tibiae and hindtibiae.

Parageotrupes incanus Nikolajev et Ren, sp. nov. (Fig. 1–2)

Etymology: “Incanus” (Latin) meaning “ancient” (very old), referring to the age of a species.

Holotype: Well-preserved, almost complete male undersides, collected near Chaomidian village, Beipiao city, Liaoning province, China; Yixian Formation; housed at the College of Life Science, Capital Normal University, Beijing, China (No. CNU-COL-LB2009751).

Diagnosis: Same for genus.

Description: Pronotum transverse, broadest just posteriorly of middle, sides crenulated, lateral edge arcuately convex. Elytral striae very finely punctuated, intervals very rarely punctuated.

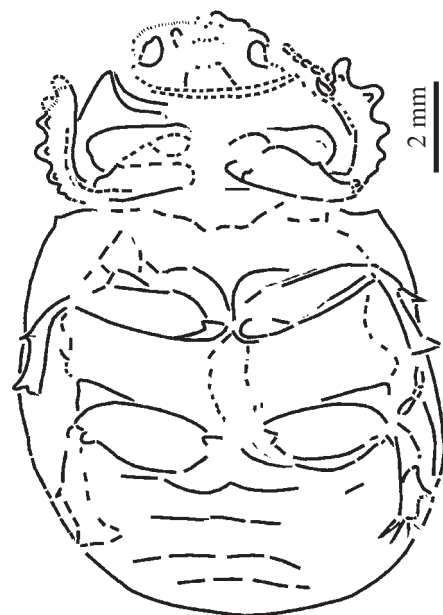


Fig. 2. Holotype of *Parageotrupes incanus* sp. nov. (No. CNU-COL-LB2009751); line drawing.

Protibiae 5 dentated on outer margin.

Measurements (in mm): Body length 13.29 (including mandibles and apex of elytra); distance between inner margin of eyes 1.9; width of pronotum 6.15; elytron length 8.36, width 4.53; profemur width 1; protibia length 2.6; protibial spur length 0.96; mesofemur length 3.12, width 1.1; mesotibia length 2.37; metafemur width 1.46.

Material: Holotype.

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