

# **A new species of the genus *Ledouxius* ZAMOTAJLOV, 1992 from Uttar Pradesh (India) (Coleoptera: Carabidae: Patrobinae)**

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## **Abstract**

*Ledouxius franzi* sp.n. (Coleoptera: Carabidae) is here described. *Ledouxius franzi* sp.n. strongly deviates within the genus for the occurrence of 4 - 6 setae on vertex. The genus *Ledouxius* ZAMOTAJLOV is recorded from Uttar Pradesh (India) for the first time.

**Key words:** Coleoptera, Carabidae, Patrobinae, taxonomy, new species, India, Uttar Pradesh.

## **Introduction**

According to ZAMOTAJLOV (1992), ZAMOTAJLOV & SCIACKY (1996) and after the reunification of the two tribes Patrobini and Deltomerini (CASALE & SCIACKY 1994), the Palaearctic genera of the subfamily Patrobinae can be arranged in two rather well defined groups:

1) apterous species with rather shallow neck-constriction, antennomere 1 with 2 or more setae subequal in length, with macroseta hardly distinguishable among others, populating mostly the Mediterranean region: *Deltomerus* MOTSCHULSKY, 1850, *Penetretus* MOTSCHULSKY, 1864, and *Ledouxius* ZAMOTAJLOV, 1992.

2) apterous or alate species usually with deeper neck-constriction, antennomere 1 with a single dorso-anterior macroseta, most abundant in Southeast Asia, but occurring also in Siberia and Europe (the only known exception, possessing a transitional type of chaetotaxy of antennomere 1 is the genus *Platydiolus* CHAUDOIR, 1878 from Siberia): *Patrobus* DEJEAN, 1821, *Diplous* MOTSCHULSKY, 1850, *Dimorphopatrobis* CASALE & SCIACKY 1994, *Archipatrobus* ZAMOTAJLOV, 1992, *Apatrobis* HABU & BABA, 1960, *Parapenetretus* KURNAKOV, 1960, *Chinapenetretus* KURNAKOV, 1963, *Deltomerodes* DEUVE, 1992, *Platydiolus*, and *Minypatrobus* UENO, 1955.

The phylogenetic relations between these two groups remain unclear until now.

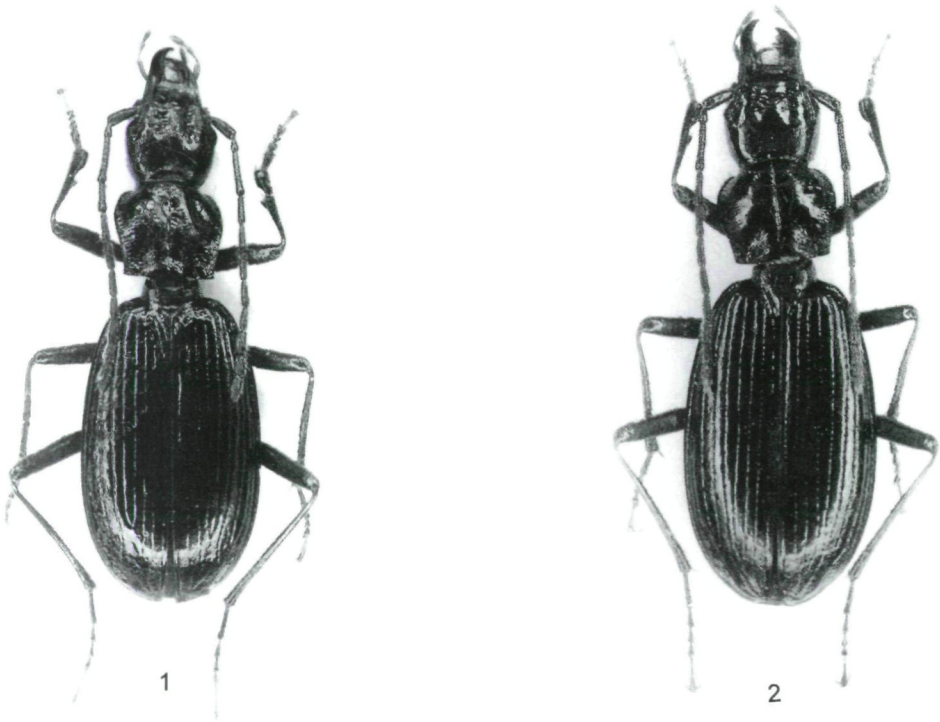
## ***Ledouxius franzi* sp.n.**

**Holotype** ♂: India, N Uttar Pradesh, Tapovan (ca. 17 km SE of Gangotri), 4500 m, 26.VI.1996, in coll. Sciacky.

**Paratypes:** 1 ♀ with same data as holotype, in coll. Sciacky; 1 ♂ with same data as holotype, in coll. Zamotajlov.

**DIAGNOSIS.** A *Ledouxius* of large size (10.3 - 11.6 mm), dark brown, microphthalmous, with 4 - 6 setiferous pore-punctures between eye and neck-constriction on each side. Aedeagus rather long, with apical lamella twisted toward left (in dorsal view); endophallus with large bilobed proximal copulatory piece and 2 apical tooth-shaped pieces.

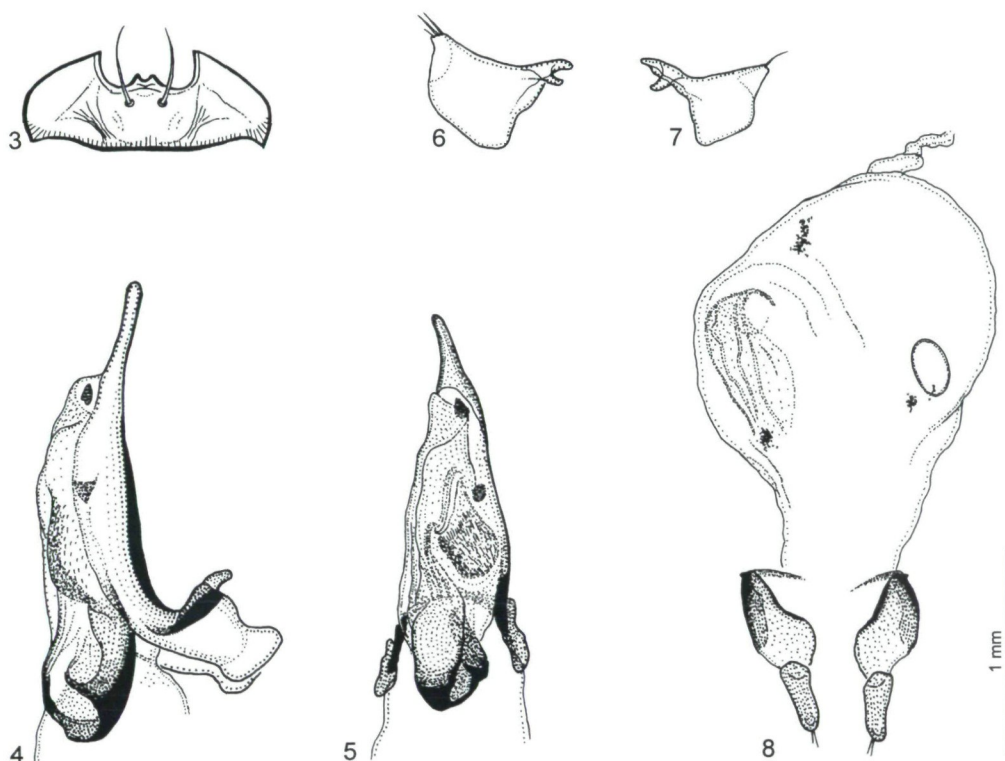
**DESCRIPTION.** Body dark brown, shiny, antennae, mandibles, tibiae, and tarsi brown, apex of palpi reddish. Total length 10.3 - 11.6 mm. Habitus as in figs. 1 and 2.



Figs. 1 - 2: *Ledouxius franzi* sp.n., habitus, 1) holotype ♂, 2) paratype ♀ .

Head ovate, 0.81 - 0.85 (0.83) times as wide as pronotum; mandibles very long and slender, eyes small, inconspicuous, temples long, much longer than eye diameter, faintly tumid, neck constriction rather shallow; frontal furrows distinct, slightly divergent posteriad; surface smooth, slightly punctate only in frontal furrows, temples and sides of vertex with 4 - 6 setiferous pore-punctures between eye and neck-constriction on each side, the hind one closer to neck-constriction. Antennomere 1 with 4 subapical setae. Mentum tooth (fig. 3) bifid, short and hardly projected.

Pronotum subcordate, 1.14 - 1.20 (1.17) times as wide as long, very faintly convex, distinctly constricted posteriad, anterior margin somewhat rounded, lateral margins slightly rounded in front, indistinctly sinuate before hind angles, posterior margin nearly straight, front angles indistinct, rounded, not projected anteriorly, posterolateral angles right, pointed at tip; anterior transverse impression shallow, sparsely punctate, basal foveae rather shallow, wrinkled and coarsely punctate, disk smooth, median line distinct, extended almost to both extremities, lateral grooves rugosely punctate; lateral margins with 4 - 5 anterior setae, 1 more seta situated in hind angles. Pro-, meso-, metepisterna, and mesosternum sparsely punctate, pro- and metasternum almost smooth, lateral areas of sterna finely rugose. Metepisternum longer than wide at base. Tarsi with dorsal surface glabrous. Meso- and metatarsomere 5 ventrally with 1 - 3 minute indistinct setae on each side.



Figs. 3 - 8: *Ledouxius franzi* sp.n., 3) mentum, 4) aedeagus, left lateral view, 5) aedeagus, dorsal view, 6) left paramere, left lateral view, 7) right paramere, right lateral view, 8) female reproductive tract.

Elytra oblong-ovate, 1.70 - 1.72 (1.71) times as long as wide and 1.57 - 1.61 (1.59) times as wide as pronotum, almost flat, humeri rounded, indistinct, humeral tooth indistinct; intervals slightly convex, striae deep, coarsely punctate basally, interval 3 with 3 - 6 setiferous punctures adjoining stria 3, marginal series of 9 - 10 setae, concentrated basad and apicad, few medially; microsculpture in form of fine transverse meshes and rather large punctures. Hind wings markedly reduced, shorter than 1/3 of the elytral length.

Genitalia. Aedeagus (figs. 4, 5) markedly bent at base, apical lamella nearly straight (in lateral view), narrow, gradually attenuated toward apex and twisted toward left (in dorsal view); endophallus with large bilobed, markedly sclerotized proximal copulatory piece, median spinulate folders, and 2 apical tooth-shaped pieces; left paramere (fig. 6) larger than right one (fig. 7) both with short projections somewhat truncate apically, with 1 - 3 long apical setae. Spermatheca (fig. 8) similar to that of *Deltomerodes*, with small round sclerotized ring 0.24 mm in diameter and folded structures, each gonapophysis with 2 subapical setae.

SPECIFIC EPITHET. We are pleased to dedicate this species to Prof. DI DDr. h.c. H. Franz as a tribute for his important contribution to the knowledge of Coleoptera, including Carabidae.

TAXONOMICAL REMARKS. The new species is easily distinguishable from the other known *Ledouxius* through its plurisetose head, bearing 4 - 6 setae between anterior margin of eye and neck-constriction on each side (the other species have 2 - 3 setae). In this respect, however, *L. franzi* is similar to the species of the genera *Deltomerus* and *Penetretus*. Furthermore, almost all

the other species of *Ledouxius* (except the very isolated *L. falciger* (HEINZ & LEDOUX, 1989)) have larger, markedly convex eyes and anevidently cordate pronotum. On the other hand, the features characteristic of *L. franzi* sp.n., e.g., the extremely long temples, the somewhat leftward curved apical lamella of the aedeagus, the basal part of proximal copulatory piece forming a long flagellum turned apically, and the apically truncate parameres seem to approach this species to *Deltomerodes*. However, it differs from the species of the latter genus in the glabrous dorsal tarsal surface and the plurisetose lateral pronotal gutter. Structure of male genitalia and habitus are similar to those of *L. falciger*, but the two species differ in many important respects.

Both *L. franzi* sp.n. and *L. falciger*, though placed in *Ledouxius*, share some characters with *Deltomerodes*, and maybe they represent a transition between the two genera. However, for the present, we treat both species as members of *Ledouxius*, although the diagnosis of this genus concerning the setation of head must be modified.

**BIOGEOGRAPHICAL REMARKS.** The first patrobines from the Himalaya were described rather recently by LEDOUX (1984), who discovered five species in Kashmir. In that work, Ledoux wrote that his entomological explorations in Pakistan, Afghanistan and Uttar Pradesh did not produce any Patrobinae. Later, three more species were added from Pakistan (HEINZ & LEDOUX 1987, HEINZ & LEDOUX 1989), but nothing was known yet from Uttar Pradesh. The discovery of *Ledouxius franzi* from this province, which is already quite well known entomologically, is therefore extremely interesting. It is also very remarkable to observe that this species is especially similar to *L. falciger*, that lives at the opposite extreme of the distributional range of the genus, in Pakistan. This, and the systematic considerations exposed above, prove that there is still a lot to discover in this group of carabid beetles.

### Acknowledgements

We are very thankful to George Ball (Edmonton) for his advice about the linguistic aspects of an earlier draft of the manuscript on which this paper is based.

### Zusammenfassung

*Ledouxius franzi* sp.n. wird hier beschrieben. Es ist die erste Art dieser Gattung aus Uttar Pradesh und ist innerhalb der Gattung (aufgrund des Vorhandenseins von 4 - 6 Borsten auf dem Kopf) sehr isoliert.

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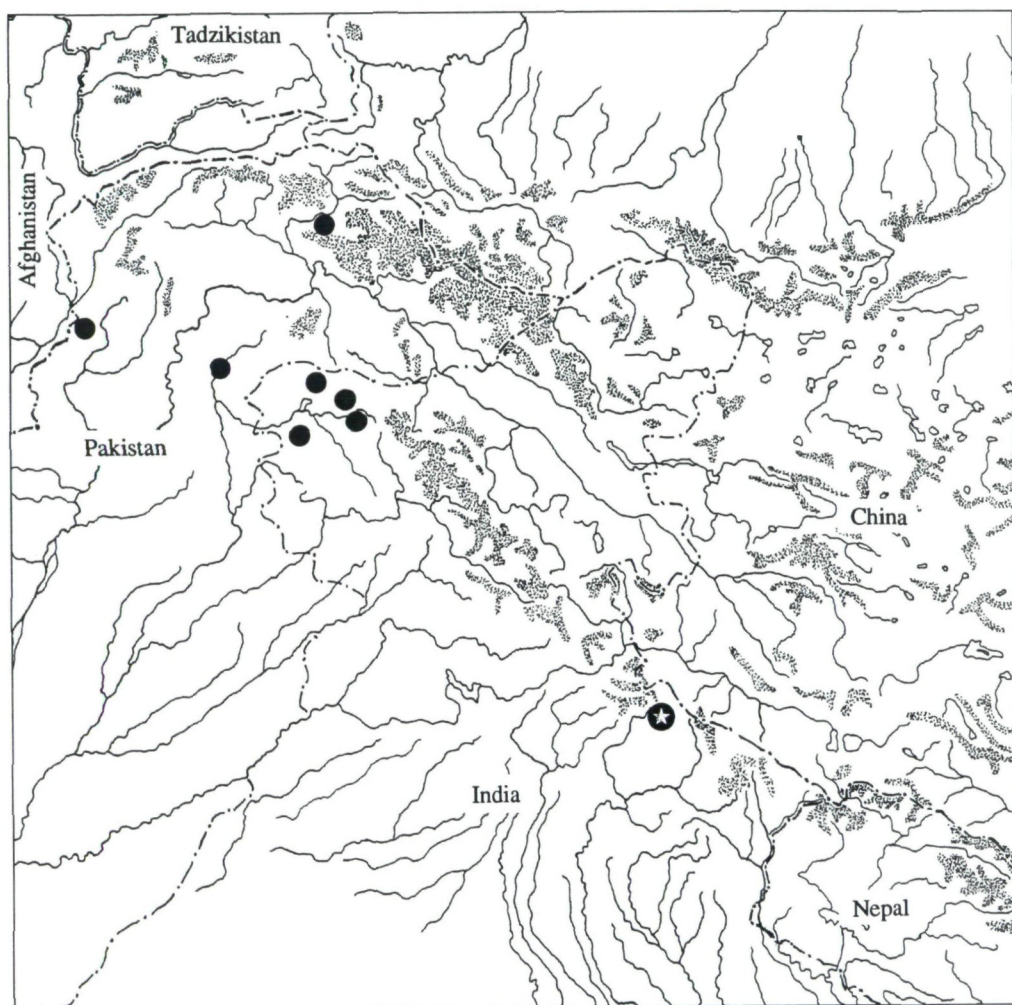


Fig. 9: Map showing the distribution area of the species of *Ledouxius* known until today. The black dots represent the species previously known, the star *Ledouxius franzi* sp.n. The grey areas represent the glaciers.

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Artikel/Article: [A new species of the genus \*Ledouxius\* Zamotajlov, 1992 from Uttar Pradesh \(India\) \(Carabidae\). 47-51](#)