

# A Review of the *Pseudocleonus* Subgenus *Phryganocleonus* Arnol'di, with the Description of a New Species from Afghanistan (Coleoptera, Curculionidae: Lixinae)

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**Abstract**—*Pseudocleonus* (*Phryganocleonus*) *kratkyi* sp. n. is described from Afghanistan. Some remarks on the taxonomy of the subgenus *Phryganocleonus* are given, with a key to the species. Lectotypes of *Pseudocleonus guldarensis* Arnol'di, *Ps. iskanderi* Arnol'di, and *Ps. tadzhika* Arnol'di are designated. Hypotheses on the historical biogeographical events that may have caused species differentiation are proposed.

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The subgenus *Phryganocleonus* Arnol'di, 1956 was described to accommodate three new species of *Pseudocleonus* from Tajikistan and Uzbekistan that differ from the other species of the genus in the short, thick antennal funicle, the absence of a developed epistoma, the presence of a visible scutellum, and the odd-numbered intervals of the elytra raised at least in their basal part. Arzanov (2005) revised the infrageneric taxonomy of *Pseudocleonus* and discussed *Phryganocleonus* in detail, adding information on the shape of the endophallus.

To date, the subgenus has been known from only a few montane localities in Uzbekistan and Tajikistan, above 2500 m, in the south-western part of the Hissar Range, on the northern side of the Amu-Darya basin. The habitat is a xerophytic landscape with phrygana vegetation (Arnol'di, 1956), an open dwarf scrub with cushion-shaped spiny shrubs. Recently, three specimens of a new species described here were found in the southwestern part of the Afghan Hindu Kush Range.

The main morphological characters of the subgenus *Phryganocleonus* are summarized here.

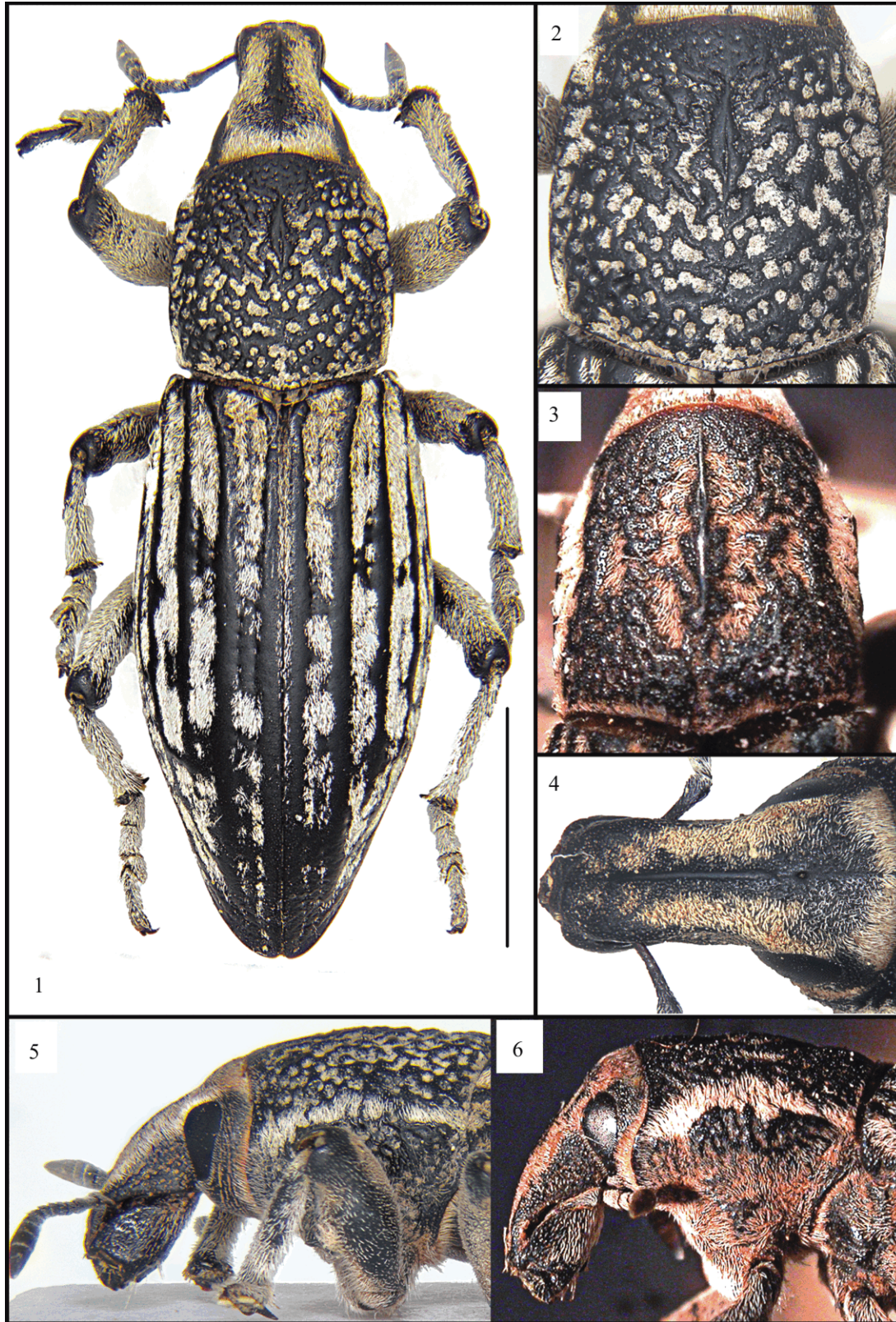
Genus **PSEUDOCLEONUS** Chevrolat, 1872

Subgenus ***Phryganocleonus***

Arnol'di, 1956

Arnol'di, 1956 : 682.

**Description.** Rostrum elongate, thick, with rounded sides, without lateral edges, dorsoventrally curved, with narrow, more or less raised median keel, dorsum at sides of median keel flat or weakly longitudinally impressed. Epistoma not developed. Eyes flat, subtriangular, narrowed toward lower part, dorsal margin slightly curved. First antennomere of funicle short, thick, twice as long as second; antennomeres 3–7 transverse, very short. Club elliptical, more than twice as long as wide, and almost as long as funicle, annulus on club antennomere 3 distinct. Pronotum with postocular lobes, dorsum flat or with median impression, with irregular, usually deep, sculpture, often with median line, generally more distinct on anterior half, not always present. Scutellum distinct, triangular, often very short, transverse. Elytra with odd-numbered intervals convex at least at base, or for their entire length, either glabrous or with scales. Aedeagus regularly curved in profile, apex shortly acute or rounded. Endophallus with elongated upper lip, more or less deeply bifid anteriorly, with variously shaped tubercles in ventral part. Female sternum VIII with arms fused in basal third, more or less curved in their midlength; lamina slightly elongate, parallel-sided, sclerotized only near apex of arms. Apodeme half as long as lamina, usually slightly curved. Spermatheca with short collum, broadly dilated in rounded nodulus; ramus present, short and broad; cornu curved at 90° relative to collum, narrow, long and subacutely pointed at apex.



**Figs. 1–6.** *Pseudocleonus*: (1, 2, 4, 5) *Ps. kratkyi* sp. n., paratype female: (1) dorsal view; (2) pronotum; (4) rostrum; (5) rostrum and pronotum, lateral view; (3, 6) *Ps. guldarensis* L. Arnol'di, male lectotype: (3) pronotum; (6) rostrum and pronotum, lateral view. Bar: 5 mm (Fig. 1 only).

## Key to Species

1. Elytra distinctly striped; odd-numbered intervals glabrous, strongly raised on entire length of elytra, striae and even-numbered intervals covered with whitish scales (Fig. 1) ..... 2.  
—Elytra not striped, odd-numbered intervals weakly raised, scales also present on odd-numbered intervals ..... 3.
2. Pronotum with impression on disc, median carina narrow, distinct and continuous from apex to basal quarter; surface deeply sculptured, lacking isolated punctures (Fig. 3) .....  
..... *Ps. guldarensis* Arnol'di (Fig. 12).  
—Pronotum lacking discal impression, median carina absent or at most a small trace only present in anterior half; surface with irregular large isolated punctures (Fig. 2) ..... *Ps. kratkyi* n. sp. (Fig. 1).
3. Pronotum longer than wide, with shallow sculpture; odd-numbered intervals only raised near base; vestiture uniformly greyish on entire body, covering integument, even-numbered intervals not distinctly raised ..... *Ps. iskanderi* Arnol'di (Fig. 13).  
—Pronotum as long as wide, deeply and irregularly sculptured; elytral vestiture not uniform, with patches of light greyish scales; even-numbered intervals slightly but distinctly raised .....  
..... *Ps. tadhika* Arnol'di (Fig. 14).

## TYPIFICATION

Arnol'di (1956) did not select holotypes for the three species of *Pseudocleonus* (*Phryganocleonus*) that he described. Therefore, lectotypes are designated here by M. Meregalli. Labels are given verbatim, transliterated (/: different line; //: different label).

*Pseudocleonus guldarensis* Arnol'di, 1956.

Lectotype, ♂: Verkh. Plato Khan-Takhta / 9.VII.42 2900 m / Kashka-Dar'ya Uzb. / K. Arnol'di // *Pseudoclon. (Phryganocleon.) / guldarensis* sp. n. typus / ♂ / opr. L. Arnol'di // Meregalli des. 2017 (red label). Conserved at the Zoological Institute of the Russian Academy of Sciences, St. Petersburg, Russia. Paralectotypes: same data, 10.V, 9.VII.1942, 2 ♀; Verkh. plato gor SE Yakkabaga, Kashka-Dar'in[skaya obl.], 15.IX.941 K. Arnol'di, 1 ♀; Vost. Bukhara, Gilan, 7.VI.1898, Barshevskiy, 1 ♂.

*Pseudocleonus iskanderi* Arnol'di, 1956.

Lectotype, ♂: Tajikistan, Ghissarsk[iy] / khrebet, okr. oz. Iskander- / Kul', 10.VIII.47 / A. N. Kirichen-

ko // *Pseudoclon. (Phryganocleon.) / iskanderi* sp. n. typus / ♂ / opr. L. Arnol'di // Meregalli des. 2017 (red label). Conserved at the Zoological Institute of the Russian Academy of Sciences, St. Petersburg, Russia. Paralectotypes: Tajikistan, Ghissarsk[iy] / khr[ebet] / g-ry po prav. ber. r. Is- / kander-Dar'ya, istoki / 23.VIII.47 A. Kirichenko, 2 ♂, 1 ♀.

*Pseudocleonus tadhika* Arnol'di, 1956.

Lectotype ♂: Gissarsk. khr. Tadh. / Rujdasht 10.IX. / A. Kirichenko 947 // *Pseudoclon. (Phryganocleon.) / tadhika* sp. n. typus / ♂ / opr. L. Arnol'di // Meregalli des. 2017 (red label). Conserved at the Zoological Institute of the Russian Academy of Sciences, St. Petersburg, Russia. Paralectotype: same data, 1 ♀.

*Pseudocleonus (Phryganocleonus) kratkyi*  
Meregalli et Talamelli, sp. n.

**Material.** Holotype, ♂: C **Afghanistan**, *Bamyan Prov.*, Bandi-Amir env., 34°50'N 67°12'E, 3000 m, 27.V.2010 (O. Pak & E. Ivanova) (coll. Meregalli).

Paratypes: Same data as the holotype, 1 ♀ (coll. Pelikán); **Afghanistan**, *Bamyan*, Bande-Amir, 2900 m, 31.V.2012 (I. Pljutsch), 1 ♀ (coll. Talamelli).

**Diagnosis.** A species of *Pseudocleonus* belonging to the subgenus *Phryganocleonus*, apparently sister to *P. guldarensis* Arnol'di, 1956, characterized by pronotum with median carina absent or, if present, scarcely distinct and limited to anterior half, absence of a discal impression and with broad raised punctulate interspaces between large irregular punctures. Odd-numbered intervals of elytra raised, convex, glabrous; even-numbered intervals flat, striae and even-numbered intervals covered with whitish scales, giving striped appearance to elytra.

**Description.** External morphology (Figs. 1, 2, 4, 5). Body elongate, integument black, vestiture composed of slender whitish scales, very long blade-like, appressed to integument, relatively dense on rostrum, forming a narrow lateral stripe on pronotum, above dorsolateral margin, and densely distributed on elytra on striae and even-numbered intervals, giving a striped appearance to elytra, and on legs, including tarsi; tibiae with longer, semi-erect setae; vestiture on sterna and ventrites composed of more slender scales, spaced on ventrites, thinner in median part and slightly thicker toward sides (Fig. 1). Rostrum short and robust, median keel narrow, anteriorly interrupted at level of antennal insertion; surface smooth, densely, minutely and roughly punctulate. Dorsum with two barely

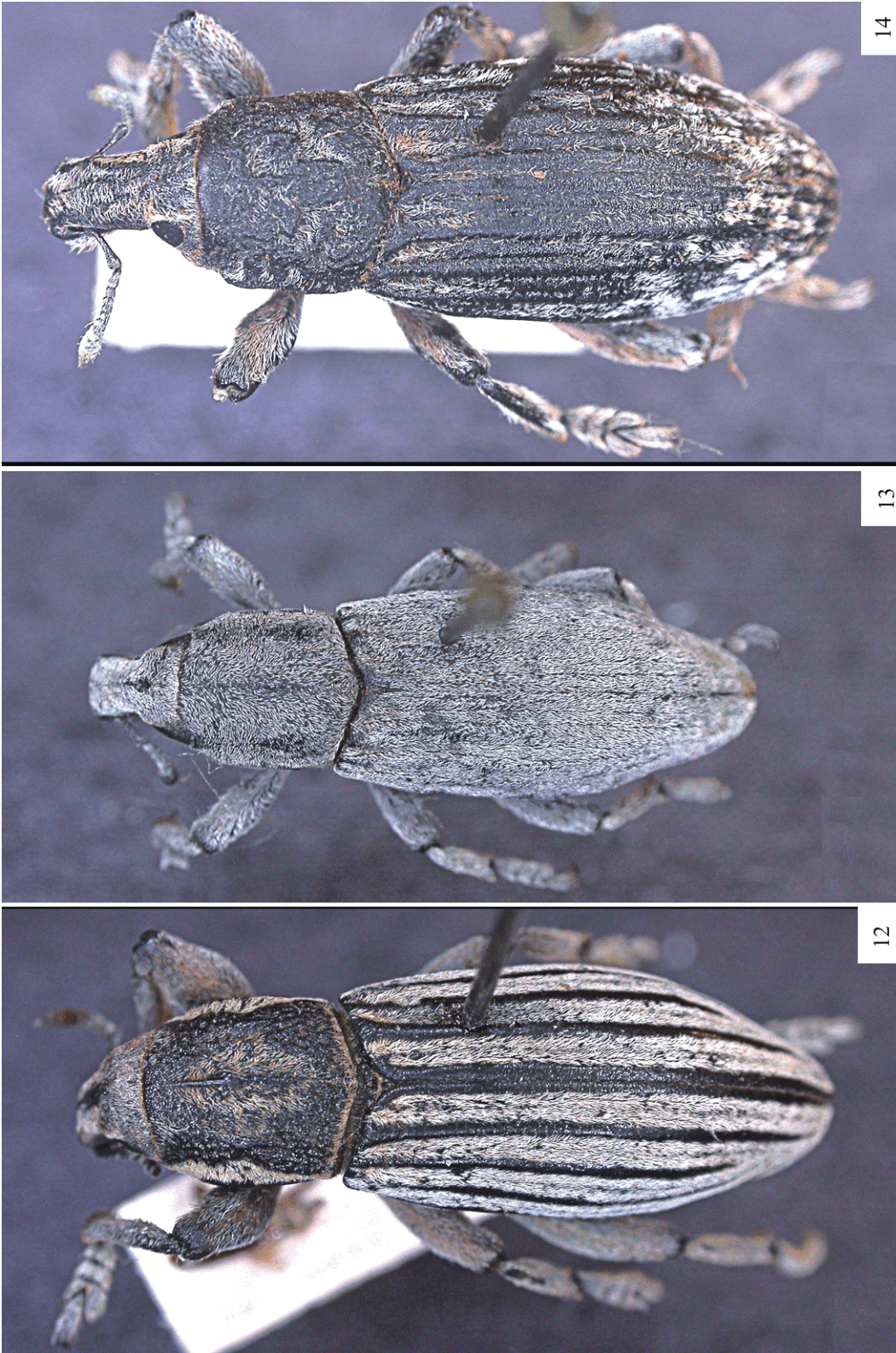


**Figs. 7–11.** *Pseudocleonus kratkyi* sp. n. [(7, 8, 10) holotype male [(7, 8) penis, dorsal and lateral view; (10) everted internal sac, lateral view]; (9, 11) female, paratype [(9) sternum VIII, (11) spermatheca]. Bar: Fig. 7: 5 mm; Fig. 9: 2 mm; Fig. 10: 1 mm; Fig. 11: 0.2 mm.

visible oblique lines directed from base of median keel to sides, reaching antennal insertion, delimiting a slightly raised median triangular plate. Sides almost parallel, slightly compressed in basal half; in lateral view rostrum thick, curved, junction between head and rostrum slightly sinuate, sides in front of eyes slightly impressed, with broader punctures. Genae short, with smaller and irregular punctures. Scrobes curved, narrow, upper and lower margins parallel, directed to and reaching underside of rostrum. Antennae short; scape moderately curved, broadened from base and more strongly so near apex, slightly flattened dorso-ventrally; funicle antennomere 1 conical, at least twice

as long as wide; antennomere 2 shortly conical, less than half as long as 1; antennomeres 3–7 short, transverse, 7 broader than previous ones. Club  $2/3$  as long as funicle, acutely elliptical, club antennomeres 1+2 as long as 3, annulus separating apical pseudo-antennomere clearly visible. Head weakly convex, deeply and roughly sculptured laterally, interocular space broader than rostrum at base, vertex with deep oblong fovea, with trace of median line, or at least shallowly sculptured, behind fovea. Eyes large, broadened dorsally, sub-triangular, flat.

Pronotum barely longer than wide, base sub-linearly prominent toward elytra, sides almost rectilinear,



**Figs. 12–14.** *Pseudocleonus* (*Piryanocleonus*), lectotypes (12) *P. guldarensis* Arnol'di, 1956; (13) *P. guldarensis* Arnol'di, 1956; (14) *P. tadzhika* Arnol'di, 1956.

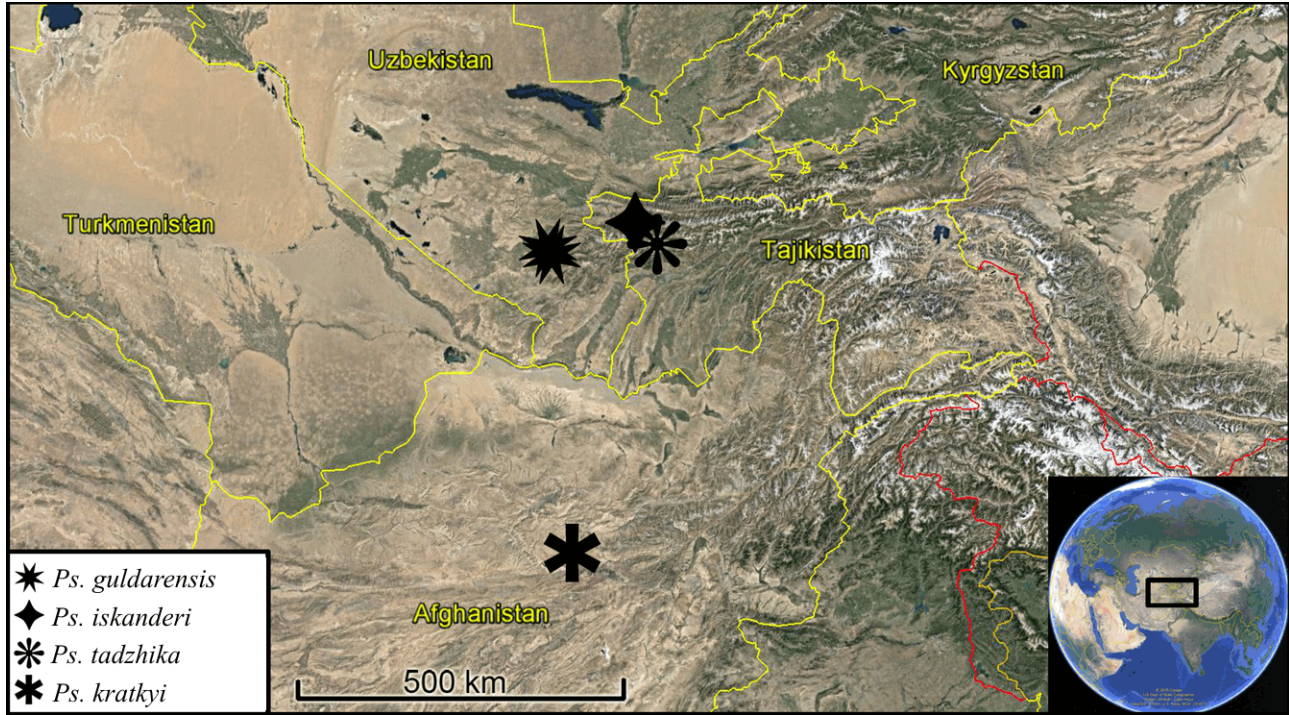


Fig. 15. Distribution map of *Pseudocleonus* subgenus *Phryganocleonus*. Map from Google Maps, completed with Photoshop CS3 (Adobe Systems Inc.).

maximum width near midlength, dorsolateral margin in part sharp, forming a trace of irregular raised line, apex scarcely curved, not prominent above head, ocular lobes gently rounded, with long setae in lower part. Dorsum not convex, median carina indistinct or only present in anterior half, not reaching apex, and slightly broadened in its basal part, where elongate foveola may be impressed. Surface of pronotum deeply sculptured, with dense punctures on dorsolateral and basal parts and irregular short deep furrows toward disc, interspaces among punctures almost as broad as punctures, narrower and slightly raised toward disc, minutely but deeply punctulate; sides below dorsolateral margin more shallowly sculptured.

Elytra elongate, at base as wide as pronotal base, sides weakly curved, maximum width at midlength or immediately after midlength, not sharply converging to apex, in lateral view declivity long, moderately oblique; odd-numbered intervals raised, minutely punctulate, completely glabrous; interval 1 (sutural) raised and glabrous in its external part, inner part flat and scaly; interval 3 raised from base to near apex, at junction with interval 9; interval 5 shorter, interrupted on declivity; interval 7 raised until its merging with interval 3; even-numbered intervals flat, densely scaly, interval 8 with narrow, scarcely raised median line all

along its length; striae hidden by vestiture, with irregular round shallow punctures. Ventrites glossy, shallowly punctate, ventrite 5 in female with shallow median impression, and less transverse than in male. Legs robust, femora thick, scarcely broadened at midlength; tibiae straight, inner side barely sinuate, apex rounded; subapical tooth on female fore tibiae robust; tarsi robust, first tarsomere short and small, tarsomere 2 transverse, broader than 1, tarsomere 3 bilobed, lobes developed, large, longer than tarsomere 2; tarsomere 5 almost as long as 2+3 (including lobes); underside of foretarsi with spongy pad complete in male, reduced in female; spongy pad on underside of other tarsi complete in both sexes.

Genitalia (Figs. 7–11). Penis curved, sides in dorsal view slightly and linearly convergent, apex shortly triangular, obtuse; upper part of internal sac with a broad median flat plate slightly bilobed at sides, median part with a broad globose lobe with some tubercles. Female sternum VIII with arms strong, fused in basal third, moderately curved, almost reaching apex of plate and delimiting outer side of plate, sclerotization only present in a narrow lateral area near apex of arms; spermatheca with globular nodulus and short collum, ramus distinct, shortly cylindrical, cornu strongly curved, long attenuated at apex.

**Differential notes** (characters of *Ps. kratkyi* in brackets). *Pseudocleonus guldarensis* has rostrum weakly curved (Fig. 6) (curved and slightly sinuate basad, Fig. 5), ratio length/width of pronotum 1.1 (pronotum subquadrate), base of pronotum arcuate at sides of median projection toward elytra, dorsum with dense, irregular sculpture, lacking isolated punctures, disc with distinct impression covered with scales and with raised median carina (Fig. 3) (base of pronotum linearly prominent toward elytra, dorsum with broad, isolated punctures, disc lacking scaly impression, with only a trace of median keel, Fig. 2), lateral scaly white stripe slightly broadened anteriorly and better delimited, hiding integument (Fig. 6) (lateral scaly white stripe not broadened anteriorly, some raised parts of integument visible here and there, Fig. 5). *Pseudocleonus tadjhika* and *Ps. iskanderi* are very easily distinguishable since their elytra are not striped; moreover, *Ps. iskanderi* has dense, uniform vestiture of greyish, almost hair-like scales covering entire integument, including dorsum of pronotum, and *Ps. tadjhika* has even-numbered intervals also slightly raised, with scales in irregular patches, and pronotum with deep irregular sculpture, lacking clearly delimited punctures.

**Variability.** The three specimens show a limited variation. The ratio length / width of the pronotum varies between 1.05 and 1.12, and a small median carina can be present on the anterior part, with a narrow, elongate fovea on disc.

**Etymology.** The new species is named after our friend Jiří Krátký, who kindly entrusted the specimens to us for study.

**Distribution and ecology.** *Pseudocleonus kratkyi* is known from the surroundings of the Lake Band-e-Amir in central-northern Afghanistan. Host plants and bionomy are not known. The habitat is a very dry montane steppe with sparse xerophytic phrygana vegetation.

**Historical biogeography.** Considering its present day distribution (Fig. 15), the differentiation of the subgenus *Phryganocleonus* may have been triggered by the uplift of the Asian mountain chains, with subsequent habitat aridification, that occurred in the late Miocene (Caves et al., 2014). These species are nowadays adapted to the montane xerophytic habitat and appear to have a relict, very limited areal, probably determined by isolation and speciation by vicariance.

Even though a phylogenetic study was not performed, the morphology of the four species suggests that the subgenus is composed of two pairs of sister taxa: *Ps. iskanderi*–*Ps. tadjhika* and *Ps. guldarensis*–*Ps. kratkyi*. The first two species occur on the northern and southern sides of the Hissar Range respectively; their diversification from their common ancestor probably resulted from the uplift of the chain, when the main axis reached an altitude too high, more than 4000 m, for the survival of the weevils, thereby isolating the populations on the northern and southern sides. The diversification between *Ps. guldarensis* and *Ps. kratkyi* from their common ancestor may have been caused by the onset of the drainage system of the upper Amu-Darya, when it changed from longitudinal to transverse in the early Quaternary (Nikonov, 1970). By the mid-Quaternary, the valley downcutting reached depths of 1500–2000 m (Brookfield, 1993), isolating these high-altitude adapted species on the two sides of the Amu-Darya valley.

These species are probably rare and localized, since, to our knowledge, no other specimens of the three original species of the subgenus have been found since the description, and only very recently the fourth species was discovered at a single locality. However, it should be considered that their bionomy is unknown, and that these regions have scarcely been investigated, at least for weevils; therefore, their range may be broader. Since no apparent biogeographical barriers isolate the type locality of *Ps. kratkyi*, more populations of this species, or closely related taxa, may be present in the Afghan Hindu Kush mountains northeast of the type locality. For the same reason, more populations of *Ps. iskanderi* and *Ps. tadjhika* may be present on the northern and southern slopes, respectively, of the southwestern part of the Hissar chain. *Pseudocleonus guldarensis* colonizes the extreme southwestern part of the Hissar range, and is probably localized in this region.

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