Review of genus *Pogonarthron* Semenov, 1900 with a description of a new species (Coleoptera, Cerambycidae)

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Summary

The genus *Pogonarthron* is composed of six species. One species from Tadzhikistan is described as new: *P. petrovi* Danilevsky, sp. n. A short morphological diagnoses of each species is supplied with colour photographs of several specimens, determination of its type-locality, list of synonyms, description of its geographical distribution, taxonomical remarks and list of studied specimens.

Résumé

Le genre *Pogonarthron* est composé de six espèces. Une espèce est nouvellement décrite du Tadzhikistan: *P. petrovi* Danilevsky, sp. n. Une courte diagnose morphologique de chaque espèce est accompagnée de photos couleurs de quelques spécimens, de la localité typique, de la liste des synonymes, de l’aire de répartition, de remarques taxonomomiques et de la liste des spécimens étudiés.

Key words

Coleoptera, Cerambycidae, *Pogonarthron*, taxonomy, new species, Central Asia, Tadzhikistan, Uzbekistan, Kirgizia, Afghanistan, Iran, Iraq.

*Pogonarthron* Semenov, 1900

1. *Pogonarthron bedeli* (Semenov, 1900)
2. *Pogonarthron minutum* (Pic, 1905)
3. *Pogonarthron semenowi* (Lameere, 1912)
4. *Pogonarthron tschitscherini* (Semenov, 1889)
5. *Pogonarthron petrovi* Danilevsky, sp. n.
**Pogonarthron Semenov, 1900**


*Pseudomonocladum* Villiers, 1961: 445 (type species: *Polyarthron minutum* Pic, 1905) (part.).

*Pogonarthron*, Danilevsky, 1999: 189 (= *Pseudomonocladum* Villiers, 1961, syn. n.)

Type species: *Polyarthron bedeli* Semenov, 1900.

**Diagnosis.** - Males (female unknown). Body length: 15,5-35,5 mm, body width: 6,5-13,2 mm.

Body from relatively large to rather small, coloration from pale orange-yellow to dark-brown.

Head with long and sharp mandibulae; palpi from moderately long to very long with axe-like apical segments (in *P. minutum*); eyes very large, finely faceted.

Antennae with 20-27 segments, most of segments bearing one or two (in *P. semenovianum*) narrow long lamellae; lamellae of middle segments in *P. bedeli* are distinctly curved dorsally (externally), in *P. minutum* – ventrally (internally), in *P. tschitscherini* – relatively straight; 3rd segment always elongated, simple or angulated, or with apical triangular process; 4th segment with apical triangular process or with short lamella; apical segment lamelliform or (as a result of fusion of 2-3 segments) of complicated form, sometimes with 3 lamellae; sometimes right and left antenna of one specimen with different number of segments, because apical segment consists of different number of fused segments.

Prothorax usually with only one pair of small central lateral spines, which can be in form of small tubercles or totally absent (often in *P. petrovi*, sp.n.); only in large specimens of *P. bedeli* the anterior pair of prothorax spines are also developed, and in such case the central spines are rather long. Pronotum nearly always roughly sculptured, densely punctate with dense erect setae.

Elytra usually with well developed costae, which can be more or less obliterated (*P. bedeli*, *P. semenovianum*); often diverging posteriorly along suture; internal apical elytral angle sometimes with a short spine (or without spine in another specimens of same species).

Tarsi with 1st-3rd joints bearing attenuated sharp lobes.

Ventral body surface (including metathorax and abdomen) with long erected setae.

**Distribution.** - Central and south Asia: Kirgizia (and possibly Uzbekistan), Tadzhikistan (and possibly north Afghanistan), Iran, Iraq.
Bionomy. - Imagoes of all species are nocturnal and males can be attracted to light. They are active from June to September. Most species are distributed in dry stony landscapes with dense brush up to 2000 m above sea level, but *P. bedeli* is known only from broad-leaved forest.

Remarks. *Pogonarthron* seems to be close to *Pseudoprionus* Pic, 1898 (type species: *Polyarthron bienerti* Heyden, 1885), but in *Pseudoprionus* antennal lamellae are very wide, semicircular (or funnel-shaped); antennae with a greater number of segments (from 27 to 32); palpi extremely long with very wide apical segments. *Polyarthron minutum* Pic, 1905 together with *Prionus semenowi* were separated in *Pseudomonocladum* Villiers, 1961, but undoubtedly belong to *Pogonarthron* (see Danilevsky, 1999: 189).

The genus presently includes 6 described species:

1. *Pogonarthron bedeli* (Semenov, 1900) (Figs. 1-2)

   *Polyarthron (Pogonarthron) bedeli* Semenov, 1900: 249 (« in Buchariae orientalis provincia Hissar: ad opp. Karatagh.»).


   *Pogonarthron bedeli*, Danilevsky, 1999: 189.

Type locality: Tadzhiksitan, south slope of Gissar Ridge, Karatag (about 35 km westwards Dushanbe), according to the original description.

Diagnosis. - Body length in males: 26.5-35.5 mm, body width: 10.-13.2 mm.

Males (females unknown): body large (the largest representative of the genus), pale, orange-yellow; dark specimens unknown.

Head with moderately long palpi, distinctly longer than mandibulae; apical segments triangular, strongly widened apically, axe-like.

Antennae with 23-26 segments, reaching apical elytral third; 3rd segment strongly elongated, from 1.3 to 1.5 times longer than 1st; simple, not angulated apically; 4th segment with apical triangular process; 5th segment with short narrow lamella; long lamellae of middle segments are distinctly curved dorsally (externally) and sometimes slightly angulated at dorsal (external) sides of bases; apical segment bilobed. My remark (Danilevsky, 1999), that sometimes 3rd antennal segment in *P. bedeli* can possess an apical process was incorrect.

Prothorax usually with only one pair of long central lateral spines; sometimes in large specimens an anterior pair of prothorax spines is also present. Pronotum covered with dense erect setae; usually with very dense, close, irregular punctuation, but sometimes the punctures are not so dense, with wide shining interspaces.

Elytra with small internal apical angle, which sometimes can be nearly indistinct.
According to A. Lameere (1912) and N. N. Plavilstshikov (1936), the minimal length can be 22 mm, but I have not seen such specimens.

Distribution. - Tadzhikistan, south slope of Gissar Ridge, from about Dushanbe environs (Kondara in Varzob Canyon) eastwards to Ramit; north foothills of Babatag Ridge (Gissar-city environs). The known range is only about 100 km long.

Bionomy. - Specimens from near Kondara and from Ramit Natural Reserve were attracted by light inside broad-leaved forest. Larvae unknown, but undoubtedly develop in soil. According to Plavilstshikov (1936) imagoes are active in September, but all my specimens were collected in the beginning of August.

Materials. - 3 males, Tadzhikistan, Ramit village environs (about 50 km NE Dushanbe), Ramit Natural Reserve, 8.VIII.1980, Danilevsky leg.; 1 male, same locality, 13.V.1979 (the data seems to be wrong), M. Cherniakhovsky leg.; 1 male, Tadzhikistan, Gissar-city env., 7.VIII.1975, R. Danov leg. - all in author’s collection.

Remarks. - The species is a little similar to P. minutum, but P. minutum is smaller (from 19.5 mm to 23.2 mm), often dark-brown, the palpi are much longer, about two times longer than mandibulae; 3rd antennal segment shorter, about as long as 1st or barely longer, nearly always with a short triangular process; the antennal shape is entirely different: long lamellae of middle segments are distinctly curved ventrally (internally), with more or less distinct ventral (internal) angles. The areas of occurrence of the two species are widely separated.

2. Pogonarthron minutum (Pic, 1905) (Fig. 3-6)

Polyarthron minutum Pic, 1905 : 300 (« Perse : Chaîne bordière »).
Prionus (Polyarthron) minutus, Semenov-Tian-Shanskij, 1927 : 236.
Prionus (Polyarthron) obenbergeri Heyrovsky, 1939 : 27 (« Persepolis, Iran »).
Pseudomonocladum minutum, Villiers, 1961: 445; 1967 : 345 (= obenbergeri
Heyrovsky, 1939, syn. n. = loeffleri Fuchs, 1956, syn. n.).
Pogonarthron minutum, Danilevsky, 1999 : 189.

Type locality: Iran, Zagros Mountains between Susa and Esfahan, according to the remark by A. Lameere (1912).
**Diagnosis.** - Body length of males from original description: 21-23 mm; males from Persepolis: 22 mm (Heyrovsky, 1939), 23.5 mm (male from British Museum), width of the latter: 8.9 mm; length of males from near Shiraz: 20.6-21 mm, width 8.8-9.2 mm; length of two males from Feschar: 18 mm and 20 mm (Fuchs, 1956, 1957); length of males from near Yasug: 19.5-22 mm, width: 7.4-8.9 mm.

Males (females unknown): Body of moderate size or small; pale, orange-yellow, or brown, or dark-brown, nearly black, from 2.3 (specimens from near Shiraz) to 2.6 (specimen from Persepolis) times longer than wide.

Head with very long palpi, about two times longer than mandibulae, though the relative length of palpi can be rather different inside one population; apical joints triangular, strongly widened apically, axe-like.

Antennae with 25-27 segments, reaching apical elytral third, or a little longer; 3rd segment relatively short about as long as 1st or hardly longer; usually with apical triangular process, but sometimes simple, not angulated apically (Fig. 6); 4th segment with apical triangular process or with a short narrow lamella; 5th segment with longer lamella; long lamellae of middle segments are distinctly curved ventrally (internally) and always with more or less distinct ventral (internal) angles; apical segment in form of narrow lamella, or bilobed, or trilobed.

Prothorax large - 1.5 times narrower that elytral base (specimen from Persepolis) or small - 1.8 times narrower, than elytral base (one of Shiraz specimens); with only one pair of central lateral spines, which can be very long (specimen from Persepolis) or reduced to a short angle (one of Yasug specimens). Pronotum covered with dense erect setae; often with very dense irregular confluent punctuation; sometimes punctures are not so dense, with several wide shining interspaces.

Elytra with well-developed costae, sometimes rounded apically (one of Shiraz specimens), or usually with a more or less distinct small internal apical angle, or with apical spines (specimen from Persepolis).

**Distribution.** - SW. Iran, south half of Zagros Mountains from about Esfahan level to Shiraz. Known localities are: between Esfahan and Susa (type locality), Shiraz environs (Villiers, 1967) and author’s collection; Kakan near Shiraz, 2300 m (Villiers, 1967), Persepolis (Heyrovsky, 1939), Feschar (Fuchs, 1956) [near Persepolis, according to personal communication of M. Rejzek], Buyer Ahmad in 20 km southwards Yasug [about 150 km NW Shiraz] (author’s collection).

**Bionomy.** - Imagoes are active in June-July (Fuchs, 1956; Villiers, 1967).

**Materials.** - 1 male, with two labels: « Persepolis, VIII : 28 : 34 Persia » and « Prionus (Polyarthron) semenowi » Lamere DET.-E.F.GILMOUR (British Museum of Natural History); 3 males, « Shiraz, 15-25.6.1953, Kakhkuli », author’s collection; 6 males, « Iran, Mt. Zagros, Buyer Ahmad, 20 km S Yasug (about 150 km NW Shiraz), 7.6.2000 Thomas Hacz leg. », author’s collection.
Remarks. - I preliminary accept the synonymy by Villiers (1961) : Polyarthron minutum Pic, 1905 = Prionus obenbergeri Heyrovsky, 1939 = Prionus loeffleri Fuchs, 1956. All three populations, represented in my material show small, but distinct differences, so it seems to be evident that the species consists of geographically distinct forms. Further investigations may demonstrate subspecies or even species status for some of them.

P. minutum is close to P. semenowi, but not one of the specimens of P. minutum seen has the glabrous and shining pronotum and scutellum, or narrow antennal lamellae of P. semenowi, so for now I am not ready to regard P. semenowi as a form of P. minutum.

Large orange specimens of P. minutum are similar to P. bedeli, but P. bedeli is larger, from 26.5 mm to 35.5 mm, or according to A. Lameere (1912) from 22 mm; always pale-orange; the palpi are shorter, barely longer than mandibulae; 3\textsuperscript{rd} antennal segment is longer, about 1.3-1.5 times longer than 1\textsuperscript{st}, always simple, without triangular process; the entire antennal shape is totally different : long lamellae of middle segments are distinctly curved dorsally (externally) and always with more or less distinct dorsal (external) angles.

The geographical areas of occurrence of the two species are widely separated.

3. Pogonarthron semenowi (Lameere, 1912) (Fig. 7)

Prionus semenowi Lameere, 1912 : 224 (« Bagdad »); 1913 : 75.
Pogonarthron semenowi, Danilevsky, 1999 : 189.

Type locality. - Iraq, Bagdad environs, according to the original description.

Diagnosis. - Body length in male : 20.7 mm (according to the original description - 19 mm, but now head and thorax of the holotype look to be moved anteriorly); body width : 7 mm.

Male (only one male-holotype in bad condition known, females unknown) : body small; pale, orange-yellow; about 2.8 times longer than wide.

Head with very long palpi, about two times longer than mandibulae; apical segments triangular, strongly widened apically, axe-like.

Antennae are broken in unique known specimen (only 5 basal segments are represented); according to the original description, with 24 segments; 3\textsuperscript{rd} segment relatively short about as long a 1\textsuperscript{st}, angulated apically; 4\textsuperscript{th} segment with a short, sharp, narrow lamella, which is narrower and sharper, than in most known to me P. minutum, but similar to 4\textsuperscript{th} segment of the specimen from Persepolis; 5\textsuperscript{th} segment with longer lamella.

Prothorax large, about 1,6 times narrower than elytral base; relatively narrow, basal width about 1,6 times more than length (while in P. minutum this
ranges from 1.8 to 2.2), wider anteriorly than posteriorly (in *P. minutum* wider posteriorly than anteriorly, or about equal in width); with one pair of central lateral spines, which are moderately long. Pronotum relatively smooth, shining, covered with sparse erect setae; punctation sparser than in any known specimen of *P. minutum*; posterior pronotal margin in the middle without punctuation, a condition which does not occur in *P. minutum*.

Scutellum relatively small, smooth, shining, nearly without punctuation (in *P. minutum* it can be somewhat pubescent, sometimes densely punctured, but never glabrous and smooth).

Elytra with well-developed costae, without apical spines, with the apical angle barely pronounced.

Because the holotype is now heavily damaged, I have repeated herein the original description.

*Original description.* - « Long de 19 millimètres, d’un jaune testacé, rougeâtre sur la tête, le prothorax et les appendices, l’extrémité des mandibules noire. Il me paraît être au *P. minutus* ce que *P. bedeli* est au *P. tschitscherini*, et il défère du précédent, outre par sa coloration, par :

- 1. Des antenne de 24 articles, avec le 24ème article non appendiculé; le 3ème article est plus grêle, plus court, pas plus long que le 1er, son processus étant réduit à une dent terminale, bien moins développée que le processus du 3ème article du *P. minutus*; le processus du 4ème article est de même dimension que chez *P. minutus*, mais il est moins large, de même que les lamelle des articles suivants qui sont nettement plus étroites, plus grêles et moins serrées, les articles de l’antenne étant moins courts;

- 2. Des yeux un peu plus gros.
- 4. Un pronotum moins densément ponctué.
- 5. Un écuusson moins large, moins ponctué.
- 6. Des élytres moins rétrécies en arrière. »

*Distribution.* - Iraq, Bagdad environs (type locality).


*Remark.* - I preliminary regard *P. semenowi*, as a species, because of rather narrow lamellae of antennal segments, anteriorly enlarged smooth nearly glabrous pronotum, and smooth glabrous scutellum. Still, some specimens of *P. minutum* are rather close in corresponding characters to *P. semenowi*. The range of variability of *P. semenowi* is totally unknown at this time, and new materials may show that it is only a form of *P. minutum*.
4. *Pogonarthron tschitscherini* (Semenov, 1889) (Figs. 8-10)

*Pogonarthron tschitscherini* Semenov, 1889 : 225 (« Turkestan: Osch (?) »); Pic, 1898 : 34.


*Prionus tschitscherini*, Lamere, 1912 : 220; 1913 : 75.


*Pogonarthron tschitscherini*, Danilevsky, 1999 : 189.

**Type locality**: Kirgizia, Osh environs.

The definition of the type locality must be regarded as preliminary. In the original description, based on a single specimen from Obert’s collection, the type locality was mentioned with question mark as « Turkestan : Osch ? ». Later (Semenov, 1903) it was definitely recorded as « as Osh of Fergana Region », but with the reference to the original Obert’s data. I have not seen other specimens from « Osh environs ».

**Diagnosis.** - Body length : 17-18.5 mm, body width : 7-7.5 mm. According to A. Semenov (1903), the minimal length of body can be 13.5 mm with width 6 mm, but I do not know such specimens.

Males (females unknown) : body small, pale, orange-yellow, or brown, or dark-brown, nearly black.

Head with moderately long palpi, distinctly longer than mandibulae; apical segments elongated, a little widened apically.

Antennae with 20-24 segments, reaching apical elytral fourth; 3rd segment strongly elongated, from 1.5 to 1.7 times longer than 1st, with more or less distinct apical angle, which can be totally obliterated; 4th segment with a short apical lamellae; 5th segment with a longer lamella; long lamellae of middle segments relatively straight or slightly curved dorsally, but lamellae bases without dorsal (external) angles; apical segment in form of a narrow lamella or bilobed.

Prothorax with one pair of short central lateral spines, which sometimes can be nearly absent. Pronotum covered with dense erect setae; usually with very dense irregular confluent punctuation; sometimes punctures are not so dense, with several wide shining interspaces.

Elytra with very small internal apical angle, sometimes lacking.

**Distribution.** - South-west Kirgizia and probably Fergana Valley of Uzbekistan. The species is definitely distributed along west part of Naryn River Valley and in foothills north-eastwards Fergana Valley (Tash-Kumyr environs – own materials). The occurrence of the species in putative type locality (Osh environs) needs confirmation.
The record for « Alexandrovsky Ridge [now Kirgizsky Ridge], Dogus-Tau » by A. Semenov (1903), partly repeated by N. N. Plavilstshikov (1936), was regarded as doubtful by the former author; Semenov could not localize « Dogus-tau » and supposed that the record was connected with Donguz-tau Mountains to the southwest from Son-Kul Lake or with Togus-torau, which was nearby.

N. N. Plavilstshikov (1936) also recorded « Torus-tiube » in Naryn Valley and « Dogut-tau ».

The record for « N Margelan » by A. Semenov (1903) was ignored by Plavilstshikov (1936); it could be connected with Uzbekistan part of Fergana Valley.

**Materials.** - 3 males, Kirgizia, Naryn River Valley, Tash-Kumyr environs, 700 m, 12-26.7.1991, M.Danilevsky leg.; 1 male, same locality, 10.7.1997, A.Klimenko leg. – all in author’s collection.

**Remarks.** - Similar to *P. bedeli* and *P. minutum* by structure of antennal segments: each with a single lamella, but long lamellae of middle segment relatively straight, without basal angles; apical palpi segments elongated, not axe-like; prothorax with very small lateral spine, sometimes absent.

The area of *P. minutum* (SW. Iran) is very far from the area of *P. tschitscherini*; *P. bedeli* (W Tadzhikistan) is also absent in Kirgizia or near Fergana Valley.

**5. Pogonarthron petrovi, sp. n.** (Fig. 11)

*Type locality:* Tadzhikistan, Babatag Ridge, 15 km SW. Gissar, Dzhartepe.

*Description.* - Body length: 16.3-19.8 mm, body width: 5.3-7.8 mm.

Males (females unknown): body small, pale, orange-yellow; dark specimens unknown.

Head with moderately long palpi, distinctly longer than mandibulae; apical segments elongated, a little widened apically.

Antennae with 23-26 segments, reaching apical elytral fourth; 3rd segment elongated, from 1.2 to 1.5 times longer than 1st, with long triangular apical process; 4th segment with a short apical lamellae; 5th segment with a longer lamella; long lamellae of middle segments slightly curved dorsally, but lamellae bases without dorsal (external) angles; apical segment in form of a narrow lamella or bilobed.

Prothorax with one pair of short central lateral tubercles, which sometimes totally absent. Pronotum covered with dense erect setae; with very dense, irregular, confluent punctuation.

Elytra with very small internal apical angle, which sometimes can be entirely lacking.

*Distribution.* - W. Tadzhikistan, north part of Babatag Ridge near Gissar-city.
Typical material. - 1 male, HOLOTYPE, Tadzhikistan, Babatag Ridge, 15 km SW Gissar, Dzhartepe, 600 m, 25-27.6.2003 – author’s collection and 9 PARATYPES; 1 male with same label – author’s collection; 5 males with same label – collection of A. Petrov (Moscow, Russia); 1 male with same label – collection of Ziro Komiya (Tokyo, Japan); 1 male from same locality, 9.6.2001, A. Petrov leg. - collection of A. Petrov (Moscow, Russia); 1 male, Tadzhikistan, Gissar environs, 7.1974, R. Danov leg. – author’s collection.

Remark. - Very close to P. tschitscherini, but not dark-colored; 1st antennal segment with long apical process, while P. tschitscherini has only a short angle, which may be lacking altogether; long antennal lamellae distinctly curved dorsally (externally).

P. tschitscherini is not known from Tadzhikistan, but P. bedeli was collected in same locality as P. petrovi sp.n.

Derivatio nominis. - The new species is dedicated to Moscow entomologist Alexander Petrov, who discovered its type locality.

6. Pogonarthron semenovianum (Plavilstshikov, 1936) (Fig. 12)


Pogonarthron semenovianus, Danilevsky, 1999 : 189.

Type locality: Tadzhikistan, Kuliab Region, according to the original description.

Diagnosis. - Body length: 29.5-34 mm, body width: 11.5-13 mm. According to N. N. Plavilstshikov (1936), the minimum length can be 26 mm.

Males (females unknown): body large, pale, orange-yellow; dark specimens unknown.

Head with moderately long palpi, distinctly longer than mandibulae; apical segments triangular, strongly widened apically, axe-like.

Antennae with 22-25 segments, barely surpassing middle of elytra; 3rd segment strongly elongated, from 1.5 to 1.6 times longer than 1st; with a small apical angle, which can be nearly indistinct; 4th segment with a little longer apical angle; 5th segment with short triangular apical process bearing a distinct dorsal angle at base; 6th segment with a short bilobed lamella, dorsal lobe about two times shorter than ventral; middle segments with long narrow bilobed lamellae, dorsal lamellae shorter than ventral; apical segment anomalous, appearing to be the fusion of several independent segments (from 3 to 4) bearing from two to three short bilobed lamellae with an elongated lamella at apex.
Prothorax with one pair of small central lateral spines; which can be reduced to small indistinct tubercles or totally absent. Pronotum covered with dense erect setae; with very dense irregular confluent punctuation. Elytra usually with distinct internal apical angle, which sometimes can be nearly absent.

**Distribution.** - Tadzhikistan, Kuliab Region. Known localities are: «Cheshme-Govan» (Plavilstshikov, 1936), Khodzha-Galton about 25 km SEE Kuliab and in about 10 km from Afghan border (Plavilstshikov, 1936), Sary-Chashma about 20 km southwards Kuliab (own materials). The species is undoubtedly distributed in neighbor areas of Afghanistan.

**Bionomy.** - My males were attracted by light in dry hilly steppe landscape near Sary-Chashma in the beginning of August. According to N. N. Plavilstshikov (1936), imagoes are also active at the end of July.

**Materials.** - 4 males, Tadzhikistan, Kuliab Region, Sary-Chashma, 1000 m, 2-8.8.1984, M. Danilevsky leg. – all in author’s collection.

**Remark.** - The species is not close to any other *Pogonarthron*, because of bilobed antennal segments.

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**References**


Pic (M.), 1898. Essais synoptiques sur plusieurs genres de la faune d'Europe et Circa. Polyarthron Serv. - Matériaux pour servir à l'étude des Longicornes, 2 : 27-35.


SEMENOV (A.), 1903. - [Note on poorly known Polyarthron (Pogonarthron) tschitscherini Sem. (Coleoptera, Cerambycidae). - Revue Russe d'Entomologie, 3 : 203-204.][in Russian]


Note de l'auteur : tout nouveau nom ou acte nomenclatural inclus dans ce travail, édité selon un procédé permettant d'obtenir de nombreuses copies identiques, est destiné à une utilisation permanente, publique et scientifique.

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