Pseudoscorpions from Middle Asia, Part 3
(Arachnida: Pseudoscorpionidae)

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With 38 figures

Summary

This third contribution to the pseudoscorpion fauna of Middle Asia treats the families Cheiridiidae and Atemnidae (5 species). Besides, additional materials from the families Neobiidiidae, Olpiidae and Garypidae are listed. *Diplotemnus egregius* Beier, *Apocheiridium ferum* (Simon) and *A. rossicum* Redikorzev are recorded from Middle Asia for the first time. The following new synonymies are proposed: *Apocheiridium nepalense* Ćurčić with *Apocheiridium rossicum* Redikorzev; *Diplotemnus afghanicus* Beier, *D. lindbergi* Beier, *D. ophthalmicus* Redikorzev and *D. persicus* (Redikorzev) with *Diplotemnus insolitus* Chamberlin.

Zusammenfassung


Резюме

1. Introduction

The present paper is the third contribution to a revision of the Middle Asian pseudoscorpion fauna, being primarily restricted to the families Cheiridiidae and Atemnidae. Besides, we have at our disposal some material of the families Neobisiidae, Olpiidae and Garypidae, which are presented herein as an addendum.

In this paper we try to decide some problems within the genus Diplotemnus. In particular both type and non-type materials of ophthalmicus, persicus (n. comb.) and pomerantzevi have been restudied, and new synonymies have been determined. Besides, the species insolitus Chamberlin from the Western Himalayas ought to be considered as the type-species of Diplotemnus.

Material

The present paper is based on material which was collected in various parts of Middle Asia (see map fig. 38) in 1985–1991 by Aliev, Dashdamirov, Deryugin, Fedorov, Ibraev, Kalabin, Kandybaev, Komarova, Ovtchinnikov, Tarabaev, Zonstein, Zorkin and Zyuzin. The samples have been shared between the collections of the Institute of Zoology in Baku (IZB), the Staatsliches Museum für Naturkunde Stuttgart (SMNS), the Biological Institute Novosibirsk (BIN) and the Senckenberg Museum Frankfurt/Main (SMF). Besides, the Redikorzev collection housed in the Zoological Institute of the Russian Academy of Sciences St. Petersburg (ZIP) has been revised by one of us (S. D.). In the text each locality is followed by the respective number put in square brackets and referring to the numbers in the map (fig. 38).

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2. The species

2.1. Apocheiridium ferum (Simon 1879) (figs. 1–2)


Description: Carapace with 4 setae on anterior and 17 setae on posterior margin. Tergal chaetotaxy 20-19-16-18-23-25-26-26-30-21-14. Galea bifid with one terminal and one subterminal branch. Pedipalp femur 3.86x, tibia 2.88x, chela with pedicel 3.8x, without pedicel 3.6x longer than broad. Movable finger with a single trichobothrium.

Measurements (in mm) of pedipalps: femur 0.27/0.07, tibia 0.23/0.08, chela with pedicel 0.38/0.10, length of hand with pedicel 0.19, length of fixed finger 0.19.

Remarks: This species differs from A. turcicum Beier 1967 by the size of the pedipalps. Thus turcicum has more plump palpal segments (tibia 2.4x, femur 3.2x, chela with pedicel 3.2x longer than broad) as compared to ferum (tibia 2.7–3.0x, femur 3.8–4.0x, chela 3.5–3.8x longer than broad). Prior to a complete revision of the Asian species assigned to this genus it is impossible to distinguish ferum satisfactorily from other described species.

Distribution: Apocheiridium ferum is widely distributed in Europe, this being the first record from Middle Asia.
Figs. 1–2. Apocheiridium ferum, ♂, from Babatag (IZB 230). – 1. Pedipalp, dorsal view; – 2. Tip of the cheliceral movable finger. – Scale line: 0.3 mm.

Figs. 3–6. Apocheiridium rossicum. – 3, 4. Pedipalp, dorsal view, ♂♂ from Chon-Uryuktu (IZB 231); – 5, 6. Tip of the cheliceral movable finger, ♀ from Arslanbob (IZB 232) (5), ♂ from Arslanbob (IZB 232) (6). – Scale line: 0.3 mm.

2.2. Apocheiridium rossicum Redikorzev 1935 (figs. 3–7)

Apocheiridium nepalense Ćurčić 1980 n. syn.


Description: Carapace 0.79x (♂) and 0.85x (♀) longer than broad. Tergal chaetotaxy 25-30-28-34-37-39-40-38-37-33-16. Galea bifid (♂) or with 3 distal branches (♀). Pedipalp femur 4.75–5.13x (♂) or 3.5x (♀), tibia 3.63–3.67x (♂) or 3.38x (♀), chela with pedicel 4.23–4.30x (♂) or 3.91 (♀), chela without pedicel 4.00–4.10x (♂) or 3.73x (♀), hand with pedicel 2.08–2.20x (♂) or 2.09x (♀) longer than broad.

Measurements (in mm) of pedipalps, ♂ (♀): femur 0.32–0.41/0.07–0.08 (0.35/0.10), tibia 0.29–0.33/0.08–0.09 (0.27/0.08), chela with pedicel 0.43–0.55/0.10–0.13 (0.43/0.11), length of hand with pedicel 0.22–0.27 (0.23), length of finger 0.21–0.29 (0.21).

Remarks: Although no type material of Apocheiridium nepalense has been examined, it is doubtless conspecific with rossicum. The measurements and ratios of
Fig. 7. *Apocheiridium rossicum*, body in dorsal view, ♂ from Arslanbob (IZB 232). — Scale line: 0.5 mm.
the pedipalp segments given by Ćurčić (1980) fully fit in the variation range of rossicum, furthermore, newly collected material in the Himalayas by one of us (W. S.) shows no differences with Middle Asian records.

Distribution: This species has a wide Palaeartic distribution from Estonia in the west to the Siberian Far East and reaching southward to the Himalayas.

2.3. *Atemnus politus* (Simon 1878)


2.4. *Diplotemnus egregius* Beier 1959 (figs. 8—11)


Description of ♂ from Gandzhina: Pedipalps dark red, carapace slightly red-brown, tergites and legs lighter yellow-brown. Surface of carapace and pedipalps regularly granulate. Carapace 1.26x longer than broad, with 4 setae on anterior margin and 7 setae on posterior margin; two furrows on carapace present, posterior furrow closer to posterior margin than to anterior furrow; 2 eyes present. Chelicera with 5 setae on palm, b, sb and es finely denticulate, movable finger only with 1 simple seta; serrula exterior consisting of 24 lamellae; flagellum consisting of 4 blades, anterior one with several spinules on anterior face, other blades simple. Gape only with 2 tiny terminal branches (about 6 branches in ♀♀). Tergal chaetotaxy 7—8—6—9—10—10—10—9—8 (4 tactile ones) -8 (4 tactile ones.). Sternal chaetotaxy x-17—10—11—9—8—9—9—9—8 (4 longer ones). Genital opercula as in fig. 8 (spermatheca of ♀ as in fig. 11). Pedipalp trochanter 2.0x, femur 4.03x, tibia 2.96x, chela with pedicel

3.49x and chelal palm with pedicel 2.37x longer than broad. Fixed and movable finger with 31 marginal teeth each. Venom apparatus present in fixed finger, nodus ramosus close to it. Leg IV with a single tactile seta medially on tarsus, TS = 0.54.

Measurements (in mm), ♂: body length 4.19, carapace 1.36/1.08, pedipalp trochanter 0.72/0.36, femur 1.45/0.36, tibia 1.45/0.49, chela with pedicel 2.06/0.59, chela length without pedicel 1.97, length of movable finger 0.77, length of chelal palm with pedicel 1.40.

Remarks: This species is characterized by its large size unique within the genus *Diplotemnus*, especially in ♀♀ reaching 7.0 mm. The shape of the female spermatheca seems to be also diagnostic; it consists of 4 terminally expanded sacs with many cribriform plates (fig. 11). Such large spermathecae are the first to be recorded in *Diplotemnus*, however, the genitalia of most congeners have not been described. *Diplotemnus egregius* is closely related to *insolitus* Chamberlin 1933 according to the spermathecal structure (compare figs. 11 & 13), but it can easily be distinguished by the body size.
Distribution: *Diplotemnus egregious* has hitherto been reported only by a single female from Afghanistan (Beier 1959), this being the first record from Middle Asia. All specimens were collected under stones on dry slopes.

2.5. *Diplotemnus insolitus* Chamberlin 1933 (figs. 12–33, 36–37)

*Diplotemnus afghanicus* Beier 1959, n. syn.

*Diplotemnus lindbergi* Beier 1960, n. syn.

*Diplotemnus ophthalminus* Redikorzev 1949, n. syn.

*Diplotemnus persicus* (Redikorzev 1934) n. comb. and n. syn.

*Diplotemnus insolitus sinensis* (Schenk 1953) n. comb.


Remarks: The present large series from Middle Asia, coupled with museum material including types from adjacent regions, make it possible to provide some generalizations, which are of significance for the systematics of the genus *Diplotemnus*.

It is necessary to mention that many authors (including ourselves) made a mistake in determining these specimens as *Diplotemnus piger* (Simon 1878) (Beier 1971, Werner 1971, Schawaller & Dashdamirov 1988, Schawaller 1989, Dashdamirov 1991) having overlooked a paper by Vachon (1970) in which he shows that the type of *Chelifer piger* Simon 1878 actually represents *Withius subruber* (Simon 1879). Thus, the valid name is now *Withius piger* (Simon 1878). Vachon (1970) provided a new name, *Diplotemnus beieri* Vachon 1970, for the species that previously has been misidentified as *Diplotemnus piger*. 
Schawaller (1985, 1989) has shown that *Diplotemnus milleri* Krumpal 1983, *D. ophthalmicus* Redikorzev 1949, *D. pomerantzevi* Redikorzev 1949 and *D. tura- nicus* Krumpal 1983 are all synonyms of „*Diplotemnus piger*“. Also, Dashdamirov (1991) has shown that *Withius persicus* (Redikorzev 1934) is a synonym of „*Diplotemnus piger*“. For that time, *Diplotemnus persicus* (Redikorzev 1934) has become the oldest available name for the species in question.

However, after the present materials from Middle Asia have been studied, variability of some morphological structures has become apparent. This concerns mainly the size and proportions of the pedipalps with gradual transitions between the extreme values of these characters (compare figs. 16—33). We also include into this row the original drawings (copied to an approximate scale) of *afghanicus* (Beier 1959: fig. 14), *lindbergi* (Beier 1960: fig. 1) and also *insolitus* (Chamberlin 1933: fig. 1), which also nicely fit in the variation range of the above characters. In other words, we face only one single species involved: *Diplotemnus insolitus* Chamberlin 1933, which was described from the northwestern Himalayas „probably in or near Kabul or Lahore“. Earlier, one of us (W. S.) has already supposed that all *Diplotemnus* species from Middle Asia and Afghanistan are probably one single bio-
Figs. 21–26. *Diplotenmus insolitus*, ♂♂, pedipalps in dorsal view. – 21. From Sibeston (IZB 236); – 22. From Borolday (IZB 167); – 23. From Chon-Aryk (IZB 196); – 24. From Karabuge (IZB 238); – 25. From Afghanistan, holotype of *afghanicus*, copy from BEIER 1959: fig. 14; – 26. From Western Himalayas, holotype of *insolitus*, reverse copy of CHAMBERLIN 1933: fig. 1. – Scale line: 1.0 mm.
Figs. 27–33. *Diplotemnus insolitus*, ♀♀, pedipalps in dorsal view. – 27. From Sibeston (IZB 235); – 28. From Chulak-Kurgan (IZB 239); – 29. From Vannovka (IZB 233); – 30. From Borolday (IZB 167); – 31. From Sibeston (IZB 236); – 32. From Aksak-Ata (IZB 198); – 33. From Kandybay (IZB 240). – Scale line: 1.0 mm.
species (Schawaller 1985). We do not discuss here any subspecific separation, thus we have to establish a new combination: Diplothemnus ophthalmicus sinensis (Schenkel 1953) = Diplothemnus insolitus sinensis (Schenkel 1953).

In the case of Diplothemnus lindbergi, Beier (1960) utilized tergal chaetotaxy to separate this species from other congeners. We have examined abundant material, including some types, and disagree with his conclusion. Tergal chaetotaxy is more variable than he stated, even within the same population (from 3 to 8 setae on each semitergite).

The scattergram (fig. 36) shows the distribution of 52 individuals in relation to the length and width of the pedipalp chela. The ratios of some insolitus Chamberlin 1933, pieperi Helversen 1965 (from Selvagens Islands) and vachoni Dumitresco &
Orghidan 1960 (from Romania) are indicated as given in the literature. All ratios (excluding those of *egregius*) are situated near a single line, which points to a single species. The diagram leads to one of two conclusions: either the species *insolitus*, *pieperi* and *vachoni* are morphologically inseparable, or the used characters are no satisfactory for the separation of these forms. Although it is obvious from the following graph (fig. 37) that *pieperi* is nevertheless separate from *insolitus* (the limits of these species are given approximately), it is necessary to mention that the top part of the "*insolitus*"-group (fig. 37: B) is represented mainly by males, while *vachoni* is situated within this group (fig. 37: D).

The separation of these 3 species as given in the literature is based on the following characters: the ratio of femur length/width, tibia length/width and chela length/width; number of blades of the serrula exterior (21–24 in *insolitus*, 24 in *pieperi*, 22–25 in *vachoni*); size and shape of the galea; chaetotaxy of the carapace, especially near the eyes. It thus becomes clear that a separation by these characters is not satisfactory. Eventually we face a transition field between geographical subspecies and
fully established biospecies, where *vachoni* is probably a synonym of *insolitus* whereas *pieperi* is a morphologically somewhat different insular population.

Teratology: A single female from Vannovka (IZB 233) is characterized by its surprising teratology (figs. 14—15). The eye-like protuberance on the dorsal side of the palpal tibia seems to be unique and cannot be compared with similar structures in other pseudoscorpions.

Distribution: The species is widespread in the Palaearctic region, ranging from Algeria in the west to China and the Himalayas in the east. All specimens have been collected under stones.

### 3. Addendum

Since our former parts on pseudoscorpions from Middle Asia, dealing with the families Chthoniidae, Neobisiidae, Olpiidae and Garypidae, new material came to our disposal which is accumulated herein as an addendum.

#### 3.1. *Minniza* sp. (figs. 34—35)


Remarks: This single female is very similar to *desertica* Simon 1885 by its size and the shape of the pedipalpal segments (femur 0.63/0.18 mm, 3.5x longer than broad; tibia 0.58/0.23 mm, 2.52x; chela 1.13/0.30 mm, 3.77x), and to *vermis* Simon 1881 by its tarsal chaetotaxy of the leg IV (fig. 35). This female is distinguished from both *desertica* and *vermis* by the presence of granulation on the anterior part of the carapace and by granulation turning on the medial side of the chelal hand into tubercles (fig. 34).

#### 3.2. *Bisetocreagris nuratiensis* Dashdamirov & Schawaller 1991

Material: Kazakhstan, Alma-Ata Area (Semiretchie), Kopa River [33], fir forest in litter, 7. X. 1932 leg. SHNITNIKOV, 3 ♂♂, 2 ♀♀ (ZIP 1151), 1 ♀ (ZIP 1152).

Remarks: This old material was determined by REDIKORZEV (1949) as *Olpium pal-lipes* Lucas 1845.

#### 3.3. *Calocheridius centralis* (Beier 1952)


#### 3.4. *Olpium* (?)*lindbergi* Beier 1959

Material: Kazakhstan, Djambul Area, Mayunkumsky Distr., road between Mirnyi and Khantau at km 61 [32], 9. VI. 1990 leg. FEDOROV & ZYUZIN, 1 ♂, 1 ♀ (IZB 266), 1 ♀ (SMNS 3217).

#### 3.5. *Geogarypus continentalis* (Redikorzev 1934)


4. References


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