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New data on lithobiomorph centipedes (Chilopoda: Lithobiomorpa: Anopsobiidae, Henicopidae, Lithobiidae) from Kazakhstan

Новые данные о многоножках-костянках (Chilopoda: Lithobiomorpha: Anopsobiidae, Henicopidae, Lithobiidae) Республики Казахстан

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KEY WORDS: Lithobiomorpha, Anopsobiidae, Henicopidae, Lithobiidae, faunistics, new records, Kazakhstan.

КЛЮЧЕВЫЕ СЛОВА: Lithobiomorpha, Anopsobiidae, Henicopidae, Lithobiidae, фаунистика, новые находки, Казахстан.

ABSTRACT. 11 species of lithobiomorph centipedes are recorded in Kazakhstan: *Dzhungaria gigantea* Farzalieva, Zalesskaja et Edgecombe, 2004, *Cermatobius kirgisicus* (Zalesskaja, 1972), *Australobius magnus* (Trotzina, 1894), *Disphaerobius loricatus* (Sseliwanoff, 1881), *Hessebius golovatchi* Farzalieva, 2017, *H. multicalcaratus* Folkmanová, 1958, *H. perelae* Zalesskaja, 1978, *H.* cf. *plumatus* Zalesskaja, 1978, *Lithobius* (*L.*) *forficatus* (Linnaeus, 1758), *L.* (*Monotarsobius*) *franciscorum* Dányi et Tuf, 2012, and *L.* (*M.*) *insolens* Dányi et Tuf, 2012. Three species are new to the Almaty Region: *D. loricatus*, *H.* cf. *plumatus* and *L. forficatus*. *L. forficatus* and the genus *Lithobius* Leach, 1814, as well as the family Lithobiidae and the order Lithobiomorpha, are also new to the fauna of Kyzylorda Region. Remarks are provided and the mouthparts are illustrated for some species encountered. All new records are mapped. A table showing the distribution of all lithobiomorph species in Kazakhstan is provided.

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РЕЗЮМЕ. 11 видов многоножек-костянок зарегистрированы в Казахстане: *Dzhungaria gigantea* Farzalieva, Zalesskaja et Edgecombe, 2004, *Cermatobius kirgisicus* (Zalesskaja, 1972), *Australobius magnus* (Trotzina, 1894), *Disphaerobius loricatus* (Sseliwanoff, 1881), *Hessebius golovatchi* Farzalieva, 2017, *H. multicalcaratus* Folkmanová, 1958, *H. perelae* Zalesskaja, 1978, *H.* cf. *plumatus* Zalesskaja, 1978, *Lithobius* (*L.*) *forficatus* (Linnaeus, 1758), *L.* (*Monotarsobius*) *franciscorum* Dányi et Tuf, 2012 и *L.* (*M.*) *insolens* Dányi et Tuf, 2012. Три вида: *D. loricatus*, *H.* cf. *plumatus* и *L. forficatus* впервые отмечены в Алматинской области. *L. forficatus*, род *Lithobius* Leach, 1814, семейство Lithobiidae и отряд Lithobiomorpha впервые отмечены в Кызылординской области. Для некоторых видов приведены примечания и проиллюстрированы ротовые придатки. Дана карта, иллюстрирующая новые находки в регионе. Приводится таблица с указанием распространения всех видов костянок в Казахстане.

Introduction

Knowledge of the lithobiomorph centipede fauna of Kazakhstan is extensive, but this huge territory is prospected very fragmentarily [Sseliwanoff, 1881; Attems, 1904; Lignau, 1929; Zalesskaja, 1978; Eason, 1997; Farzalieva *et al*., 2003, 2004, 2017; Farzalieva, 2006, 2017; Tuf, 2007, 2010; Vsevolodova-Perel, 2009; Bragina, 2012, 2016; Dányi, Tuf, 2012; Dyachkov *et al*., 2016; Dyachkov, 2017a; Dyachkov, Farzalieva, 2018]. To date, 34 species of lithobiomorph centipedes are known from Kazakhstan, mostly from the Almaty and East Kazakhstan regions.

Material and methods

This paper is based on the material collected in eastern and southern Kazakhstan in 2015– 2018 (Map). Specimens were taken by hand and preserved in 70% ethanol.

Specimens were photographed using an Olympus XC50 camera attached to an Olympus BX51 stereo microscope. Mouthparts, forcipules and legs were mounted in permanent preparations in euparal.

Map. Distribution of *Australobius magnus* (Trotzina, 1894) (asterisk), *Cermatobius kirgisicus* (Zalesskaja, 1972) (diamond), *Disphaerobius loricatus* (Sseliwanoff, 1881) (cross), *Dzhungaria gigantea* Farzalieva, Zalesskaja, Edgecombe, 2004 (square), *Hessebius multicalcaratus* Folkmanová, 1958 (six-pointed asterisk), *H. perelae* Zalesskaja, 1978 (triangle), *H.* cf. *plumatus* Zalesskaja, 1978 (crescent), *H. golovatchi* Farzalieva, 2017 (pentagon), *Lithobius* (*Monotarsobius*) *insolens* Dányi et Tuf, 2012 (three-pointed asterisk), *L.* (*M.*) *franciscorum* Dányi et Tuf, 2012 (circle) and *Lithobius forficatus* (Linnaeus, 1758) (trapeze) in Kazakhstan.

Карта. Распространение *Australobius magnus* (Trotzina, 1894) (пятиконечная звезда), *Cermatobius kirgisicus* (Zalesskaja, 1972) (ромб), *Disphaerobius loricatus* (Sseliwanoff, 1881) (крестик), *Dzhungaria gigantea* Farzalieva, Zalesskaja, Edgecombe, 2004 (четырехугольник), *Hessebius multicalcaratus* Folkmanová, 1958 (шестиконечная звезда), *H. perelae* Zalesskaja, 1978 (треугольник), *H.* cf. *plumatus* Zalesskaja, 1978 (полумесяц), *H. golovatchi* Farzalieva, 2017 (пятиугольник), *Lithobius* (*Monotarsobius*) *insolens* Dányi et Tuf, 2012 (трехконечная звездочка), *L.* (*M.*) *franciscorum* Dányi et Tuf, 2012 (круг) и *Lithobius forficatus* (Linnaeus, 1758) (трапеция) в Казахстане.

The material is shared between the collections of the Altai State University, Barnaul (ASU), the Zoological Museum of the Moscow State University, Moscow (ZMMU), the Perm State University, Perm (PSU).

The terminology for external anatomy follows that of Bonato *et al*. [2010]. Body length was measured from the anterior margin of the cephalic plate to the posterior end of the postpedal tergite. The following abbreviations are used in the text, table and maps: morphology: T, TT — tergite, tergites, D — dorsal, Tr — trochanter, P — prefemur, F — femur, Ti — tibia, Ts — tarsus; names of collectors: RD — R.Yu. Dudko, YD — Yu.V. Dyachkov, AF — A.A. Fomichev, GK — G.N. Kuftina, AEN — A.E. Nakonechniy, AN — A.E. Naydenov, EN — E.A. Nepaeva, VR — V.V. Rudoi, IT — I.I. Temreshev, RY — R.V. Yakovlev; countries: TU — Turkmenistan, UZ — Uzbekistan, KG — Kyrgyzstan; regions: AKM — Akmola, AKT — Aktobe, AT — Atyrau, AL — Almaty, EK — East Kazakhstan, KA — Karaganda, KO — Kostanay, KY — Kyzylorda, MA — Mangystau, NK — North Kazakhstan, PR — Pavlodar, SK — South Kazakhstan, WK — West Kazakhstan, JA — Jambyl Regions.

New records

Family ANOPSOBIIDAE Verhoeff, 1907

Genus *Dzhungaria* Farzalieva, Zalesskaja et Edgecombe, 2004

Dzhungaria gigantea Farzalieva, Zalesskaja et Edgecombe, 2004
Map.

Dzhungaria gigantea Farzalieva, Zalesskaja et Edgecombe, 2004: 223; Koch, Edgecombe, 2008: 4–19; Zapparoli, Edgecombe, 2011: 377; Shear, 2018: 280.

MATERIAL. **Almaty Region**, Dzungarian Alatau Mts: 1 ♂ (ASU No. 60), between Aksu and Krasnyi Yar rivers, stony steppe with shrub thickets, N45°06′00.13″, E79°34′59.93″, 1700–1800 m a.s.l., 22.VI.2016; 1 ♂, 1 ♀ (ASU No. 61), Burkhansartay Mt. Range, N44°34′00.18″, E79°57′00.09″, 3000 m a.s.l., 27.VI.2016; 1 ♀ (ASU No. 62), Ermenesay River Valley, stony meadow, N44° 44′00.13″, E79°19′00.58″, 2150 m a.s.l., 2.VII.2016; 1 ♂, 1 ♀ (ASU No. 63), same place, stony mountain tundra, N44°43′00.10″, E79°18′00.12″, 3000–3100 m a.s.l., 3.VII.2016; 1 ♂ (ASU No. 64), between Ermenesay and Koksay rivers, stony alpine meadow, N44°43′00.08″, E79°19′00.01″, 2900–3000 m a.s.l., 3.VII.2016, all AF.

DISTRIBUTION. This species is known only from the Dzungarian Alatau [Farzalieva *et al*., 2004] and has never been recorded above 1800 m a.s.l.

REMARKS. Body length 12–22 mm (*vs.* 13–15 mm in the original description); 33–43 antennomeres (*vs.* 30–38 in the original description).

COMMENTS. The existing opinions concerning the taxonomic position of this genus and species are varied [Farzalieva *et al*., 2004; Koch, Edgecombe, 2008; Zapparoli, Edgecombe, 2011; Bonato *et al*., 2016; Shear, 2018]. Farzalieva *et al*. [2004] and Zapparoli & Edgecombe [2011: 377] identified this genus as a member of Anopsobiidae, *vs.* Koch &

Figs 1–7. *Cermatobius kirgisicus* (Zalesskaja, 1972): 1 — clypeus and labrum, ventral view; 2 — maxillary complex, ventral view; 3 — mandible; 4 — leg 5, lateral view; 5 — ultimate legs of female, dorsal view; 6 — ocellus, lateral view; 7 — tergites 5–10, dorsal view. Scale: 1–3 — 0.25 mm, 4, 5, 7 — 1 mm, 6 — 0.5 mm.

Рис. 1–7. *Cermatobius kirgisicus* (Zalesskaja, 1972): 1 — клипеус и лабрум, вентрально; 2 — максиллярный комплекс, вентрально; 3 — мандибула; 4 — 5-я нога, латерально; 5 — последняя пара ног самки, дорсально; 6 — глазок, латерально; 7 — 5–10 тергиты, дорсально. Масштаб: 1–3 — 0,25 мм, 4, 5, 7 — 1 мм, 6 — 0,5 мм.

Edgecombe [2008] and Bonato *et al*. [2016] who consider this genus as a henicopid.

Family HENICOPIDAE Pocock, 1901

Genus *Cermatobius* Haase, 1885

Cermatobius kirgisicus (Zalesskaja, 1972)
Map, Figs 1–7.

Cermatobius kirgisicus (Zalesskaja, 1972): 608–611; 1978: 25–27; Eason, 1997: 120–121.

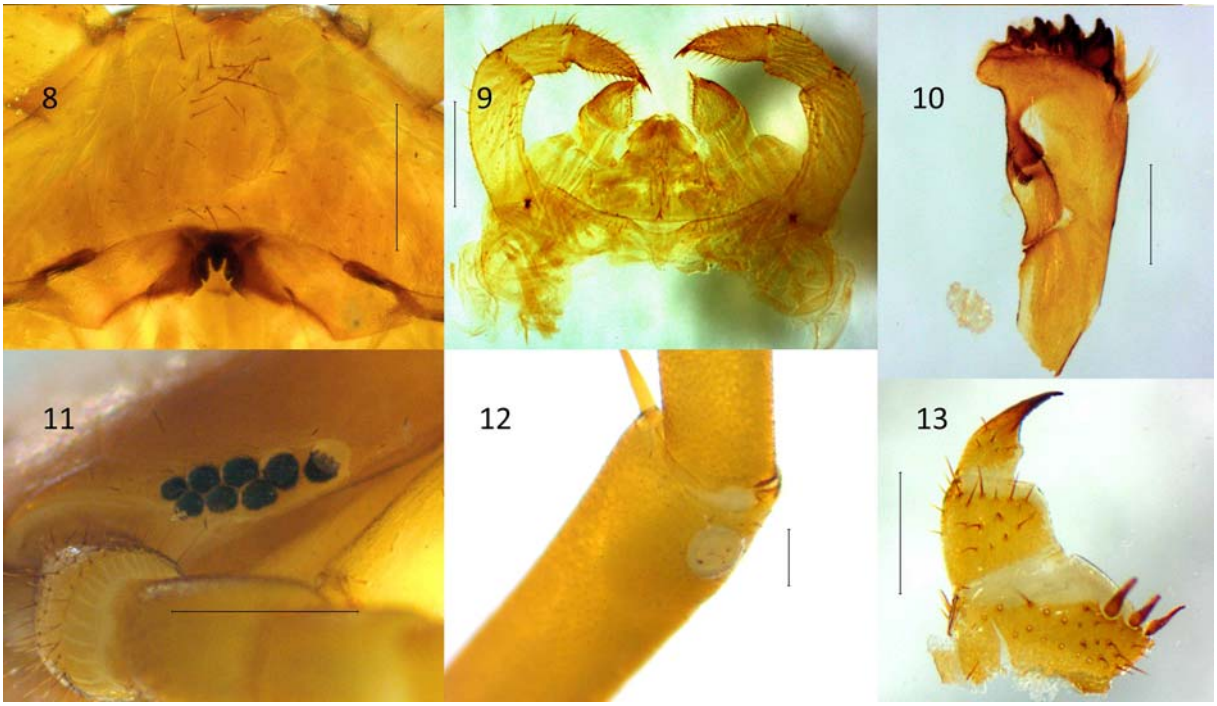
MATERIAL. **South Kazakhstan Region**, western Tian-Shan: 3 ♂♂, 5 ♀♀, 4 juv. (ASU No. 65), Ugamskiy Mt. Range, Sayram-Ugam National Park, Sazanata River Valley, *Betula*, N42°09′00.10″, E70°24′00.06″, 1845 m a.s.l., 19–20.V.2017; 3 ♂♂, 4 ♀♀, 8 juv. (ASU No. 66), same valley, N42°10′00.21″, E70°25′00.07″, ca 1955 m a.s.l., 3–6.VI.2017, all YD.

DISTRIBUTION. *C. kirgisicus* is known from Kazakhstan, Kyrgyzstan and Uzbekistan [Zalesskaja, 1978; Eason, 1997]. Kazakhstan: South Kazakhstan Region (western Tian-Shan: Aksu-Zhabagly Nature Reserve [Zalesskaja, 1978] and Sayram-Ugam National Park).

REMARKS. According to Zalesskaja [1972, 1978] and Eason [1997], this species has 41–71 antennal articles (53–75 in the studied specimens); 5+5–7+7 short coxosternal teeth, often unequal on either side, e.g. 7+8 (5+5–8+8 in the studied specimens); from 3+4 to 5+5–6+6 spurs of the female gonopods (4+4–5+5 in the above specimens). Ocellus, maxillary complex, mandible, clypeus and labrum, 5–10 TT, 5 leg and ultimate legs are as in Figs 1–7.

Family LITHOBIIDAE Newport, 1844

Genus *Australobius* Chamberlin, 1920



Figs 8–13. *Australobius magnus* (Trotzina, 1894): 8 — clypeus and labrum, ventral view; 9 — maxillary complex, ventral view; 10 — mandible; 11 — ocelli, lateral view; 12 — wart-shape process on male tibia 15, dorsal view; 13 — female gonopod, lateral view. Scale: 8, 9, 11 — 0.5 mm, 10, 13 — 0.25 mm, 12 — 0.12 mm.

Рис. 8–13. *Australobius magnus* (Trotzina, 1894): 8 — клипеус и лабрум, вентрально; 9 — максиллярный комплекс, вентрально; 10 — мандибула; 11 — глазки, латерально; 12 — бородавкоподобный вырост на 15-й голени самца, дорсально; 13 — гонопод самки, латерально. Масштаб: 8, 9, 11 — 0,5 мм, 10, 13 — 0,25 мм, 12 — 0,12 мм.

Australobius magnus (Trotzina, 1894)
Map, Figs 8–13.

Australobius magnus (Trotzina, 1894): 248; Zalesskaja, 1978: 142; Eason, 1989: 368; Eason, 1997: 120.

MATERIAL. 1 ♂ (ASU No. 58), **Jambyl Region**, Kyrgyz Ala-Too Mt. Range, Merke River Valley, near Esenkulsay River estuary, forest, N42°43′56″, E73°13′33″, 1180 m a.s.l., 15.VIII.2017, AF, YD; 2 ♂♂, 2 juv. (ASU No. 59), **Almaty Region**, Küngöy Ala-Too Mt. Range, near an unnamed tributary of Kolsay River, between Kolsay-1 and Kolsay-2 lakes, *Picea* forest, under stones, in moss, under dead wood, N42°57′36″, E78°18′45″, 1870 m a.s.l., 21–22.VIII.2017, YD; 1 ♂ (PSU), same Region, Uygur District, Kyrgyzsay village, mountain steppe, 12.VII.1978.

DISTRIBUTION. This species seems to be widespread in Central Asia: Kazakhstan, northern Tian-Shan (Almaty (Trans-Ili Alatau and Küngöy Ala-Too Mt. ranges) and Jambyl (Kyrgyz Ala-Too Mt. Range) regions), Tajikistan, Kyrgyzstan [Trotzina, 1894; Attems, 1904; Lignau, 1929; Zalesskaja, 1978; Eason, 1997; Dyachkov, 2017a]. In addition, it is known from China [Ma *et al*., 2014] and eastern Nepal [Eason, 1989, 1997]. The record from Georgia, Caucasus (Batumi) [Attems, 1907] is doubtful [Zalesskaja, 1978: 144].

REMARKS. Ocelli, clypeus, labrum, maxillary complex, mandible, a wart-shaped process on male 15Ti and female gonopod as in Figs 8–13.

Genus *Disphaerobius* Attems, 1926

Disphaerobius loricatus (Sseliwanoff, 1881)
Map, Figs 14–19.

Disphaerobius loricatus (Sseliwanoff, 1881): 16; Zalesskaja, 1978: 119; Farzalieva, Zalesskaja, 2003: 265–266; Farzalieva *et al*., 2017: 131–134.

MATERIAL. 1 ♀ (ASU No. 83), **East Kazakhstan Region**, Saur Mts, 20 km SEE Zaisan village, N47°22′00.20″, E85°09′00.22″, 1225–1250 m a.s.l., 20.VI.2018, RY, VR, AN; 1 ♂ (PSU), same Region, Kalkutty River Valley, 32 km NW Ayagoz City, salina near river, N48°10′, E80°04′, 770 m a.s.l., 15.IV.2016, AF, AN, RD; 1 juv. (PSU), **Almaty Region**, near Saykan station, sandy steppe, N46°26′, E80°41′, 400 m a.s.l., 15.IV.2016, AF, AEN, RD.

DISTRIBUTION. Known from Russia, Orenburg Region (Sol-Iletsk District) in the west to the East Kazakhstan Region in the east [Sseliwanoff, 1881; Zalesskaja, 1978; Farzalieva, Zalesskaja, 2003; Farzalieva *et al*., 2017]. In Kazakhstan: Aktobe, East Kazakhstan [Farzalieva *et al*., 2017] and Almaty regions.

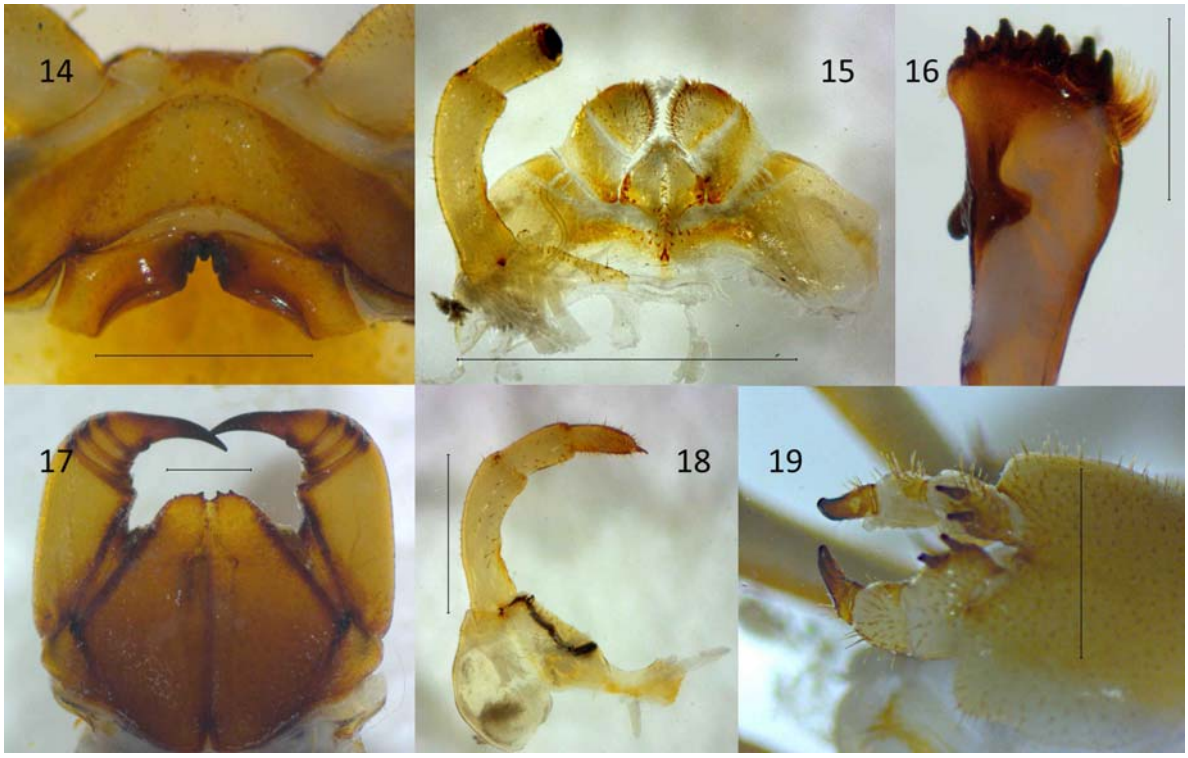
REMARKS. Based on the main characters, all above specimens belong to this species, but the sole female studied has the shoulders of the forcipular coxosternite sloping more strongly than illustrated by Farzalieva *et al*. [2017]. This species is new to the centipede list of the Almaty Region. Clypeus, labrum, maxillary complex, mandible, forcipules and female gonopods as in Figs 14–19.

Genus *Hessebius* Verhoeff, 1941

Hessebius golovatchi Farzalieva, 2017
Map, Figs 20–23.

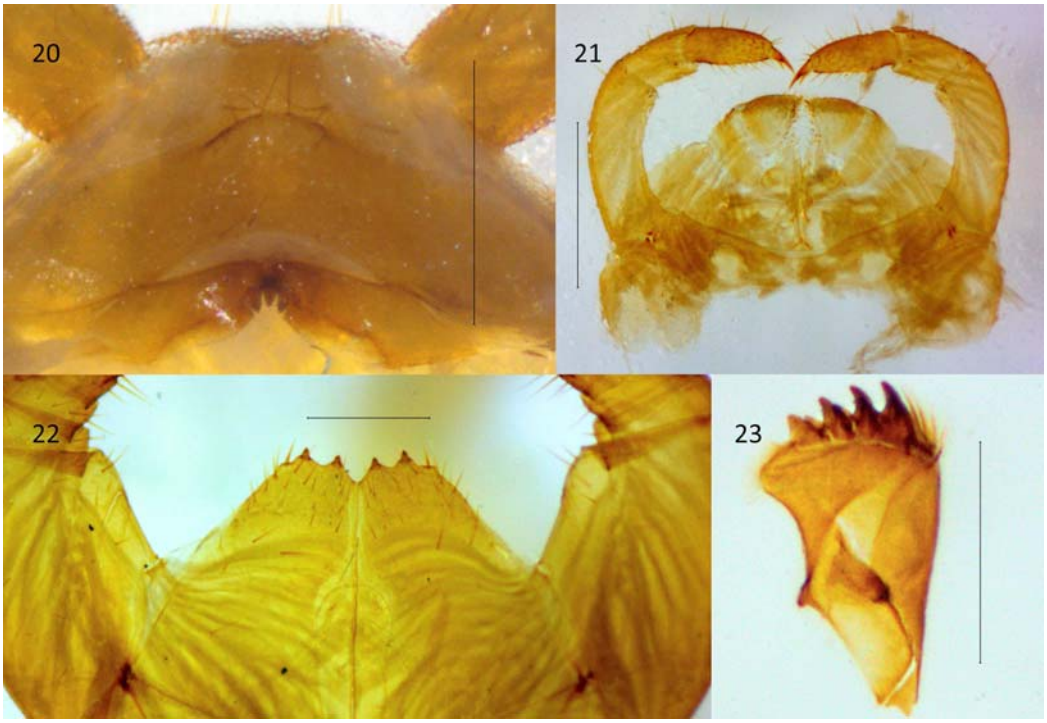
Hessebius golovatchi Farzalieva, 2017: 30–32.

MATERIAL. **Almaty Region**, Dzungarian Alatau Mts: 1 ♂ (ASU No. 45), Aksu River (near source of Akambay River), stony



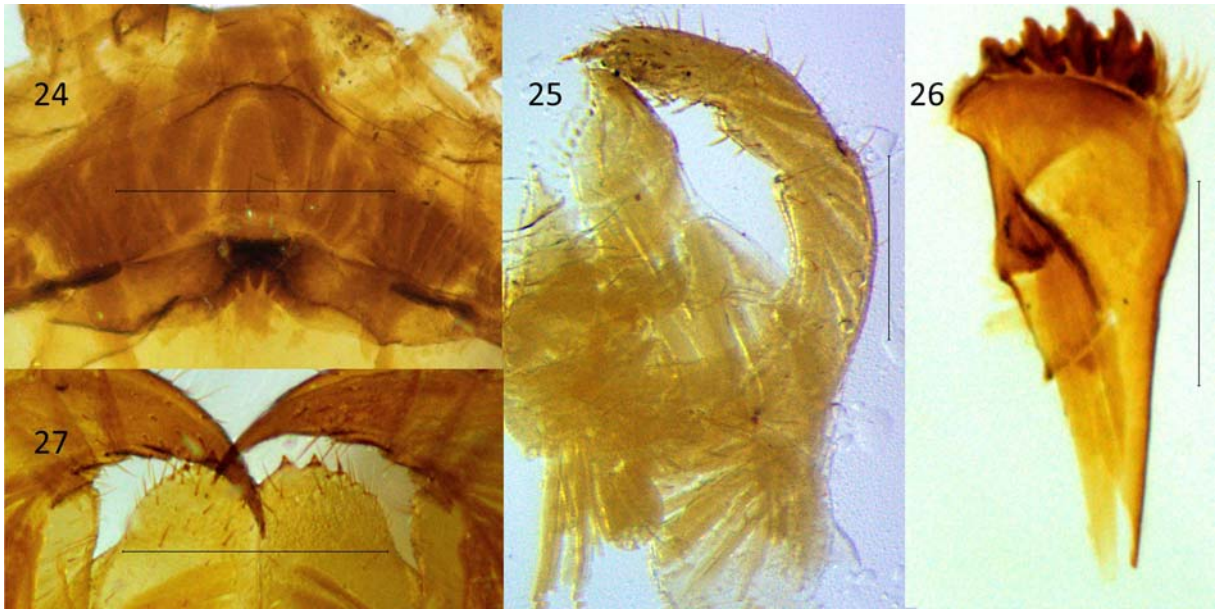
Figs 14–19. *Disphaerobius loricatus* (Sseliwanoff, 1881): 14 — clypeus and labrum, ventral view; 15 — first maxillae, ventral view; 16 — mandible; 17 — forcipules, ventral view; 18 — left part of second maxillae, dorsal view; 19 — female gonopods, ventrolateral view. Scale: 14, 15, 17–19 — 1 mm, 16 — 0.5 mm.

Рис. 14–19. *Disphaerobius loricatus* (Sseliwanoff, 1881): 14 — клипеус и лабрум, вентрально; 15 — первые максиллы, вентрально; 16 — мандибула; 17 — ногочелюсти, вентрально; 18 — левая часть вторых максилл, дорсально; 19 — гоноподы самки, вентролатерально. Масштаб: 14, 15, 17–19 — 1 мм, 16 — 0,5 мм.



Figs 20–23. *Hessebius golovatchi* Farzalieva, 2017: 20 — clypeus and labrum, ventral view; 21 — maxillary complex, ventral view; 22 — dental margin of forcipular coxosternite, ventral view; 23 — mandible. Scale: 20, 21 — 0.5 mm, 22, 23 — 0.25 mm.

Рис. 20–23. *Hessebius golovatchi* Farzalieva, 2017: 20 — клипеус и лабрум, вентрально; 21 — максиллярный комплекс, вентрально; 22 — зубной край коксостернита ногочелюсти, вентрально; 23 — мандибула. Масштаб: 20, 21 — 0,5 мм, 22, 23 — 0,25 мм.



Figs 24–27. *Hessebius multicalcaratus* Folkmanová, 1958: 24 — clypeus and labrum, ventral view; 25 — left part of maxillary complex, ventral view; 26 — mandible; 27 — dental margin of forcipular coxosternite, ventral view. Scale: 24, 27 — 0.5 mm, 25, 26 — 0.25 mm.

Рис. 24–27. *Hessebius multicalcaratus* Folkmanová, 1958: 24 — клипеус и лабрум, вентрально; 25 — левая часть максиллярного комплекса, вентрально; 26 — мандибула; 27 — зубной край коксостернита ногочелюсти, вентрально. Масштаб: 24, 27 — 0,5 мм, 25, 26 — 0,25 мм.

stream, N45°03′00.91″, E79°40′00.67″, 3000–3300 m a.s.l., 23.VI. 2016; 1 ♀ (ASU No. 44), between Ermenesay and Koksay rivers, stony mountain tundra, N44°43′00.10″, E79°18′00.02″, 3000–3100 m a.s.l., 3.VII.2016; 2 ♂♂, 3 ♀♀ (ASU No. 43), same place, stony alpine meadow, N44°43′00.16″, E79°19′00.35″, 2900–3000 m a.s.l., 3.VII.2016, all AF.

DISTRIBUTION. Dzungarian Alatau Mts [Farzalieva, 2017].

REMARKS. Most of the studied specimens have 20 antennal articles. Clypeus, labrum, maxillary complex, mandible, dental margin of forcilupar coxosternite as in Figs 20–23.

Hessebius multicalcaratus Folkmanová, 1958
Map, Figs 24–27.

Hessebius multicalcaratus Folkmanová, 1958: 186; Zalesskaja, 1978: 45–47; Vsevolodova-Perel, 2009: 138; Bragina, 2012: 141; 2016: 109; Kunah, 2013: 73; Zuev, Evsyukov, 2016: 418.

MATERIAL. **West Kazakhstan Region**, Zhanybek Research Station: 2 ♀♀ (ZMMU No. 7798), forest belt, soil sample No. 3, 13.V.1965; 1 ♂, 1 ♀ (ZMMU No. 7877), same place, soil sample Nos 1 and 6, 12–14.V.1965; 2 ♂♂, 1 ♀ (ZMMU No. 7879), same place, soil sample No. 31, 15.V.1966; 1 ♂, 2 ♀♀ (ZMMU No. 7880), same place, slope, soil sample Nos 4–5, 13.V.1965; 1 ♂ (ZMMU No. 7882), same place, depression, 15.V.1965; 1 ♂, 1 ♀, 1 fragm. (ZMMU No. 7878), same place, flat salina (aridisol), 6.V.1965; 1 ♀ (ZMMU No. 7883), same place, *Matricaria*, 1.V.1965, coll. unknown.

DISTRIBUTION. Russia (Volgograd and Rostov-on-Don regions), Ukraine (Dnepropetrovsk Region) [Zalesskaja, 1978, Zuev, Evsyukov, 2016]. Kazakhstan (West Kazakhstan and Kostanay regions) [Vsevolodova-Perel, 2009; Bragina, 2012, 2016].

REMARKS. According to Zalesskaja [1978], body length is 9–11 mm (*vs.* 9–21 mm in the above specimens); coxal pores 2–3 (*vs.* 2–5 in the studied specimens). P, F of 14 and 15 legs of male slightly dilated, 14P and 15P have small D sulci in the studied specimens (not mentioned by Folkmanová [1958] and Zalesskaja [1978] because of the lack of male material). Clypeus, labrum, maxillary complex, mandible and dental margin of forcipular coxosternite as in Figs 24–27.

Hessebius perelae Zalesskaja, 1978
Map, Figs 28–32.

Hessebius perelae Zalesskaja, 1978: 43–45.

MATERIAL. **South Kazakhstan Region**: 11 ♂♂, 12 ♀♀ (ASU No. 49), 10 km SW of Abay, Karatau Mt. Range, Karatau Nature Reserve, Kelinschektau Mts, steppe, under stones, N43°47′00.13″, E68°46′00.02″, 1029 m a.s.l., 6–7.V.2017; 2 ♂♂, 4 ♀♀ (ASU No. 47), same Region, 12 km E Terekty village, Karatau Mt. Range, Syrdarya-Turkestan State Regional Natural Park, Boralday River Valley, meadow, under stones, N42°51′00.56″, E69°51′00.29″, ca 530 m a.s.l., 14–15.V.2017; 8 ♂♂, 13 ♀♀ (ASU No. 48), same Region, western Tian-Shan Mts, Ugam Mt. Range, Sayram-Ugam National Park, 10 km NE of Tulkubas village, Iirsu River Valley, meadow, under stones, N42°24′00.03″, E70°21′00.11″, 1296 m a.s.l., 16–18.V.2017; 4 ♂♂, 1 ♀ (ASU No. 46), same Mt. Range, Sayram-Ugam National Park, Sazanata River Valley, steppe, N42° 10′00.10″, E70°25′00.20″, 2035 m a.s.l., 3–6.VI.2017, all YD.

DISTRIBUTION. South Kazakhstan Region: western Tian-Shan (Aksu-Zhabagly Nature Reserve) and Karatau Mts (Sayram-Ugam National Park [Zalesskaja, 1978], Karatau Nature Reserve, Syrdarya-Turkestan State Regional Natural Park).

REMARKS. The studied male specimens have 1-segmented gonopods with 6–10 setae (*vs.* 10–12 in the original description). Clypeus, labrum, maxillary complex, mandible, dental margin of forcipular coxosternite and Tr, P, F of ultimate legs of male as in Figs 28–32.

Figs 28–32. *Hessebius perelae* Zalesskaja, 1978: 28 — clypeus and labrum, ventral view; 29 — maxillary complex, ventral view; 30 — trochanter, prefemur and femur of male legs 15, dorsal view; 31 — dental margin of forcipular coxosternite, ventral view; 32 — mandible. Scale 0.5 mm.

Рис. 28–32. *Hessebius perelae* Zalesskaja, 1978: 28 — клипеус и лабрум, вентрально; 29 — максиллярный комплекс, вентрально; 30 — вертлуг, предбедро и бедро 15 ног самца, дорсально; 31 — зубной край коксостернита ногочелюсти, вентрально; 32 — мандибула. Масштаб 0,5 мм.

Hessebius cf. *plumatus* Zalesskaja, 1978
Map, Figs 33–42.

Hessebius plumatus Zalesskaja, 1978: 47; Bragina, 2012: 141; 2016: 109.

MATERIAL. **Almaty Region**: 1 ♀ (ASU No. 90), Küngöy Ala-Too Mt. Range, between Kolsay-1 and Kolsay-2 lakes, near source of an unnamed tributary of Kolsay River, mountain tundra with stones, N42°56′10″, E78°16′34″, 3110–3160 m a.s.l., 22.VIII.2017, AF.

DISTRIBUTION. *H. plumatus* is widespread in Central Asia: Kyrgyzstan (Jalal-Abad Region), Tajikistan (Districts of Republican Subordination and Khatlon Region) [Zalesskaja, 1978], Kazakhstan (Kostanay Region) [Bragina, 2012, 2016].

REMARKS. The above specimen is extremely close to *H. plumatus* Zalesskaja, 1978 by all of its main characters, but differs by 3+3 gonopodal spurs. This difference may reflect a deviation or variability. This species is new to the lithobiomorph centipede list of the Almaty Region. Habitus, dental margin of forcipular coxosternite, ocelli, coxal pores, gonopods and claw of 15Ts as in Figs 33–42.

Genus *Lithobius* Leach, 1814

Lithobius (*Lithobius*) *forficatus* (Linnaeus, 1758)
Map, Figs 43–47.

Lithobius (*Lithobius*) *forficatus* (Linnaeus, 1758): Zalesskaja, 1978: 69–71; Farzalieva, 2008: 41–42; Farzalieva et Esyunin, 2008: 926–929; Nefediev *et al*., 2016: 261–263; Zuev, 2016: 25; Zuev et Evsyukov, 2016: 418–419; Prado *et al*., 2018: 560–563.

MATERIAL. 3 ♂♂ (ASU No. 50), **East Kazakhstan Region**, Shemonaikha town, garden, N50°37′20.16″, E81°55′04.36″, 308 m a.s.l., 6.V.2017, VR; 2 ♀♀ (ASU No. 51), **Almaty Region**, Trans-Ili Alatau Mt. Range, Malaya Almatinka River Valley, Medeu, 21.VIII.2015, IT; 1 ♂ (ASU No. 52), same Mt. Range, Kazakchka River Valley, 15.V.2015, IT; 1 ♂ (ASU No. 53), same Mt. Range, Butakovka River Valley, 7.X.2016, IT; 1 ♀ (ASU No. 159), same Region, Almaty city, Rakhat District, 7.XI.2018, IT; 1 ♀ (ASU No. 160), **Kyzylorda Region**, vicinity of Abay village, paddy fields with *Oryza*, 26.III.2018, IT.

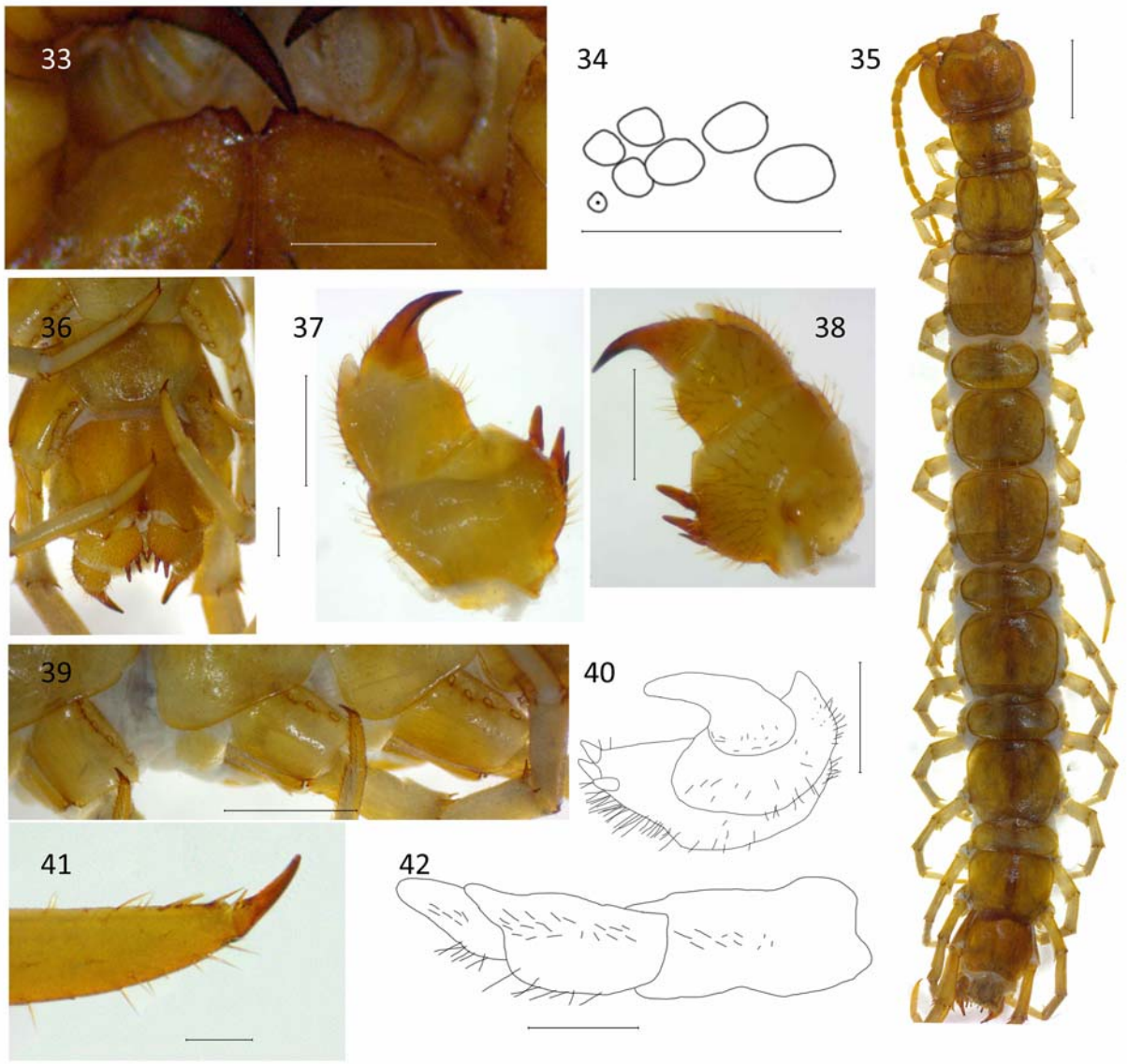
DISTRIBUTION. This species is widespread through human agency (North and South America, Greenland, Europe, western Siberia and Mongolia) [Zalesskaja, 1978; Farzalieva, 2008; Tuf *et al*., 2015; Nefediev *et al*., 2016; Zuev, Evsyukov, 2016; Prado *et al*., 2018]. In Kazakhstan: East Kazakhstan Region (Zyryanovsk City and Ulken-Naryn village) [Dyachkov *et al*., 2016], Almaty and Kyzylorda regions.

REMARKS. Clypeus, labrum, maxillary complex, mandible, dental margin of forcipular coxosternite and 11T as in Figs 43–47. This species is new to the lithobiid centipede list of the Almaty and Kyzylorda regions.

Lithobius (*Monotarsobius*) *franciscorum* Dányi et Tuf, 2012
Map, Figs 48–51.

Lithobius (*Monotarsobius*) *franciscorum* Dányi et Tuf, 2012: 16–28; Dyachkov, 2017b: 454; Nefediev *et al*., 2017a: 220–221.

MATERIAL. **East Kazakhstan Region**, Katonkaragay District: 1 ♀ (ASU No. 18), near Korobikha village, *Picea* forest, in dead wood, N49°27′32.4″, E085°03′14.5″, ca. 600 m a.s.l., 4.VII.2017, GK, EN; 1 ♀ (ASU No. 84), Listvyaga Mt. Range, near Aksharbak village, N49°32′01.40″, E085°32′01.51″, 1400 m a.s.l., 3–5.VII.2018, RY, VR, AN.



Figs 33–42. *Hessebius* cf. *plumatus* Zalesskaja, 1978: 33 — dental margin of forcipular coxosternite, ventral view; 34 — ocelli, lateral view; 35 — habitus, dorsal view; 36 — terminal part of body, ventral view; 37 — female gonopod, mesal view; 38 — same, lateral view; 39 — 12–14 coxae, ventral view; 40 — female gonopod, dorsal view; 41 — claw of tarsus of leg 15; 42 — female gonopod, dorsal view. Scale: 33, 34, 36–38, 40, 42 — 0.5 mm, 35 — 2.5 mm, 39 — 1 mm, 41 — 0.12 mm.

Рис. 33–42. *Hessebius* cf. *plumatus* Zalesskaja, 1978: 33 — зубной край коксостернита ногочелюсти, вентрально; 34 — глазки, латерально; 35 — габитус, дорсально; 36 — конечная часть тела, вентрально; 37 — гонопод самки, вид изнутри; 38 — то же, латерально; 39 — 12–14 тазики, вентрально; 40 — гонопод самки, дорсально; 41 — коготь лапки 15 ноги; 42 — гонопод самки, дорсально Масштаб: 33, 34, 36–38, 40, 42 — 0,5 мм, 35 — 2,5 мм, 39 — 1 мм, 41 — 0,12 мм.

DISTRIBUTION. This species is distributed in the East Kazakhstan Region (Kazakhstan's Altais) [Dányi, Tuf, 2012] and the Republic of Altai [Dyachkov, 2017b; Nefediev *et al*., 2017a].

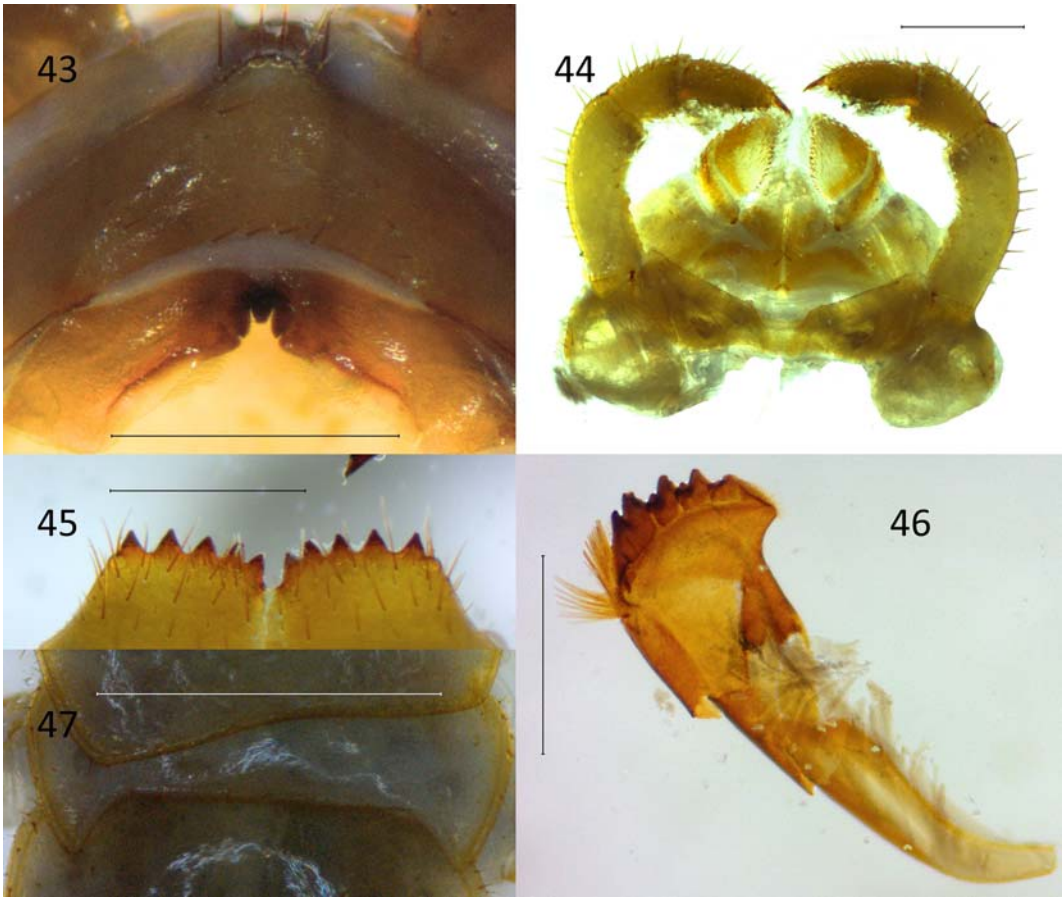
REMARKS. Clypeus, labrum, maxillary complex, mandible and dental margin of forcipular coxosternite as in Figs 48–51.

Lithobius (*Monotarsobius*) *insolens*
Dányi et Tuf, 2012
Map, Figs 52–56.

Lithobius (*Monotarsobius*) *insolens* Dányi et Tuf, 2012: Farzalieva, 2006: 105–108; Dányi, Tuf, 2012: 27; Dyachkov, 2017b: 454; Nefediev *et al*., 2017a: 221; 2017b: 116; 2018: 233.

MATERIAL. **East Kazakhstan Region**: 1 ♂, 1 ♀ (ASU No. 87), Altai Mts, Listvyaga Mt. Range, near Aksharbak village, N49° 31′59.66″, E085°31′59.74″, 1400 m a.s.l., 3–5.VII.2018; 3 ♂♂, 2 ♀♀, (ASU No. 88), same Region, Saur Mts, Tas Mt. Range, northern slope, N47°16′00.10″, E085°04′00.07″, 2230–2400 m a.s.l., 21–23.VI.2018, all RY, VR, AN.

DISTRIBUTION. Kazakhstan: East Kazakhstan and Almaty regions [Farzalieva, 2006], Russia: Omsk Region [Nefediev *et al*., 2017b], Altai Province and the Republic of Altai [Dyachkov, 2017b; Nefediev *et al*., 2017a, 2018].



Figs 43–47. *Lithobius forficatus* (Linnaeus, 1758): 43 — clypeus and labrum, ventral view; 44 — maxillary complex, ventral view; 45 — dental margin of forcipular coxosternite, ventral view; 46 — mandible; 47 — tergite 11, dorsal view. Scale: 43–46 — 0.5 mm, 47 — 1 mm.

Рис. 43–47. *Lithobius forficatus* (Linnaeus, 1758): 43 — клипеус и лабрум, вентрально; 44 — максиллярный комплекс, вентрально; 45 — зубной край коксостернита ногочелюсти, вентрально; 46 — мандибула; 47 — тергит 11, дорсально. Масштаб: 43–46 — 0,5 мм, 47 — 1 мм.

REMARKS. Clypeus, labrum, maxillary complex, mandible, dental margin of forcipular coxosternite and 14 leg of male as in Figs 52–56. This species is new to the fauna of the Saur Mts.

Conclusions

At present, the lithobiomorph fauna of Kazakhstan comprises 34 species from 3 families (Anopsobiidae, Henicopidae, Lithobiidae), all distributed mostly in the mountains in the eastern and southern parts (Table).

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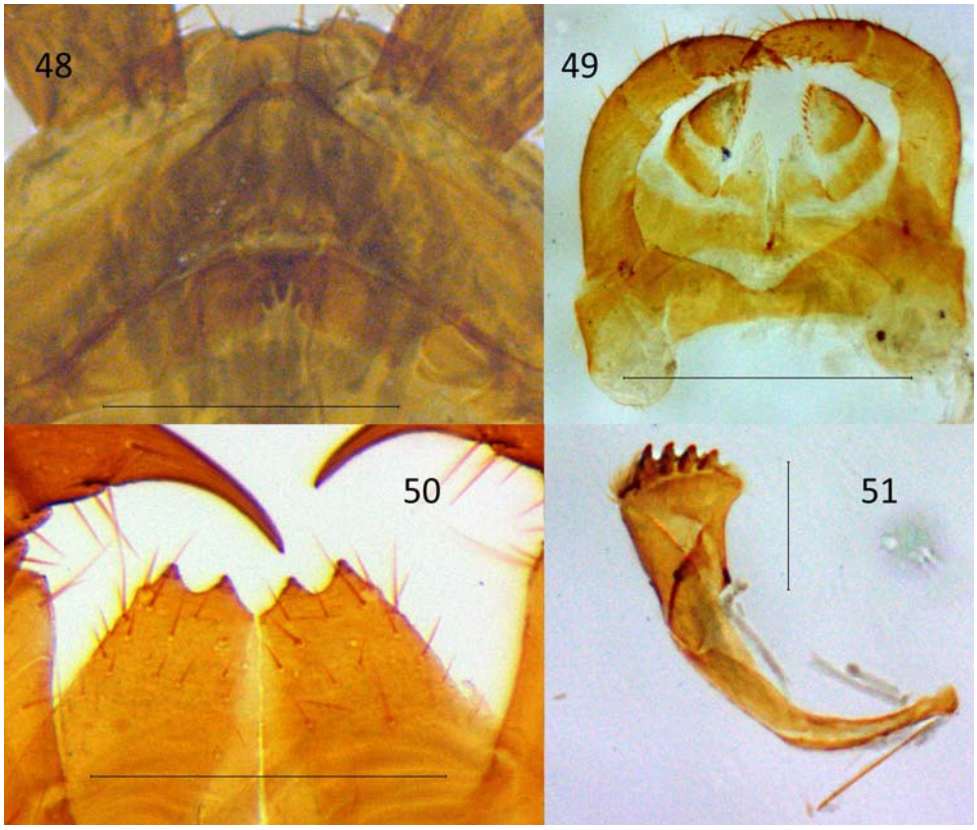
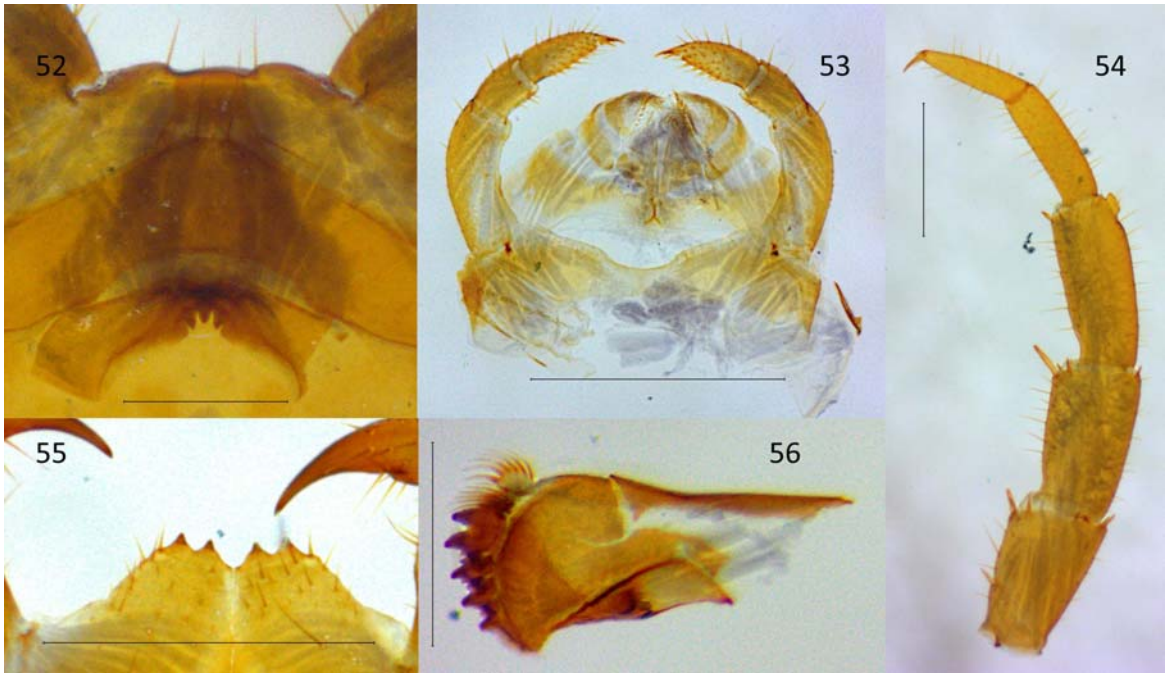


Figs 48–51. *Lithobius franciscorum* Dányi et Tuf, 2012: 48 — clypeus and labrum, ventral view; 49 — maxillary complex, ventral view; 50 — dental margin of forcipular coxosternite, ventral view; 51 — mandible. Scale: 48, 49 — 0.5 mm, 50 — 0.25 mm, 51 — 0.12 mm.

Рис. 48–51. *Lithobius franciscorum* Dányi et Tuf, 2012: 48 — клипеус и лабрум, вентрально; 49 — максиллярный комплекс, вентрально; 50 — зубной край коксостернита ногочелюсти, вентрально; 51 — мандибула. Масштаб: 48, 49 — 0,5 мм, 50 — 0,25 мм, 51 — 0,12 мм.



Figs 52–56. *Lithobius insolens* Dányi et Tuf, 2012: 52 — clypeus and labrum, ventral view; 53 — maxillary complex, ventral view; 54 — leg 14 of male, lateral view; 55 — dental margin of forcipular coxosternite, ventral view; 56 — mandible. Scale: 52–55 — 0.25 mm; 56 — 0.12 mm.

Рис. 52–56. *Lithobius insolens* Dányi et Tuf, 2012: 52 — клипеус и лабрум, вентрально; 53 — максиллярный комплекс, вентрально; 54 — нога 14 самца, латерально; 55 — зубной край коксостернита ногочелюсти, вентрально; 56 — мандибула. Масштаб: 52–55 — 0,25 мм; 56 — 0,12 мм.

Table. Distribution of the lithobiomorph centipedes in Kazakhstan.
Таблица. Распространение многоножек-костянок в Казахстане.

No	Species	Administration Regions of Kazakhstan													
		AKM	AKT	AT	AL	EK	KA	KO	KY	MA	NK	PR	SK	WK	JA
1	*Cermatobius kirgisicus* (Zalesskaja, 1972)												+		
2	*Dzhungaria gigantea* Farzalieva et al., 2004				+										
3	*Lamyctes emarginatus* (Newport, 1844)					+									
4	*Australobius magnus* (Trotzina, 1894)				+										+
5	*Disphaerobius loricatus* (Sseliwanoff, 1881)		+		+	+									
6	*Disphaerobius svenhedini* (Verhoeff, 1934)				+										
7	*Hessebius golovatchi* Farzalieva, 2017				+										
8	*Hessebius multicalcaratus* Folkmanová, 1958							+						+	
9	*Hessebius perelae* Zalesskaja, 1978												+		
10	*Hessebius plumatus* Zalesskaja, 1978				+			+							
11	*Hessebius zalesskajae* Farzalieva, 2017				+										
12	*Lithobius amplinus* Farzalieva, 2006				+										
13	*Lithobius canaricolor* Farzalieva, 2006				+										
14	*Lithobius crassipes* L. Koch, 1862					+									
15	*Lithobius curtipes* C.L. Koch, 1847							+						+	
16	*Lithobius farzalievae* Dányi et Tuf, 2012				+										
17	*Lithobius forficatus* (Linnaeus, 1758)				+	+			+						
18	*Lithobius franciscorum* Dányi et Tuf, 2012					+									
19	*Lithobius insolens* Dányi et Tuf, 2012				+	+									
20	*Lithobius* cf. *juniperius* Zalesskaja, 1978					+									
21	*Lithobius ketmenensis* Farzalieva, 2006				+										
22	*Lithobius monocoxaporus* Dyachkov, Farzalieva, 2018														+
23	*Lithobius princeps* Stuxberg, 1876					+									
24	*Lithobius proximus* Sseliwanoff, 1880					+									
25	*Lithobius steppicus* Farzalieva et Zalesskaja, 2003					+									
26	*Lithobius sulcipes* Stuxberg, 1876					+									
27	*Lithobius simplis* Farzalieva, 2006				+										
28	*Lithobius* cf. *stajnegeri* (Bollman, 1893)					+									

Table (continued).
Таблица (продолжение).

No	Species	Administration Regions of Kazakhstan												
		AKM	AKT	AT	AL	EK	KA	KO	KY	MA	NK	PR	SK	WK	JA
29	*Lithobius tarbagataicus* Farzalieva, 2006					+									
30	*Lithobius trisspurus* Dyachkov, Farzalieva, 2018														+
31	*Lithobius tuberofemoratus* Farzalieva, 2006				+										
32	*Lithobius turkestanicus* Attems, 1904				+									+	
33	*Lithobius sp.* 1					+									
34	*Lithobius sp.* 2					+									

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