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**NEW DATA ON THE FAMILY GEOPHILIDAE LEACH, 1815
(CHILOPODA: GEOPHILOMORPHA) FROM KAZAKHSTAN**

Yu. V. Dyachkov¹⁾, I. H. Tuf²⁾

1) *Altai State University, Barnaul, 656049, Russia. E-mail: dyachkov793@mail.ru*

2) *Palacký University, Olomouc, 77900, Czech Republic. E-mail: ivan.tuf@upol.cz*

Summary. *Arctogeophilus macrocephalus* Folkmanová et Dobroruka, 1960 is new to the fauna of Kazakhstan. *Pachymerium ferrugineum* (C.L. Koch, 1835) is new to the Atyrau, Mangystau and South Kazakhstan Regions; *Geophilus proximus* C.L. Koch, 1847 is recorded from the Karaganda and East Kazakhstan Regions for the first time. The distribution-map of all geophilid centipedes of Kazakhstan is given.

Key words: centipedes, Geophilidae, fauna, new records, Kazakhstan.

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Резюме. Впервые для фауны Казахстана приводится *Arctogeophilus macrocephalus* Folkmanová et Dobroruka, 1960. *Pachymerium ferrugineum* (C.L. Koch, 1835) впервые зарегистрирован в Атырауской, Мангистауской и Южно-Казахстанской областях Казахстана. *Geophilus proximus* C.L. Koch, 1847 впервые найден в Карагандинской и Восточно-Казахстанской областях. Представлена карта распространения указанных видов в Казахстане.

INTRODUCTION

Three species of the family Geophilidae Leach, 1815 has been recorded from Kazakhstan, viz. *Geophilus proximus* C.L. Koch, 1847 (West Kazakhstan and Kostanay Regions), *G. cf. procerus* C.L. Koch, 1878 (Almaty Region) and *Pachymerium ferrugineum* (C.L. Koch, 1835) (West Kazakhstan, East Kazakhstan and Almaty Regions) (Lignau, 1929; Vsevolodova-Perel, 2009; Bragina, 2012, 2016; Dyachkov, 2018), but the considerable part of this large country has never been investigated. Based on new material from W, S and E Kazakhstan we provide new data on the fauna of these regions.

MATERIAL AND METHODS

Present paper is mainly based on the material collected in 2016–2019. Centipedes were taken by hand and preserved in 70% ethanol. The collections of the Altai State University, Barnaul (ASU), the Zoological Museum of the Moscow State University, Moscow (ZMMU)

and the Perm State University, Perm (PSU) are also examined. Abbreviations of collectors used in the text are as follows: LB – L.S. Berg, YD – Yu.V. Dyachkov, AF – A.A. Fomichev, MG – M.S. Ghilarov, GG – G.V. Glan, KM – K.G. Mikhailov, AN – A.E. Naydenov, TSP – T.S. Perel, TVP – T.V. Piterkina, VR – V.V. Rudoi, RY – R.V. Yakovlev, VY – V.V. Yanushhev.

LIST OF THE SPECIES

Arctogeophilus macrocephalus Folkmanová et Dobroruka, 1960

MATERIAL. Kazakhstan: East Kazakhstan Region, Urzhar District, Tarbagatai Mt Range, Kyzylbeltau Mts, Terekty River Valley, 7 km SSW Blagodatnoye Village, floodplain, *Populus*, grasses, in litter, 47°11.282' N, 81°17.414' E, 720 m, 08.V 2019, 1 ♂, YD (ASU No 238).

DISTRIBUTION. Widespread in Russia (European part, Siberia, Far East) (Volkova, 2016; Nefediev *et al.*, 2017a, b).

REMARKS. This species is new to the fauna of Kazakhstan.

Geophilus proximus C.L. Koch, 1847

MATERIAL. Kazakhstan: East Kazakhstan Region, Shemonaikha District, Shemonaikha Town, garden, 50°37'51.1" N, 81°55'33.4" E, 308 m, 07–09.V 2017, 2 ♀, VR (ASU No 1); Katonkaragay District, Ulken-Naryn Village, garden, 49°12'52.1" N, 84°30'04.0" E, 403 m, 24.VI 2016, 14 ♀, 7 juv., YD (ASU No 2); Urzhar District, Tarbagatai Mt Range, Kyzylbeltau Mts, Terekty River Valley, 7 km SSW Blagodatnoye Village, floodplain, *Populus*, grasses, in litter, 47°11.282' N, 81°17.414' E, 720 m, 08.V 2019, 1 ♀, YD (ASU No 237); **Karaganda Region**, Shet District, 4 km N Kutybay Village, Buglyly Mts, stony mountain steppe with rocks and *Juniperus*, 48°55'01.61" N, 73°08'59.91" E, 800–1200 m, 27.IV 2016, 2 ♀, AF (ASU No 3); **West Kazakhstan Region**, Zhanybek District, environs of Zhanybek Town, forest belt, *Quercus*, 08.V 2005, 3 ♀, TVP (PSU); same locality, forest belt, *Quercus*, soil sample No. 1, 29.V 1982, 1 ♀, KM (ZMMU Rc 7810); Zhanybek Station, forest belt, soil sample No. 3, 13.V 1965, 1 ♀, KM (ZMMU Rc 7850); same locality, soil sample No. 31, 16.V 1966, 1 ♀, KM (ZMMU Rc 7867); same locality, soil sample No. 5, 07.VI 1982, 1 ♀, KM (ZMMU Rc 7816); same locality, soil sample No. 10, 15.V 1966, 1 ♀, 1 fragm., KM (ZMMU Rc 7857); same locality, forest belt, cavity (relief lowering), soil samples No. 1–2, 7–14.VI 1982, 3 ♀, 3 juv., KM (ZMMU Rc 7814); same locality, soil sample No. 2, 02.VI 1982, 2 ♀, 1 juv., KM (ZMMU Rc 7818); same locality, soil sample No. 9, 15.V 1965, 1 ♀, KM (ZMMU Rc 7859); same locality, cavity, *Ulmus*, soil sample No. 1, 08.V 1966, 7 ♀, 2 juv., KM (ZMMU Rc 7866); same locality, soil samples No. 5, 7.V 1966, 11 ♀, 9 fragm., TSP (ZMMU Rc 7804); same locality, cavity, grasses, soil sample No. 16, 13.V 1966, 2 ♀, KM (ZMMU Rc 7851); same locality, forest belt, slope, soil samples No. 4–5, 13.V 1965, 1 fragm., KM (ZMMU Rc 7853); same locality, flat solonetz (aridisol), 06.V 1965, 1 fragm., KM (ZMMU Rc 7862); same locality, arboretum, 14.V 1973, 5 ♀, KM (ZMMU Rc 7871); same locality, soil sample No. 11, 19.VI 1982, 2 juv., KM (ZMMU Rc 7817); same locality, *Populus*, soil sample No. 36, 19.VI 1966, 5 ♀, 5 fragm. (ZMMU Rc 7807); same locality, 19.V.1966, 3 ♀, 1 juv., 1 fragm., KM (ZMMU Rc 7863); same locality, *Betula*, soil sample No. 1, 18.VI 1982, 1 ♀, KM (ZMMU Rc 7809); same locality, *Betula*, soil sample No. 3, 18.IV 1982, 1 ♀, KM (ZMMU Rc 7811); same locality, arboretum, litter, 10.IV 1973, 13 ♀, 1 juv., (ZMMU Rc 7869); same locality, flat watershed, *Matricaria*, soil sample No. 1, 01.V

1965, 1 ♀, KM (ZMMU Rc 7865); same locality, *Artemisia*, soil sample No. 1, 22.VI 1982, 1 ♀, KM (ZMMU Rc 7803); same locality, *Artemisia*, soil sample No. 1, 10.IX 1982, 1 ♀, KM (ZMMU Rc 7813).

DISTRIBUTION. Kazakhstan: West Kazakhstan (Vsevolodova-Perel, 2009) and Kostanay (Naurzum Reserve) Regions (Bragina, 2012, 2016). – From northeastern Europe to Japan, through Russia (European part, the Ural, S Siberia) (Volkova, 2016; Nefediev *et al.*, 2017a, b).

REMARKS. This species is new to the East Kazakhstan and Karaganda Regions. In Kazakhstan, *G. proximus* dwells mostly in open man-made places with humid soils, while in central Kazakhstan (Karaganda Region) this species is recorded in steppe nearby of village. The local populations are parthenogenetic.

***Geophilus cf. procerus* C.L. Koch, 1878**

REMARKS. This species was recorded from Kazakhstan by a single specimen collected in Almaty City (Almaty Region) (Lignau, 1929).

***Pachymerium ferrugineum* (C.L. Koch, 1835)**

MATERIAL. **Kazakhstan: South Kazakhstan Region**, Otyrar District, 65 km SW Shoulder Village, Kayrakteu Mts, ravine, steppe, under stones, 42°17'53.8" N, 67°46'21.0" E, 314 m, 24.IV 2017, 10 ♂, 6 ♀, 1 fragm., YD (ASU No 4); same locality, 42°18'19.5" N, 67°46'28.1" E, 292 m, 02.V.2017, 1 ♂, YD (ASU No 5); **East Kazakhstan Region**, Katonkaragay District, Ulken-Naryn Village, garden, 49°12'52.1" N, 84°30'04.0" E, 403 m, 24.VI 2016, 1 ♂, 1 ♀, YD (ASU No 9); environs of N Ulken-Naryn Village, steppe, under stones, 49°13'27.0" N, 84°31'18.5" E, 466 m, 26.VI 2016, 3 ♂, 3 ♀, YD (ASU No 6); 3,7 km N Ulken-Naryn Village, steppe, under stones, 49°15'07.4" N, 84°30'43.8" E, 485 m, 28.VI 2016, 1 ♀, 1 juv., YD (ASU No 7); 10 km NW Alybay Village, steppe, under stones, 49°17'40.2" N, 84°07'03.5" E, 397 m, 30.VI 2016, 1 ♀, 3 juv., YD (ASU No 8); Southern Altai Mts, Karakaba river Valley, 48°57'00.24" N, 86°04'59.81" E, 1450 m, 01.VII 2018, 2 ♀, RY, VR, AN (ASU No 85); Urzhar District, Tarbagatai Mt Range, near Urzhar Village, shrub thickets, *Malus*, *Berberis*, *Rosa*, 15.V 1981, 1 ♂, 1 ♀, MG, TSP, VY (ZMMU Rc 7736); **West Kazakhstan Region**, Zhanybek District, environs of Zhanybek Town, forest belt, *Quercus*, soil samples, 08.V 2005, 1 ♂, 1 ♀, TVP (PSU); Zhanybek Station, *Artemisia*, soil sample No. 3, 23.VI 1982, 1 ♀, KM (ZMMU Rc 7799); same locality, soil sample No. 4, 01.VI 1982, 1 ♂, KM (ZMMU Rc 7800); same locality, soil sample No. 2, 01.VI 1982, 1 ♀, 1 fragm., KM (ZMMU Rc 7815); same locality, soil trap, 14–17.IX 1982, 1 ♂, KM (ZMMU Rc 7802); same locality, *Lonicera*, litter, 24.IV 1966, 1 ♂, GG (ZMMU Rc 7855); same locality, cavity (relief lowering), soil sample, 29.X 1982, 1 ♀, KM (ZMMU Rc 7781); same locality, soil sample No. 4, 03.VI 1982, 1 ♀, 1 juv., KM (ZMMU Rc 7812); same locality, grasses, soil sample No. 16, 13.V 1966, 1 ♂, 1 ♀, KM (ZMMU Rc 7752); same locality, arboretum, *Betula*, soil sample No. 22, 19.VI 1982, 1 juv., KM (ZMMU Rc 7808); same locality, arboretum, litter, 10.IV 1973, 3 ♀, (ZMMU Rc 7870); same locality, forest belt, soil sample No. 10, 15.V 1966, 1 ♂, KM (ZMMU Rc 7856); same locality, soil sample No. 1, 12.V 1965, 2 ♀, KM (ZMMU Rc 7864); same locality, soil sample No. 31, 16.V 1966, 1 ♀, KM (ZMMU Rc 7868); same locality, soil sample No. 6, 14.V.1965, 1 ♀, KM (ZMMU Rc 7858); same locality, forest belt, cavity, soil sample No. 9, 15.V.1965, 1 ♀, 1 juv., KM (ZMMU Rc 7860); same locality, flat solonetz (aridisol), 06.V 1965, 1 ♀, 1 juv., KM (ZMMU Rc 7861); **Atyrau Region**, Atyrau city, 1897, 1 ad., LB (ZMMU Rc 7609); **Mangystau Region**, Western chink (large

almost inaccessible precipice) of Ustyurt, Ustyurt Nature Reserve, near cordon Mamekkazgan, stony foothill of chink, under stones, 43°25'06.10" N, 54°34'05.11" E, 76 m, 12–13.IV 2018, 1 ♀, AF (ASU No 28); Ustyurt Nature Reserve, between Karpakkazgan and Karzhar wells, stony foothill of chink, under stones, 43°23'52.02" N, 54°30'46.94" E, 70–100 m, 13.IV 2018, 1 juv., YD (ASU No 29); Ustyurt Nature Reserve, near Kokosim well, chink, under stones, 43°10'11.96" N, 54°52'40.03" E, 270 m, 14.IV 2018, 1 ♂, YD (ASU No 30).

DISTRIBUTION. Kazakhstan: West Kazakhstan, Almaty and East Kazakhstan Regions (Vsevolodova-Perel, 2009; Dyachkov, 2018). – Europe, N Africa, W Asia, Uzbekistan, Tajikistan, Kyrgyzstan, Russia (from European part to Far East), Mongolia, China, introduced to Japan, USA (Alaska, Hawaii Isl.), Mexico, and Chili (Volkova, 2016; Nefediev *et al.*, 2017b).

REMARKS. This species is new to the centipede fauna of the Atyrau, Mangystau and South Kazakhstan Regions of Kazakhstan.

CONCLUSIONS

The family Geophilidae is represented in Kazakhstan by at least four species from three genera. The most spread species on this territory is *Pachymerium ferrugineum* (Fig. 1). *Arctogeophilus macrocephalus* is recorded from Kazakhstan for the first time. As introduced through human agency, *Geophilus proximus* dwells in mostly open man-made places in northern, central and eastern parts of Kazakhstan. *Geophilus cf. procerus* was recorded from East Kazakhstan only (Lignau, 1929).

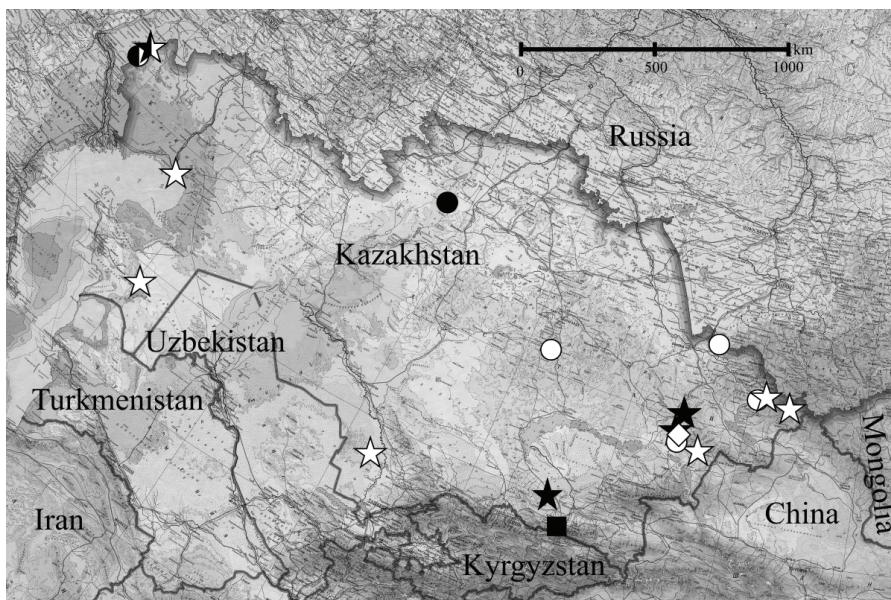


Fig. 1. Distribution of the Geophilidae species in Kazakhstan: diamond – *Arctogeophilus macrocephalus*; circle – *Geophilus proximus*; square – *G. cf. procerus*; star – *Pachymerium ferrugineum*. White marks indicate new data, black marks concern literature data.

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Address: Federal Scientific Center of the East Asia Terrestrial Biodiversity (former Institute of Biology and Soil Science), Far East Branch of the Russian Academy of Sciences, 690022, Vladivostok-22, Russia.

E-mail: storozhenko@biosoil.ru

web-site: <http://www.biosoil.ru/fee>