Far Eastern Entomologist

Number 544: 22-28 ISSN 1026-051X (print edition) ISSN 2713-2196 (online edition) March 2026

https://doi.org/10.25221/fee.544.3
https://elibrary.ru/dxtshb
https://zoobank.org/References/D32D3473-017D-4BEE-BBC2-5E1A18EA9F6D

TWO NEW SPECIES OF THE GENUS *PROTAPHIS* BÖRNER, 1952 (HEMIPTERA: APHIDIDAE, APHIDINA) FROM KAZAKHSTAN

R. Kh. Kadyrbekov[1,2)]

1) *West Kazakhstan University, N. Nazarbaev avenue 162, Uralsk, 0900000, Kazakhstan. E-mail: lepidaphis@gmail.com*

2) *Institute of Zoology, Ministry of Sciences and Higher Education, Republic of Kazakhstan, Academgorodok, Al-Farabi avenue, 93, Almaty, 050060, Kazakhstan. E-mail: rustem.kadyrbekov@zool.kz*

Summary. Two new species of the genus *Protaphis* Börner, 1952 are described from Kazakhstan. *Protaphis inulicola* **sp. n.** was found on the roots of *Inula caspica* in the Ili Valley, South-Eastern Kazakhstan. *Protaphis kokshetavica* **sp. n.** lives on the roots of *Jurinea multiflora* in the Akmola Region, Northern Kazakhstan. Keys to distinguishing of the new species from those congeners similar to them have been compiled.

Key words: aphids, Aphididae, taxonomy, new species, keys, Asia.

Р. Х. Кадырбеков. Два новых вида тлей рода *Protaphis* Börner, 1952 (Hemiptera: Aphididae, Aphidina) из Казахстана // Дальневосточный энтомолог. 2026. N 544. С. 22-28.

Резюме. Из Казахстана описаны два новых вида рода *Protaphis* Börner, 1952. *Protaphis inulicola* **sp. n.** был обнаружен на корнях *Inula caspica* в Илийской долине, Юго-Восточный Казахстан. *Protaphis kokshetavica* **sp. n.** обитает на корнях *Jurinea multiflora* в Акмолинской области, Северный Казахстан. Составлены таблицы для определения новых видов от сходных с ними родственных форм.

INTRODUCTION

Protaphis Börner, 1952 is a Holarctic genus with 42 species in the world fauna, which gravitate towards arid territories (Blackman & Eastop, 2022; Favret, 2024). Some species live on the above-ground parts, most on plants' roots and root collar, mainly from the Asteraceae family. There is a key to distinguishing aphids of this genus from the territory of the former USSR (Kadyrbekov, 2001). Based on the collection of the Institute of Zoology of the Ministry of Science and Higher Education of the Republic of Kazakhstan, Almaty (IZK), a few new species of aphids has been described recently (Kadyrbekov, 2021; Kadyrbekov et al., 2022; Kadyrbekov & Kanatova, 2024). Two new species of the genus *Protaphis* from the Ili Valley in South-Eastern Kazakhstan and Akmola region in Northern Kazakhstan was found. Holotypes and paratypes of the new species are deposited in the collection of IZK (Almaty, Kazakhstan).

Original microscope slides were prepared using coniferous balsam as mounting fluid (Kadyrbekov 2014). The specimens were examined using a Bel Photonics light microscope. Aphid identifications were done with reference to authoritatively identified material from the collection of IZK.

All measurements are given in millimeters. Plant taxonomy was verified according to POWO (2024). To distinguish new species, a key for aphids of the genus *Protaphis*, compiled for species inhabiting the territory of the former USSR, was used (Kadyrbekov, 2001).

DESCRIPTIONS OF NEW SPECIES

***Protaphis inulicola* Kadyrbekov, sp. n.**

https://zoobank.org/NomenclaturalActs/D2D203EE-3BB8-4A3E-97DA-D5D4BDF94346

Figs 1–5

TYPE MATERIAL. Holotype: apterous viviparous female, slide no 4516, **South-Eastern Kazakhstan**: right bank of Ili river, 6 km to South-East of Bakanas small town, *Inula caspica*, 17.VIII 2012, leg. R. Kadyrbekov (IZK). Paratypes: 1 alate viviparous female, 10 apterous viviparous females, same place and date, leg. R. Kadyrbekov (IZK).

DESCRIPTION. **Apterous viviparous females** (from 11 specimens). Body oval (1.56–1.80) (Fig. 1). Frons convex. Setae of frons are short (0.010–0.012) 0.35–0.52 of diameter of III antennal segment in base. Antennae six-segmented are short (0.60–0.67) 0.35–0.43 times of body length (Fig 2). Third antennal segment is 0.09–0.12 times of body length, 2.27–2.77 times of IV antennal segment, 0.77–0.94 times of VI antennal segment, 1.50–1.88 times of processus terminalis, 1.87–2.27 times of siphunculi. Processus terminalis is 0.88–1.25 times of base of VI antennal segment. Secondary rhinaria on antennae absent. Longest setae of III antennal segment (0.0058–0.0060) of 0.25–0.29 times of diameter of III antennal segment in base. Rostrum reaching to just past the third pair of coxae, its ultimate rostral segment longitude, with 2 accessory setae apart 3 pair on apex. It is 1.45–1.63 times of II segment of hind tarsus, 1.44–1.63 times of base of VI antennal segment, 0.37–0.43 times of width of head between eyes, 1.63–1.85 times of siphunculi length. Siphunculi are short with small flanges (Fig. 3). It 0.049– 0.059 times of body length, 0.19–0.27 times of width of head between eyes, 0.75–1.00 times of base of VI antennal segment, 0.70–0.80 times of cauda length, 0.78–1.00 times of II segment of hind tarsus. Cauda short, conical, with 10–14 setae (Fig. 3). It is 0.82–1.00 times of its basal width, 0.064–0.081 times of body length, 1.00–1.25 times of II segment of hind tarsus. Setae on II–VI abdominal tergites (0.010–0.012) 0.43–0.60 times of diameter of III antennal segment at base. Setae on VIII abdominal tergites (0.012–0.017) 0.60–0.74 times of diameter of III antennal segment at base. Lower setae of hind trochanter (0.012–0.017) 0.26–0.37 times of diameter of trochanteric-femoral suture. Legs are relatively short. Marginal tubercles are located on I and VII, VIII abdominal tergites. Genital plate with 2–4 setae on disk and 6–8 ones on hind margin. VIII abdominal tergites with 2–4 setae. Fist segment of tarsi is 3, 3, 2 setae.

MEASUREMENTS (holotype). Body 1.64, antennae 0.59–0.61, antennal segments: III 0.16–0.17, IV 0.07, V 0.07–0.08, VI (0.09+0.09–0.10); width of head between eyes 0.35; siphunculi 0.08; cauda 0.10; ultimate rostral segment 0.15; second segment of hind tarsus 0.09 mm.

COLOR IN LIVE. Body dark green, with brown head and faint wax hue. Antennae are dusky. Cauda is light.

COLOR IN SLIDE. Head, I, II, apex of V and VI antennal segments, femora (apart of base), apices of tibiae, tarsi, coxae, trochanters, clypeus, III–IV rostral segments, pronotum,

large marginal sclerites on meta notum and mesanotum, medial sclerite on mesanotum, transverse stripes on VI–VIII tergites, small marginal sclerites on II–VI tergites, siphunculi, anal and subgenital plates are dark brown. Cauda is light.

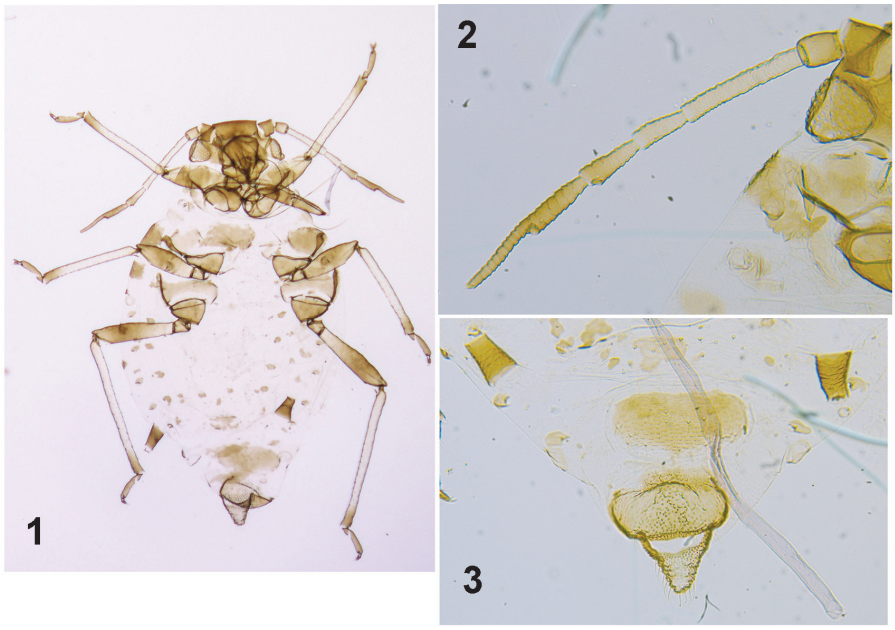

Fig. 1–3. *Protaphis inulicola* sp. n., apterous viviparous female. 1 – habitus; 2 – antennae; 3 – siphunculi and cauda.

DESCRIPTION **Alate viviparous females** (by 1 specimen). The antennal segment III with 7, IV ones with 1 secondary rhinaria. Body oval (1.87). Frons convex (Fig 4). Setae of frons are short (0.006) 0.30 of diameter of III antennal segment in base. Third antennal segment is 0.97–1.0 times of VI antennal segment, 1.89–1.90 times of processus terminalis, 2.55–2.70 times of siphunculi (Fig. 5). Secondary rhinaria on III (7) and IV (1) antennal segments are present. Longest setae of III antennal segment (0.0045) of 0.23 times of diameter of III antennal segment in base. Rostrum reaching to just past the third pair of coxae, its ultimate rostral segment longitude, with 2 accessory setae apart 3 pair on apex. It is 1.99 times of siphunculi length. Siphunculi are short with small flanges. It 0.043 times of body length. Cauda 0.058 times of body length. Lower setae of hind trochanter (0.020) 0.44 times of diameter of trochanteric-femoral suture. Genital plate with 4 setae on disk and 13 ones on hind margin. Other characters as apterous viviparous female.

MEASUREMENTS. Body 1.87, antennae 0.69–0.72, antennal segments: III 0.21–0.22, IV 0.08, V 0.08, VI (0.10–0.109+0.115); head width between eyes 0.38; siphunculi 0.08; cauda 0.11; ultimate rostral segment 0.16; second segment of hind tarsus 0.10 mm.

COLOR IN LIVE. Body dark green, with black head, thorax and faint wax hue. Antennae are dusky. Cauda is light.

COLOR IN SLIDE. Head, thorax, antennae, clypeus, rostrum, legs (apart basal part of femora and two-thirds of tibiae), siphunculi, genital and anal plates, large marginal spots of

sclerotization on I–VII abdominal tergites, transverse bars on VII and VIII abdominal tergites are dark. Cauda is light.

BIOLOGY. Aphids lives on the roots of *Inula caspica* F.K. Blume et Ledeb. Its visited by ants.

ETYMOLOGY. The new species is named after it host plant.

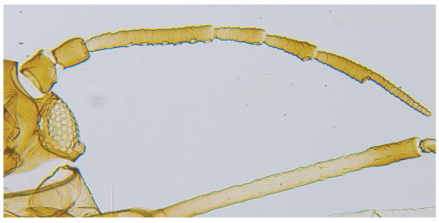

Fig. 4–5. *Protaphis inulicola* sp. n., alate viviparous female. 4 – habitus; 5 – antennae.

TAXONOMIC REMARKS. *Protaphis inulaphaga* sp. n. belongs to a group of species with the presence of marginal tubercles on the 8th tergite of the abdomen (Kadyrbekov, 2001). Within this group, the new species is closest to two species with short frontal hairs, the length of which is no more than 0.6 of the basal diameter of the third antennal segment – *P. ancathiae* Kadyrbekov, 2001 and *P. echinopsicola* Kadyrbekov, 2001. Of the two species, it is closely related to *P. ancathiae*, from which it differs in the proportions of siphunculi length to body length (0.049–0.059 versus 0.035–0.045) and siphunculi length to cauda length (0.70–0.80 versus 0.63–0.73), as well as in the ratio of the length of the lower hair on the hind trochanters to the diameter of the trochanteric-femoral suture on the hind legs (0.26–0.37 versus 0.13–0.16), and the difference in the number of hairs on the cauda (10–14 versus 18–25).

A key to the species with marginal tubercles on tergites I–VIII of the abdomen and short frontal setae (no more than 0.6 of the diameter of the third antennal segment) is given below.

1. The last segment of the rostrum is 1.20–1.35 times longer than the 2nd segment of the hind tarsus. On roots of *Artemisia* spp ……..... *P. miranda* Kadyrbekov, 2001
– The last segment of the rostrum is 1.40–1.63 times longer than the 2nd segment of the hind tarsus ……..... 2

2. Siphunculi 0.035–0.045 of body length; siphunculi 0.63–0.73 of cauda length; length of lower hair on trochanters of hind legs is 0.13–0.16 of diameter of trochanteric-femoral suture of the same legs. Cauda with 18–25 setae. On roots of *Ancathia igniaria* ….....… ….……...…….…….…… *P. ancathiae* Kadyrbekov, 2001
– Siphunculi 0.049–0.059 of body length; siphunculi 0.70–0.80 of cauda length; length of lower hair on trochanters of hind legs is 0.26–0.37 of diameter of trochantero-femoral suture of the same legs. Cauda with 10–14 setae. On roots of *Inula caspica* …..... ….....…. *P. inulaphaga* sp. n.

***Protaphis kokshetavica* Kadyrbekov, sp. n.**

https://zoobank.org/NomenclaturalActs/1A28935A-8705-4C2E-963D-52DF616CB979

Figs 6–8

TYPE MATERIAL. Holotype: apterous viviparous female, slide no 2957, **Northern Kazakhstan**: Akmola region, Enbekshilder district, Namasgul mountings, Stepnjak town environs, 11.VII 2002, leg. R. Kadyrbekov (IZK). Paratypes: 2 apterous viviparous females, same place and date, leg. R. Kadyrbekov (IZK).

DESCRIPTION. **Apterous viviparous females** (from 3 specimens). Body oval (1.38–1.50) (Fig 6). Frons convex. Setae of frons are short (0.006–0.007) 0.34–0.41 of diameter of III antennal segment in base. Antennae six-segmented are short (0.52–0.54) 0.35–0.38 times of body length (Fig. 7). Third antennal segment is 0.10–0.12 times of body length, 2.59–2.98 times of IV antennal segment, 0.99–1.07 times of VI antennal segment, 1.99–2.17 times of processus terminalis, 2.17–2.78 times of siphunculi. Processus terminalis is 0.85–1.00 times of base of VI antennal segment. Secondary rhinaria on antennae are absent). Longest setae of III antennal segment (0.004–0.005) of 0.21–0.26 times of diameter of III antennal segment in base. Rostrum reaching to just past the third pair of coxae, its ultimate rostral segment longitude, with 2 accessory setae apart 3 pair on apex. It is 1.50–1.56 times of II segment of hind tarsus, 1.57–1.70 times of base of VI antennal segment, 0.38–0.41 times of width of head between eyes, 2.00–2.38 times of siphunculi length. Siphunculi are short with small flanges (Fig. 8). It 0.041–0.046 times of body length, 0.17–0.21 times of width of head between eyes, 0.72–0.85 times of base of VI antennal segment, 0.72–0.75 times of cauda length, 0.63–0.75 times of II segment of hind tarsus. Its 1.26–1.33 times of its basal width. Cauda short, conical, with 10–12 setae (Fig. 8). It is 0.78–0.80 times of its basal width, 0.059–0.061 times of body length, 0.88–1.00 times of II segment of hind tarsus. Setae on II–VI and VIII abdominal tergites (0.006–0.007) 0.34–0.41 times of diameter of III antennal segment at base. Lower setae of hind trochanter (0.008) 0.15–0.17 times of diameter of trochanteric-femoral suture. Legs are relatively short. Marginal tubercles are located on I and VII abdominal tergites. Genital plate with 2 setae on disk and 8–10 ones on hind margin. VIII abdominal tergites with 2 setae. Fist segment of tarsi is 3, 3, 2 setae.

MEASUREMENTS (holotype). Body 1.50, antennae 0.52–0.54, antennal segments: III 0.15–0.17, IV 0.06, V 0.06–0.07, VI (0.08+0.08); width of head between eyes 0.33; siphunculi 0.07; cauda 0.09; ultimate rostral segment 0.14; second segment of hind tarsus 0.09 mm.

COLOR IN LIVE. Body dark green, with brown head and faint wax hue. Antennae are dusky. Cauda is light.

COLOR IN SLIDE. Head, I, II, apex of V and VI antennal segments, femora (apart of base), apices of tibiae, tarsi, coxae, trochanters, clypeus, III–IV rostral segments, large marginal sclerites on metanotum and mesanotum, transverse stripes on VIII tergites, siphunculi, anal and subgenital plates are dark brown. Cauda is light.

BIOLOGY. Aphids lives on the roots of *Jurinea multiflora* (L.) B. Fedtsch. Its visited by ants.

ETYMOLOGY. The new species is named after Kokshetau mountings of the Kazakh Uplands.

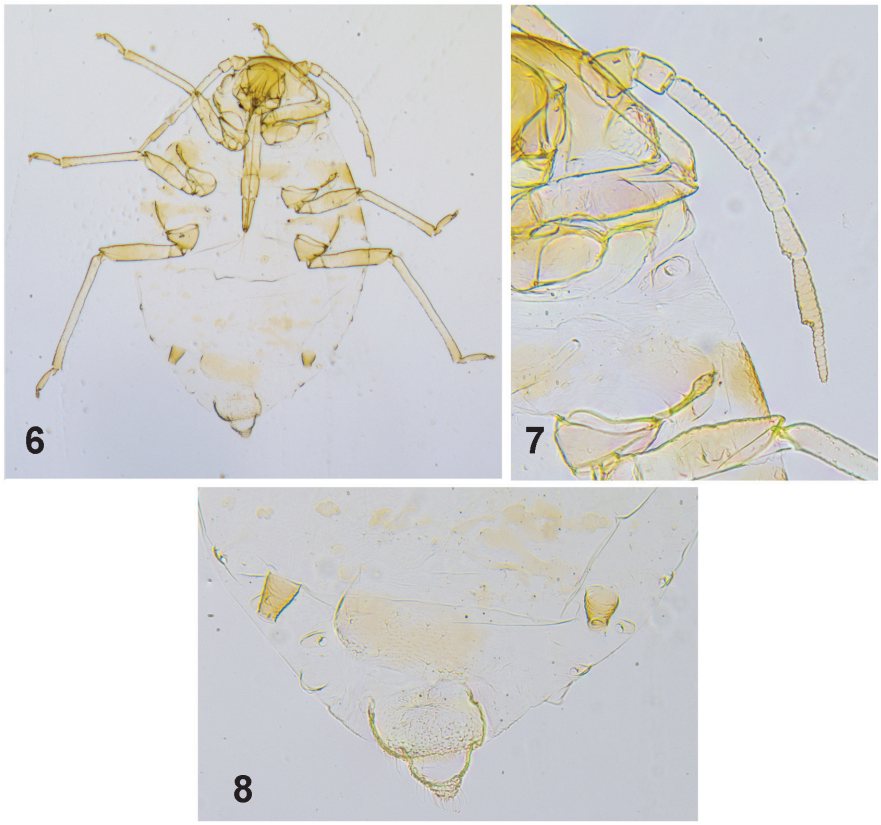

Fig. 6–8. *Protaphis kokshetavica* sp. n., apterous viviparous female. 6 – habitus; 6 – antennae; 8 – siphunculi and cauda.

TAXONOMIC REMARKS. *Protaphis kokshetavica* sp. n. is part of a group of 2 species *P. aralensis* Kadyrbekov, 2001, *P. elatior* (Nevsky, 1928) with short frontal hairs (no more than 0.5 of the basal diameter of the third antennal segment). In this group, it is closest to *P. aralensis* in the ratio of siphunculi to body length (no more than 0.055). The new species differs from *P. aralensis* in the type of sclerotization on the body, the color of the cauda (light), and the complete absence of secondary rhinaria on the third antennal segment. In addition, it is clearly distinguished from *P. aralensis* by the following proportions of the last segment of the rostrum to the second segment of the hind tarsus (1.50–1.56 versus 1.40–1.45), the lower hair on the trochanters of the hind legs to the trochanteric-femoral suture (0.15–0.17 and 0.20–0.30), the length of the siphunculi to the width of their base (1.26–1.33 in comparison with 1.00–1.20), the length of the siphunculi to the length of the last segment of the rostrum (0.42–0.50 versus 0.56–0.63) and the length of the cauda to the width of its base (0.78–0.80 and 0.90–1.00).

A key to the species with the presence of marginal tubercles on 1st and 7th abdominal tergites and short frontal hairs (no more than 0.5 of the basal diameter of the 3rd antennal segment) is given below.

1. The length of the siphunculi is 0.065-0.070 of the body length; the length of the last segment of the rostrum is 1.25-1.35 times greater than the length of the 2nd segment of the hind leg. On the roots of *Artemisia* spp. ..…..…….*P. elatior* (Nevsky, 1928)
– The length of the siphunculi is no more than 0.055 of the body length; the length of the last segment of the rostrum is not less than 1.40 of the length of the 2nd segment of the hind leg …….....……..…..……... 2
2. The length of the last segment of the rostrum is 1.50–1.56 times greater than the length of the second segment of the hind tarsus; the length of the siphunculi is 0.42–0.50 times the length of the last segment of the rostrum; the length of the lower hair on the trochanters of the hind legs is 0.15–0.17 times the diameter of the trochanteric-femoral suture of the same legs. Secondary rhinaria on the antennae are absent. The cauda is light, with 10–12 setae. On the roots of *Jurinea parviflora* …….……...… *P. kokshetavica* sp. n.
– The length of the last segment of the rostrum is 1.40–1.45 times greater than the length of the second segment of the hind tarsus; the length of the siphunculi is 0.56–0.63 times the length of the last segment of the rostrum; the length of the lower hair on the trochanters of the hind legs is 0.20–0.30 times the diameter of the trochanteric-femoral suture of the same legs. Secondary rhinaria on the 3rd segment of the antenna are present in 50% of specimens. The cauda is brown, with 16–18 setae. At the base of the stems of *Scorzonera parviflora* …….....…… *P. aralensis* Kadyrbekov, 2001

ACKNOWLEDGEMENTS

This research was funded by the Committee of Science of the Ministry of Science and Higher Education of the Republic of Kazakhstan (Grant No BR28712767 “Study of ecological, socio-demographic, economic-geographic and paleobiogeographical aspects of Ural and assessment of natural resource potential”).

REFERENCES

Blackman R.L., Eastop V.F. 2021. *Aphids on the World’s Herbaceous Plants and Shrubs*. *An Online Identification and Information Guide*. Available at: http://www.aphidsonworldsplants.info (Accessed on 15 June, 2021)

Favret, C. 2024. *Aphid Species File. Version 5.0/5.0.* Available at: http:/Aphid.Species.File.org

Kadyrbekov, R.Kh. 2001. Contribution to the systematic of the genus *Protaphis* Borner, 1952 (Homoptera, Aphididae) in the former USSR fauna. *Tethys Entomological Research*, 3: 65–90.

Kadyrbekov R.Kh. 2014. *Aphids (Homoptera, Aphidoidea) of the mountains of Kazakhstan*. LAP, Saarbrücken. 442 pp. [In Russian]

Kadyrbekov, R.Kh. 2021. A new species of *Xerobion* Nevsky, 1928 (Hemiptera: Aphidoidea, Aphididae) from Kazakhstan, with a key to apterous viviparous females of the genus. *Far Eastern Entomologist*, 431: 10–16. DOI: 10.25221/fee.431.2

Kadyrbekov, R.Kh. & Kanatova, M. 2024. A new species of the genus *Aphiduromyzus* Umarov et Ibraimova, 1967 (Hemiptera: Aphidomorpha: Aphididae) from Kazakhstan*. Far Eastern Entomologist*, 507: 10–14. DOI: 10.25221/fee.507.2

Kadyrbekov, R.Kh., Tleppaeva, A.M. & Kolov, S.V. 2022. Two new species of the genus *Macrosiphoniella* Del Guercio, 1911 (Hemiptera, Aphidomorpha: Aphididae) inhabits yarrow in Kazakhstan. *Far Eastern Entomologist*, 466: 1–8. DOI: 10.25221/fee.466.2

POVO. 2024. *Plants on the World Online*. Available at: http://powo.science.kew.org