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NEW FOR THE FAUNA OF UKRAINE ROTIFERS (ROTIFERA, BDELLOIDEA) OF ADINETIDAE AND HABROTROCHIDAE FAMILIES

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New for the Fauna of Ukraine Rotifers (Rotifera, Bdelloidea) of Adinetidae and Habrotrochidae Families. Yakovenko N. S. — The whole list of rotifer species from class Bdelloidea found in Ukraine includes 84 species and subspecies of 10 genera and 3 families. Author have found 53 species and subspecies of Class Bdelloidea in poorly investigated biotopes of five Ukrainian reserves (Kanev natural reserve, "Kam'yani mohyly", "Roztoch'chya", "Granitno-Stepove pobuzh'a", Carpathian reserve). 23 of them proved new for the Ukrainian fauna. Redescriptions and drawings of nine bdelloid species of families Adinetidae and Habrotrochidae new for Ukraine are presented in the paper. These are *Habrotrocha elegans* (Milne), *H. pavidata* Bryce, *H. plana* (?) Milne, *Otostephanos cuspidilabris* de Koning, *O. donneri* (?) Bartoš, *O. monteti* Milne, *Adineta gracilis* Janson, *A. rhomboidea* Berzins, *A. steineri* Bartoš.

Key words: Rotatoria, Bdelloidea, fauna, taxonomy, Ukraine.

Новые в фауне Украины коловратки (Rotifera, Bdelloidea) из семейств Adinetidae и Habrotrochidae. Яковенко Н. С. — В настоящее время в фауне Украины насчитывают 84 вида и подвида коловраток (из 10 родов 3 семейств), относящихся к классу Bdelloidea. В мало- или недостаточно изученных в отношении Rotatoria местообитаниях (донные осадки, обрастания, наземные мхи, почва, поверхность тела водных членистоногих) пяти заповедных территорий Украины (Каневский природный и Карпатский заповедники, "Каменные могилы", "Расточье", "Гранитно-степное Побужье") автором найдены 53 вида и подвида бделлоидных коловраток, из которых 23 — новые для фауны Украины. В данной статье приводятся краткие переописания и рисунки 9 видов из семейств Adinetidae, Habrotrochidae: *Habrotrocha elegans* (Milne), *H. pavidata* Bryce, *H. plana* (?) Milne, *Otostephanos cuspidilabris* de Koning, *O. donneri* (?) Bartoš, *O. monteti* Milne, *Adineta gracilis* Janson, *A. rhomboidea* Berzins, *A. steineri* Bartoš.

Ключевые слова: Rotatoria, Bdelloidea, фауна, таксономия, Украина.

Introduction

At present the Ukrainian rotifer fauna is investigated insufficiently in comparison with that of West Europe. The whole list of rotifer species from class Bdelloidea found in Ukraine includes 84 species and subspecies of 10 genera and 3 families.

Detailed accounts on the rotifer fauna (planktonic species mostly) of the Middle and South Ukraine are those of N. V. Voronkov (1915), N. N. Fadeev (1929), V. S. Travyanko (1968), M. L. Pidhaiko (1984), V. V. Polishchuk (1977). Commensal rotifer species from gill cavities of *Astacus astacus* are described in E. G. Boshko (1989) paper. Only Donner's (1971) paper contains some information on soil bdelloid rotifers of this region. Rotifers inhabiting terrestrial mosses and lichens were studied in Transcarpathian region and Bukovina (Bartoš, 1959; Rudescu, 1960) but publications on the subject for the central and south parts of Ukraine are absent. It should be noticed, that bdelloids, especially terrestrial, are quite insufficiently investigated in Ukraine. Of special interest is also studying of rotifers living in tree hollow reservoirs.

Therefore, the aim of our work was addition of information on the Ukrainian rotifer fauna and to continue investigation of terrestrial rotifers in the Central and South Ukraine.

For the preliminary study we've chosen several Ukrainian reserves where rotifer fauna was not properly examined before. The samples were collected in the Kanev Natural Reserve environs (Cherkassy region) and "Kam'yanni mohyly" branch of the Ukrainian Steppe Reserve (Donetsk region). Some samples of dry moss from "Granitno-Stepove Pobuzh'a" landscape park (Nikolayev region) were kindly provided by M. V. Tarashchuk (Schmalhausen Institute of Zoology of the Ukrainian Nat. Akad. of Sci.). We also ob-

tained some samples from tree-hollow reservoirs ("Roztoch'chya" reserve in Lviv region and Golosevsky park in Kiev) and dry moss samples from Carpathian reserve.

Materials and methods

Investigations in Kanev reserve (I) were carried out during summer of 1996. Periphyton and benthos samples from small temporary reservoirs, some soil and aerophytic mosses growing on stones, tree trunks and earth were taken. Sampling in the "Kamyani mohyly" (II) was performed during August of 1997, both in steppe (soil samples) and on the granitic slabs (mosses and lichens), and some benthos and periphyton samples from the Kara-Tysh river were obtained. Samples from "Granitno-Stepove Pobuzh'a" landscape park (III) are exclusively terrestrial (mosses, lichens and soil).

The samples of periphyton and bottom sediments were collected by the 0.25–0.5 l glass vessels. A glass tube 15 mm in diameter was also used for bottom sampling. Periphyton and sediments were examined without preserving directly after they had been obtained. Moss patches taken were about 6×6 cm. Iron sampler we applied for soil examining (volume of soil sample was 7×7×10 cm). Soil, mosses and lichens were dried up at the room temperature and stored in paper packets for some months, then they were wetted and studied. For the isolation of rotifer trophi we used 10% water solution of KOH. Total number of samples processed is 100 (88 from I, 9 from II, and 3 from III).

Identification of bdelloid rotifers is based on keys by Bartoš (1959), Voigt (1956–57) and Donner (1965). Classification of bdelloids is taken from Melone and Ricci (1995) and Donner (1965).

Results

We have found 53 species and subspecies of bdelloid rotifers altogether. Among them, 23 species and 9 subspecies were not recorded in Ukraine before. We give short redescriptions of nine species of rotifers from Class Bdelloidea new in Ukrainian fauna.

ORDER PHILODINIDA

Family Habrotrochidae

Genus *Habrotrocha* Bryce, 1910

Habrotrocha elegans (Milne, 1886) (fig. 1)

Material. (1) About 4 spec/cm², Cherkassy region, Kanev, Kanev reserve environs, highway side, moss *Ceratodon purpureus* (Hedw.) Bryol. eur. + *Bryum argenteum* Hedw. 14.06.96 (Yakovenko). (2) Ibid., Kanev reserve environs, concrete slab, moss *Ceratodon purpureus* (Hedw.) Bryol. eur. (very dry sample), 18.07.96 (Yakovenko). Both samples are taken in high-insolated places.

Diagnosis. Body spindle-shaped, colourless and transparent. Cuticle thin, smooth, without any humps, spines or sculpturation (excepting cuticular folds along the body). Eyespots are absent. Rostrum massive, a specimen from the first sample had rather long one (fig. 1, 1, 2). Two semicircular rostrum lobes. Neck long, wide. Dorsal antenna length as one third of neck breadth. Head rectangular. Corona high (about a half of whole head height), as wide as head is. Pedicels erect, loose. A papilla in the centre of each coronal disc. Upper lip blunt triangular with tip rounded and covers a half of narrow sulcus. Foot short, of three segments (?). Spurs short, diverge, conical and sharp; breadth of interspace vary. Jaws small, with sharp lateral angles and a great number of delicate teeth. Eggs were not found.

Measurements. About 280 mcm long.

Remark. Specimens found had no case and were freeswimming. Sometimes, however, *H. elegans* builds cases from detritus (Donner, 1965). In contradiction to description and image by Bartoš (1959, p. 146–147) any specimens found had no corona with pedicels bent to the dorsal side. Our animals have papillae clearly seen in the middle of each ciliary disc. Donner (1965) considers this species insufficiently described.

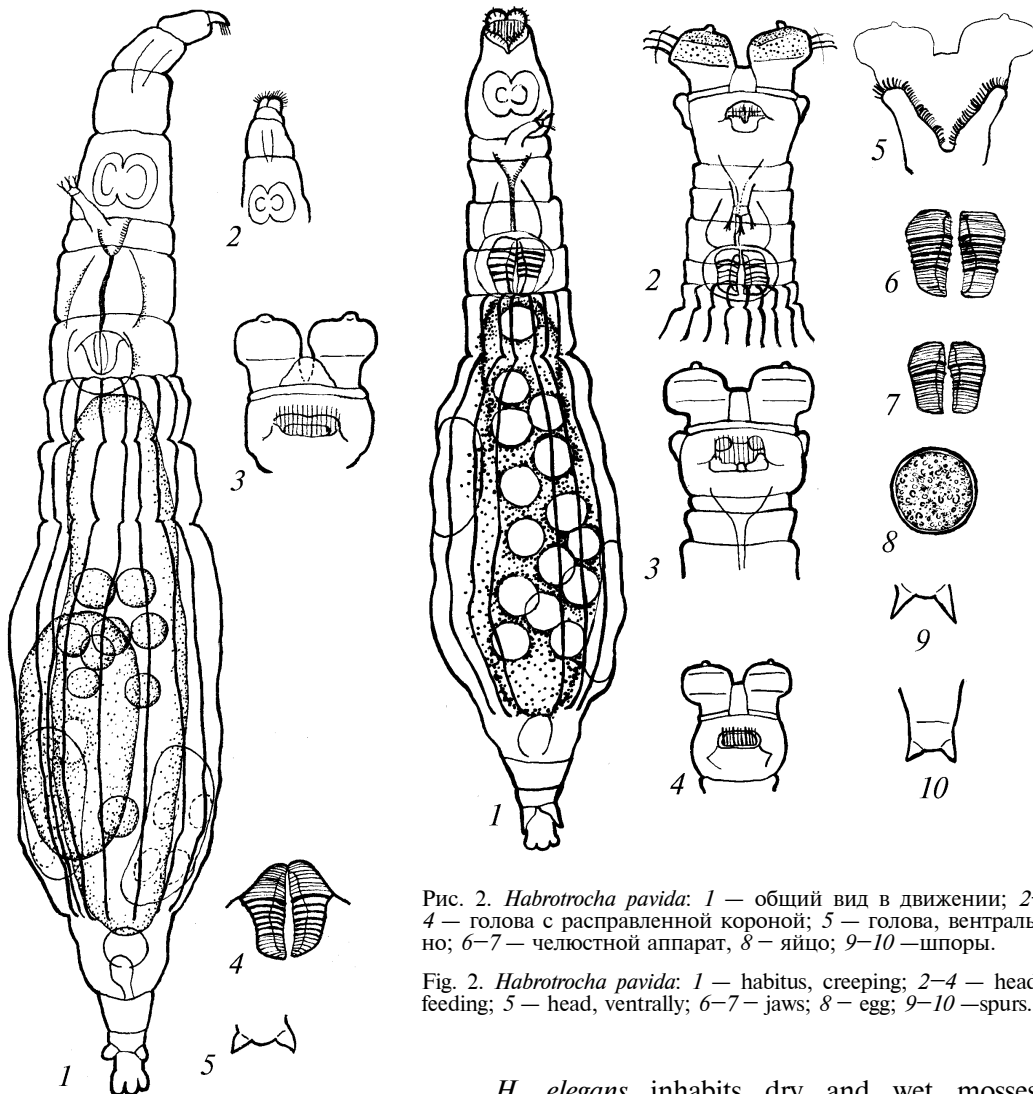


Рис. 1. *Habrotrocha elegans*: 1 — общий вид в движении; 2 — хоботок; 3 — голова с расправленной короной; 4 — челюстной аппарат; 5 — шпоры.

Fig. 1. *Habrotrocha elegans*: 1 — habitus, creeping; 2 — rostrum; 3 — head, feeding; 4 — jaws; 5 — spurs.

Рис. 2. *Habrotrocha pavidata*: 1 — общий вид в движении; 2—4 — голова с расправленной короной; 5 — голова, вентрально; 6—7 — челюстной аппарат; 8 — яйцо; 9—10 — шпоры.

Fig. 2. *Habrotrocha pavidata*: 1 — habitus, creeping; 2—4 — head, feeding; 5 — head, ventrally; 6—7 — jaws; 8 — egg; 9—10 — spurs.

H. elegans inhabits dry and wet mosses, sphagnum, soil and forest litter, it is also found between water plants, as epioic on water arthropods and in the gill cavities of *Astacus*. Numerous finds through the South and West Europe (including mountain regions) and in New Zealand are known (Koniar, 1955; Voigt, 1956—1957). In Ukraine it was not recorded earlier.

Habrotrocha pavidata Bryce, 1915 (fig. 2)

Material. (1) Cherkassy region, Kanev, Kanev reserve grounds, asphalt, moss *Ceratodon purpureus* (Hedw.) Brid. (the same samples where above — mentioned *H. elegans* was found), 18.07.96 (Yakovenko). (2) Ibid., Kanev reserve environs, highway side, moss *Ceratodon purpureus* (Hedw.) Briol. eur. + *Bryum argenteum* Hedw., 14.06.96 (Yakovenko).

Diagnosis. Body spindle-shaped, transparent, colourless or bluish. Cuticle thin, its trunk part covered with wavy folds. Any humps, spines or sculpturation are absent. Rostrum short with two small semicircular lobes. Dorsal antenna twice as shorter as neck breadth. Head rectangular or in the form of an inverted trapezium. Corona lengthways one half of whole head and one third broader than cingulum. Pedicels

erect, loose. A papilla in the centre of each coronal disc. Upper lip small, trapezium-shape, covers from one half to two thirds of the narrow sulcus. Upper lip rim elongated laterally and ventrally so that its corners are seen when observing dorsal side of animal (fig. 2, 2, 3, 5). Foot small, consists of three segments. Spurs small, diverge, conical and sharp, with interspace about double spur-breadth. Eyespots are absent. Jaws large. Teeth well developed, their number varied from 5/5 (fig. 2, 6, specimen from the first sample; in one jaw a delicate tooth before five strong ones) to 3+1 delicate tooth/4 (fig. 2, 7, specimen from the second sample). Stomach pills big and of regular shape. Egg round with smooth shell.

Measurements. Body length: creeping about 250 μm , feeding about 175 μm .

Remark. We observed only freeliving animals. According Donner (1965), *H. pavida* also makes gelatinous or detrital cases.

In Ukraine species is found for the first time. Records are known from the West, South and Central Europe and North America (moss, lichens, soil, needle and leaf litter) (Voigt, 1956–1957, Bartoš, 1959).

Habrotrocha plana (?) Milne, 1916 (fig. 3)

Material. 1 specimen, Cherkassy region, Kanev, Kanev reserve environs, shallow drying-up reservoir, submerged leaves of *Phragmites australis* (Cav.) Trin. Ex Steud, 24.05.96 (Yakovenko).

Diagnosis. Body spindle-shaped, pinkish. Cuticle thin, transparent, without sculpturation, humps or spines. Head rounded. Corona of average size, as wide as head. Pedicels erect, loose, about one third of whole head height. Sulcus not very wide (as one pedicel breadth). Papillae on the disc surfaces lacking. Upper lip triangular, obtuse and covers a half of sulcus. Middle part of the body expanded, rather suddenly tapering off along the rump. Foot massive, of four (?) segments. Spurs fairly long (their length is equal to spur segment breadth), massive, diverge and sharp, without interspace. Eyespots are absent. Jaws semicircular, teeth well developed (dental formula 2/2, in one jaw a thin tooth before two strong ones). Stomach pills small.

Measurements. Body length about 280 μm .

Remark. According Donner (1965, p. 54, a drawing from Milne, 1916) *H. plana* has small sulcus, very narrow spur segment and small spurs whereas our specimen has not. Probably we could deal with some other related species.

Previously *H. plana* was found in rupes-tral and terrestrial mosses and soil in Africa and former Czechoslovakia (Bartoš, 1959). In Ukraine it is recorded for the first time.

Genus *Otostephanos* Milne, 1916

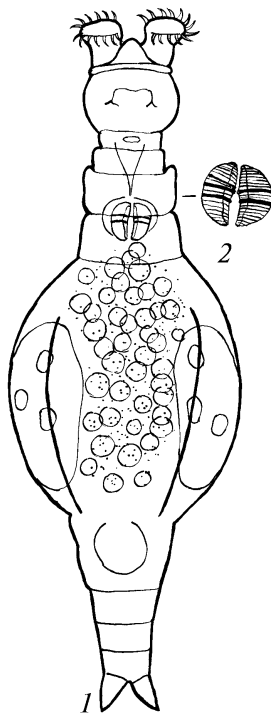


Рис. 3. *Habrotrocha plana* (?): 1 — общий вид с расправленной короной; 2 — челюстной аппарат.

Fig. 3. *Habrotrocha plana* (?): 1 — habitus, feeding; 2 — jaws.

***Otostephanos cuspidilabris* de Koning, 1947 (fig. 4)**

Material. About 3 spec/cm², Donetsk region, "Kamyani mohyly", granitic slabs, southern exposition, soggy moss (*Atrichum* sp.), 25.08.97 (Yakovenko).

Diagnosis. Body transparent and colourless. Sculpturation is absent except numerous folds along the body. Cuticle smooth, delicate. Narrow cuticular hump along the first foot segment (fig. 4, 8–11). Rostrum not very long, with two triangular or semicircular lobes (fig. 4, 1, 5, 10). Neck long. Head rectangular or square. Corona a little broader than head and neck. Pedicels erect and connected with membrane till a half of their length. Upper lip covers about one fourth of sulcus, triangular and blunt. Trunk slim, gradually turning into swollen rump. Foot very short, slender. Spurs of average length, with or without interspace (fig. 4, 3, 7), diverge. Eyespots are absent.

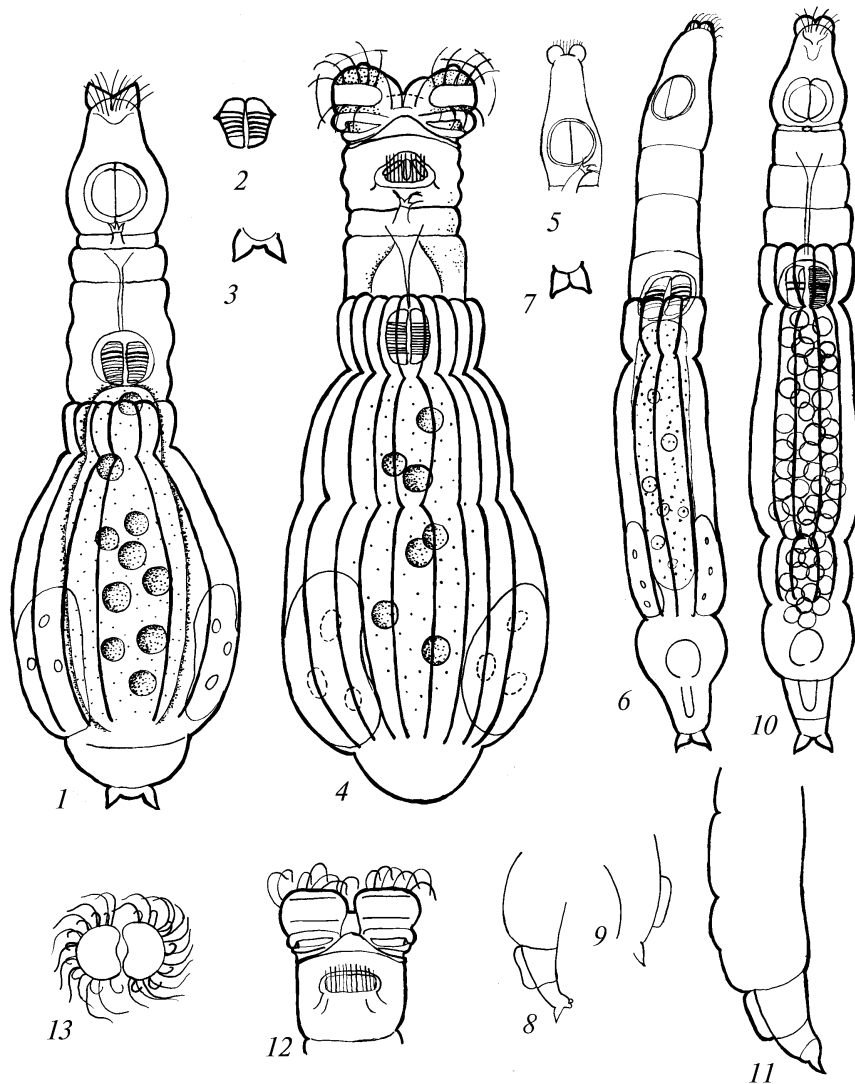


Рис. 4. *Otostephanos cuspidilabris*: 1, 6, 10 — общий вид в движении; 2 — челюстной аппарат; 3, 7 — шпоры; 4 — общий вид с расправленной короной; 5 — хоботок; 8, 11 — бедренная часть и нога; 9 — нога; 12 — голова с расправленной короной; 13 — корона, вид сверху.

Fig. 4. *Otostephanos cuspidilabris*: 1, 6, 10 — habitus, creeping; 2 — jaws; 3, 7 — spurs; 4 — habitus, feeding; 5 — rostrum; 8, 11 — rump and foot; 9 — foot; 12 — head, feeding; 13 — corona from above.

Jaws large with numerous delicate teeth. Some specimens had various numbers of strong teeth: 5/6 (fig. 4, 2), 4/4 (fig. 4, 6), 2/2 (fig. 4, 10). Eggs were not found.

Measurements. Body length: about 95 μm retracted.

Remark. In Ukraine *O. cuspidilabris* is found for the first time. Previously it is known from Netherlands (sphagnum) (Voigt, 1956–57).

***Otostephanos donneri* (?) Bartoš, 1959 (fig. 5)**

Material. 2–3 specimens. (1) Cherkassy region, Kanev reserve environs, shallow drying-up reservoir, between duckweed (*Lemna trisulca* L.), 18.07.96 (Yakovenko). (2) Ibid., 8.08.96 (Yakovenko).

Diagnosis. Body small, transparent, colourless (stomach brightly red-brown). Cuticle smooth, with longitudinal folds on the trunk and rump. Rostrum short, with two semicircular lobes and long cilia. Foot short. Spurs needle-shaped with roots swollen, its length equals double breadth of spur segment. Eyespots are absent. Jaws with numerous delicate teeth.

Remark. We failed to see stretched corona despite of observing living animals during long time and decided to attribute these specimens of Habrotrochidae family to *O. donneri* because of the distinctive spur form.

In Ukraine species is found for the first time. Formerly it is known from Germany, Romania, New Zealand and former Czechoslovakia (for example, on the lower side of *Potamogeton natans* leaves) (Bartoš, 1959).

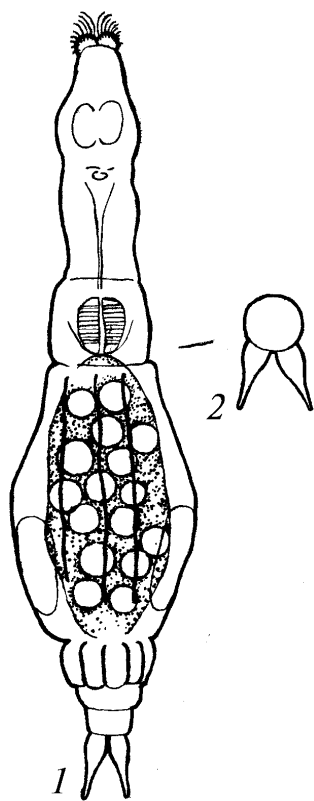


Рис. 5. *Otostephanos donneri* (?): 1 — общий вид в движении; 2 — шпоры.

Fig. 5. *Otostephanos donneri* (?): 1 — habitus, creeping; 2 — spurs.

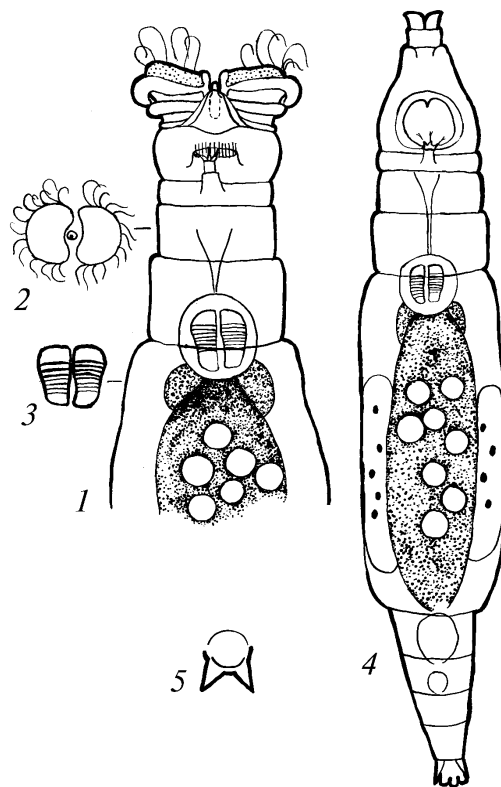


Рис. 6. *Otostephanos monteti*: 1 — голова с расправленной короной; 2 — корона, вид сверху; 3 — челюстной аппарат; 4 — общий вид в движении; 5 — шпоры.

Fig. 6. *Otostephanos monteti*: 1 — head, feeding; 2 — corona, view from above; 3 — jaws; 4 — habitus, creeping; 5 — spurs.

***Otostephanos monteti* Milne, 1916 (fig. 6)**

Material. 1 specimen, Cherkassy region, Kanev reserve environs, bank of small reservoir, wet moss (*Drepanocladus aduncus* Monk, 1.07.96 (Yakovenko).

Diagnosis. Body massive, transparent, colourless (stomach yellow-brown, vitellarium nuclei red-brown). Cuticle of the trunk very fine granulated. Any spines or humps are absent. Rostrum short, with two elongated angular lobes. Neck wide, massive. Head rectangular, its height: breadth being as 1:2. Corona rather high, pedicels erect, connected with membrane at the roots; sulcus narrow and in the middle of it a ligula is seen (fig. 6, 1, 2). Upper lip triangular, blunt, covers about two thirds of sulcus. Esophagus straight. Stomach pills of regular shape. Trunk sharply separated from rump gradually turning into the slender short foot. Spurs small, thin, pointed; interspace is equal to a spur breadth. Eyespots are absent. Dental formula 8/8. Eggs are not found.

Measurements. Body length: creeping 210 mcm, feeding 170 mcm.

Remark. According to Milne's description (kindly given by Dr. Örstan), *O. monteti* has plump body and very long dorsal antenna whereas our specimen has not. We however might not succeed to observe whole stretched antenna. In my opinion, rotifer found is similar to that depicted by Donner (Donner, 1965, p. 97; Voigt, 1965–57, Taf. 114, 2).

The species is first recorded for Ukraine. Formerly *O. monteti* was found in Switzerland, Romania, Austria, South Africa and former Czechoslovakia. In moss and on the lower side of *Potamogeton natans* leaves (Voigt, 1956–1957).

ORDER ADINETIDA

Family Adinetidae

Genus *Adineta* Hudson and Gosse, 1886***Adineta gracilis* Janson, 1893 (fig. 7)**

Material. (1) 1 specimen, Cherkassy region, Kanev, Kanev reserve environs, shallow drying-up reservoir, submerged leaves of *Phragmites australis* (Cav.) Trin. Ex Steud, 24.05.96 (Yakovenko,). (2) About 5 spec./cm², Nikolayev region, "Granitno-Stepove Pobuzh'a", rupestral mosses and lichens, 23.08.97 (Tarashchuk). The first sample had been stored about three weeks at the room temperature before identification was performed, so that the leaves began decaying.

Diagnosis. Body small, slim, transparent and colourless. Humps, spines or sculpturation are absent except numerous folds along and across the body. Cuticle delicate, smooth. Oval head with wide, rounded rostrum. Rostrum lobes lacking. Foot slender and as about one fourth of the body length. Spurs short, conical, diverge and sharp. Interspace large, convex. Toes very small. Eyespots are absent. Dental formula 2/2, lumen with a loop. Eggs are not found.

Measurements. Total length about 190 mcm

Adineta gracilis is known to dwell in lakes, running waters, bogs as well as dry aerophytic moss, forest litter and soil through the Western Europe and in South Africa, Antarctica, Northern and Southern America, New Zealand and the Pacific islands (Bartoš, 1959). First found in Ukraine.

***Adineta rhomboidea* Berzins, 1950 (fig. 8)**

Material. 4–5 specimens. Cherkassy region, Kanev, Kanev reserve environs, reserve grounds, asphalt, moss *Ceratodon purpureus* (Hedw.) Brid., 18.07.96 (Yakovenko) Along with *A. vaga*.

Diagnosis. Body about 300 mcm, transparent and colourless. Neck segment swollen with a pair of small rotating bodies on each side of the dorsal antenna. Rump

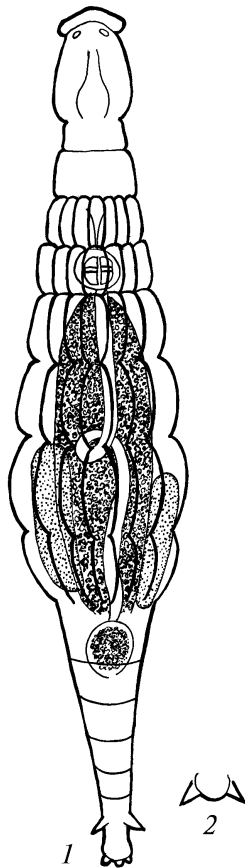


Рис. 7. *Adineta gracilis*: 1 — общий вид в движении; 2 — нижняя часть ноги со шпорами.

Fig. 7. *Adineta gracilis*: 1 — habitus, creeping; 2 — foot with spurs.

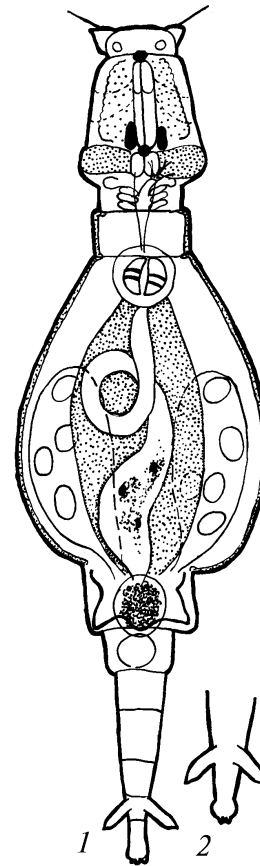


Рис. 9. *Adineta steineri*: 1 — общий вид; 2 — нижняя часть ноги со шпорами.

Fig. 9. *Adineta steineri*: 1 — habitus; 2 — foot end with spurs.

with two sharp protrusions on right and left sides (“rhombic”). Spurs sharp, with parallel sides, half as much again long as bearing joint breadth (see fig. 8, 2, 3, comparing with *A. vaga* from the same habitat). Eyes lacking. Eggs are not found.

The species is first found in Ukraine. Described from Sweden (*A. vaga rhomboidea* Berzins, 1950, but Dr. Urstan considers it a distinct species), specimens were found in *Sphagnum* (Voigt, 1956–1957).

***Adineta steineri* Bartoš, 1951 (fig. 9)**

Material. 3–5 spec/cm², Donetsk region, “Kamyani mohyly”, southern exposition, wet rupestral mosses and lichens, 25.08.97 (Yakovenko).

Diagnosis. Large body with transparent, fine granulated cuticle. Low hump in the form of inverted trident on the anterior rump part. Head very large (about one fifth of the body length) and massive. Rostrum wide, massive, two sharp triangular rostrum lobes with one long stiff bristle on each lobe. Neck wide and short. Dorsal antenna small, about one fourth of the neck breadth long. Trunk much expanded in the middle part and abruptly narrowed before the rump. Rump rectangular, with elongated inferior corners and straight-cut end of its anterior part. Foot slender, body length: foot length nearly is as 3 : 1. Spurs massive, with parallel sides, pointed and

about twice as long as spur segment breadth. Toes very small. Eyespots are absent. Esophagus straight, dental formula 2/2. Lumen with a loop. Eggs are not found.

Measurements. Body length about 350 μm

In Ukraine for the first time. Previously found in Western Europe, Canada, Brazil, Antarctic and New Zealand. Species inhabits small pools and was even found in pitcher plant leaves (Bateman, 1987) but mostly dwells in moss, soil and litter.

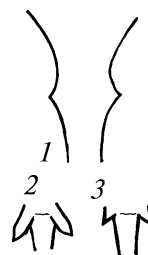


Рис. 8. *Adineta rhomboidea*: 1 — нога; 2 — шпоры. *A. vaga vaga* из той же пробы: 3 — шпоры.

Fig. 8. *Adineta rhomboidea*: 1 — foot; 2 — spurs. *A. vaga vaga* from the same sample; 3 — spurs.

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