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A redescription of *Ceratophysella stercoraria* (STACH, 1963) (*Collembola*: *Hypogastruridae*)

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ABSTRACT. *Ceratophysella stercoraria* (STACH, 1963) is redescribed, illustrated and disscused.

Key words: entomology, taxonomy, redescription, *Collembola*, *Hypogastruridae*, *Ceratophysella stercoraria*.

INTRODUCTION

During faunistic investigations in Southern Poland, a rich population of *Ceratophysella stercoraria* (STACH, 1963) was recorded (species new to the Polish fauna). During examination of these specimens I have encountered several problems with species identification. The dorsal body chaetotaxy, morphology of ant. 4 and claws presented in the original description (STACH 1963) depart in some details from the scheme of the *denticulata*-group. Moreover STACH's information on a peculiar sexual dimorphism conflicted with the rich Polish material.

A close resamblance of *C. stercoraria* to related European species requires accurate defining of this species.

Thanks to the kindness of Prof. ANDRZEJ SZEPTYCKI (PAS, Cracow) I have had an opportunity to examine syntypes of *C. stercoraria*. I have found distinct differences between STACH's original description and the type material. This has induced me to redescribe the species.

Ceratophysella stercoraria (STACH, 1963)

MATERIAL

Types: lectotype: female on slide, Afghanistan, Gaoukouch Cave, 2590 m a.s.l., halfway between Qal'eh, Chahrak and Toulak, on guano, 5.08.1962, leg. K. LINDBERG; paralectotypes: male on slide, male and immature female in alcohol (at present on slide), same data as lectotype (preserved in collection of Institute of Systematics and Evolution of Animals PAS, Cracow, Poland). Present designation.

Other material examined: c. 100 specimens, neighborhood of Maków Podhalański (Beskid Makowski Mts., Carpathians, Poland), gravel bed of Skawica river, flood debris, 11.11.1994, leg. R. J. POMORSKI, D. SKARŻYŃSKI; 2 specimens, neighborhood of Wisła (Beskid Śląski Mts., Carpathians, Poland), gravel bed of Wisła river, flood debris, 14.11.1994, leg. R. J. POMORSKI, D. SKARŻYŃSKI; 2 specimens, Chernomorets (Southern Black Sea Coast, Bulgaria), litter and soil samples from an old stable and house garden 14.09.1996, leg. R. J. POMORSKI, D. SKARŻYNSKI; 1 specimen, neighborhood of Worochta (Czarnohora Mts., E Carpathians, Ukraine), gravel bed of Prut river, flood debris, 10.09.1999, leg. D. SKARŻYŃSKI.

REDESCRIPTION

The redescription has been based exlusively on the type material: lectotype – subadult female (0.9 mm) with genital plate consisting of 9 setae and aperture (specimen partly damaged: anal spines broken off subapically, third legs and some setae missing - only chaetopores are visible), paralectotypes: male (0.85 mm) labelled by STACH (almost completely damaged, only tergum of abd. 5 is well visible), subadult male (0.9 mm) with distinctly marked (but setae unvisible) genital plate and immature female (0.63 mm) with 4 setae on genital plate.

Colour of the body (in alcohol) spotted brownish-violet, paler ventrally. Granulation strong, especially on two last abdominal terga. In the middle of abdominal tergum 5 between setae p_1 of lectotype and all paralectotypes there is a strongly granulated, semicircular swelling of variable size which is slightly protruded beyond hind margin of tergum (figs. 1, 4-6). 8-11 granules between setae p_1 on abd. 5.

Dorsal chaetotaxy typical for the *denticulata*-group (fig. 1). Body hairs moderately long, finely serrated, macrochaetae well differentiated, sensilla comparatively long (paralectotype, male: th. 3 - p_4/p_5:0.77, m_7/p_6: 0.8; abd. 3 - p_5/p_6: 0.77; abd. 4 - p_5/p_4: 0.62). Th. 2, 3 with seta m_6, without seta m_2, m_3 and with seta p_2 shifted anterad. Th. 2 with seta a_2 equally large as a_3 and $a_1/a_{2,3}$ ratio: 0.6. Abd. 1-3 with seta a_2'. Abd. 4 with 4 setae in row m and seta a_4 present or absent. Abd. 5 with seta a_2'. Subcoxae 1-3 with 1, 3, 3 setae respectively (fig. 1). Microsensillum on th. 2 present.

Ant. 4 with simple apical bulb, subapical organ, microsensillum, 7 (5 dorsal, 2 dorsolateral) moderately long, equaly large, slightly curved sensilla in typical arrangement as in figs. 2, 3. Ant. 4 ventral file weakly visible but single sensilla

1-8. *Ceratophysella stercoraria*: 1 – dorsal chaetotaxy of lectotype, 2 – ant. 3-4 sensilla in dorsolateral view, specimen from Poland, 3 – ant. 4 ventro-apical sensilla, specimen from Poland, (4-6) – strongly granulated swelling on abd. 5, 4 - paralectotype (immature female), 5 – paralectotype (male), 6 – lectotype, 7 – claw and empodial appendage of first leg of lectotype, lateral view, 8 – claw and chaetotaxy of tib. 2 of lectotype, dorsal view. Abbreviations: ms – microsensillum, s – sensillum, ab – apical bulb, so – subapical organ, d – dorsal sensilla, dl – dorsolateral sensilla, vf – ventral file

which I could observe were rather short and sharply pointed. The exact number of ventral file sensilla is difficult to ascertain but it seems to be approximately 10. Ant. 3 organ consists of two short, curved and two long, straight sensilla in typical arrangement. An eversible sac between ant. 3 and 4 present. Ant. 1 with 7 setae.

Ocelli 8 + 8. PAO about 2.5-3 times larger than ocellus, with 4 lobes of which the anterior pair larger than the posterior. Accesory boss present (fig. 1).

Labrum with 5, 5, 4 setae. 4 prelabral setae. Head of maxilla of the *denticulata*-type (FJELLBERG 1984), outer lobe with 1 sublobal hair. Labium of the *denticulata*-type (FJELLBERG 1998/1999) but labial palp with rough guard papilla e_1 which resemble proximal setae.

Tibiotarsi 1-3 with 19, 19, 18 setae. Tibiotarsal tenent hairs distinctly shorter than claws, acuminate (fig. 8). Claws with distinct inner tooth and two pairs of weak lateral teeth (figs. 7, 8). Empodial appendage with broad basal lamella and apical filament reaching middle of inner unguis (fig. 7).

Ventral tube with 4 + 4 setae. Retinaculum with 4 + 4 teeth.

Furca fully developed. Dens with uniform granulation and 7 setae (2 subapical on inner side are thicker than others). Mucro typical for the *denticulata*-group. Dens two times longer than mucro.

Anal spines long (= claws 3), curved and inserted on high papillae.

REMARKS

I have found the following distinct differences between the type material and STACH's original description: setae are slightly serrated (versus smooth), body chaetotaxy typical for the *denticulata*-group (versus chaetotaxy of the *denticulata*-group, but incomplete and disfigured), arrangement and shape of ant. 4 sensilla typical for *denticulata*-group (versus dorsal sensilla differentiated in size, microsensillum located close to the apex of antenna, subapical organ similar to dorsal sensilla but shorter, ventroapical sensilla missing), claws with distinct inner tooth and two pairs of weak lateral teeth (versus indistinct, small inner tooth only), tibiotarsal hairs distinctly shorter than claws (versus equally long), both males and females have strongly granulated swelling on abd. 5 (versus males only).

The morphological characters of the Polish specimens of *C. stercoraria* agree with the redescription. Males, females and even immature specimens have strongly granulated swelling on abd. 5. However, I have noticed some exceptions: the size of fully adult specimens varies from 1.3 in reproductive males to 1.5 mm in reproductive females (females with 9 setae on genital plate, like the lectotype, are c. 1.2 mm in lenght), the number of granules between setae p_1 on abd. 5 is 9-16, the body sensilla are distinctly shorter than macrochaetae (th. 3 - p_4/p_5:0.66, m_7/p_6: 0.57; abd. 3 - p_5/p_6: 0.57; abd. 4 - p_5/p_4: 0.62), in fully adult specimens there is often seta m_3 on th. 2, the sensilla of ant. 4 ventral file vary from short, sharply pointed to moderately long with slightly flattened apex (fig. 3).

Specimen which I have collected in Ukraine wholly agree with the Polish material while Bulgarian specimens have comparatively short dorsal setae, long thoracic sensilla (p_4/p_5: 0.9), seta m_3 on th. 2 absent, ant. 4 ventral file sensilla moderately long with flattened apex (11-12 in number) and strongly developed granulated swelling on abd. 5.

BABENKO et al. (1994) ascertained that *C. stercoraria* from the former USSR territory had 10-15 moderately long, slightly flattened apically sensilla in ant. 4 ventral file, seta m_3 on th. 2 missing. Moreover in one population from Georgia he noticed the presence of granulated swelling on abd. 5 only in females.

Undoubtedly these differences are associated with different degree of maturity of the examined specimens and with infrasubspecific variability.

DISSCUSION

C. stercoraria is closely related to *Ceratophysella gibbosa* (BAGNALL, 1940), *Ceratophysella caucasica* MARTYNOWA, 1971 sensu BABENKO et al., 1994 and *Ceratophysella denticulata* (BAGNALL, 1941). *C. gibbosa* has a swelling on abd. 5 similar to *C. stercoraria* but it differs clearly in the absence of setae m_3 on th. 2, a_1 on abd. 4 and a_2' on abd. 5. The following two species do not differ so clearly. *C. caucasica* has a circular swelling on abd. 5 protruding distinctly beyond hind margin of tergum, 20-25 short sensilla in ant. 4 ventral file (strongly flattened at the tip) and seta m_3 on th. 2, but in the Caucasus Mts. it forms mixed populations with *C. stercoraria* (BABENKO et al. 1994). *C. denticulata* has 10-20 sensillae of variable size and shape in ant. 4 ventral file, seta m_3 on th. 2 absent and no semicircular swelling on abd. 5, but populations with slightly protruding strong granules are known.

The taxonomic position of this group of species is unclear and requires further studies.

DISTRIBUTION AND ECOLOGY

C. stercoraria is known from Afghanistan, Ethiopia, Central Asia, Kazakhstan, Georgia, Azerbaijan, Ukraine, Russia (BABENKO et al. 1994), Poland and Bulgaria (POMORSKI & SKARŻYŃSKI in press), most records being from forest litter, flood debris, composts, gardens and one from the cave.

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