

First records of ciliate suctorian epibionts on *Hydraena* (Coleoptera) from South Korea

IGOR DOVGAL¹ and VLADIMIR PEŠIĆ²

¹Schmalhausen Institute of Zoology, B. Khmelnytsky str., 15, 01601, Kiev, Ukraine. E-mail: dovgal@izan.kiev.ua

²Department of Biology, Faculty of Sciences, University of Montenegro, Cetinjski put b.b., 81000 Podgorica, Montenegro. E-mail: vladopesic@gmail.com

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Abstract

In the course of a recent survey of South Korea, a two species of suctorian ciliates, i.e., *Urnula turpissima* Kormos, 1958 and *Periacineta hydrochi* (Matthes, 1954), attached on water beetles of the genus *Hydraena* (Hydraenidae, Coleoptera), were collected and reported for the first time for South Korea. *Periacineta hydrochi* is reported for the first time after its original description.

Key words: Suctorian ciliates, aquatic beetles, epibiont, lotic ecosystems.

Introduction

Suctorians (class Suctorea) is a peculiar group of carnivorous or parasitic ciliates (Dovgal 2002) which is poorly known in respect of distribution and species composition of species living as epibionts on of aquatic beetles inhabits lotic ecosystems (Dovgal and Pešić 2012).

In the course of a recent survey of the water mite fauna of South Korea (see Pešić et al. 2012), junior author collected a two species of suctorian ciliates, i.e., *Periacineta hydrochi* (Matthes, 1954) and *Urnula turpissima* Kormos, 1958, attached on the water beetles of the genus *Hydraena* (Hydraenidae, Coleoptera). This paper aims to present the highly interesting results of the investigations. This is possible first report of freshwater suctorian ciliates from Korea, and first records of these species for Korea.

Moreover as the both species rarely were collected, we give an detailed description of these species based on the new findings from South Korea.

Material and methods

Suctorian specimens used in the present study were found attached on aquatic beetles of the genus *Hydraena* (Coleoptera) collected from a river (36°57.182' N, 129°17.670' E, 24.v.2013) at the road to Sobaeksan NP, South Korea; a permanent sandy/bouldary river was remarkably exposed to sunlight, without riparian vegetation (Fig. 1B).

Hydraenid beetles were collected by hand netting, sorted on the spot from other living material and preserved in 75% alcohool. For the preparation of slides the material was placed on the microscope slide in 20% glycerol-4% formalin mixture (in the proportion 1 part of glycerol to 4 parts of formalin), coat by cover

glass accompanied by the edging of polystyrene (Jankowski 1975). Permanent slides of infested animals were deposited in the collections of the Department of Fauna and Systematics of invertebrate animals of Schmalhausen Institute of Zoology, National Academy of Sciences, Ukraine.

The measurements were performed using a computer program ScopePhoto 2.0.

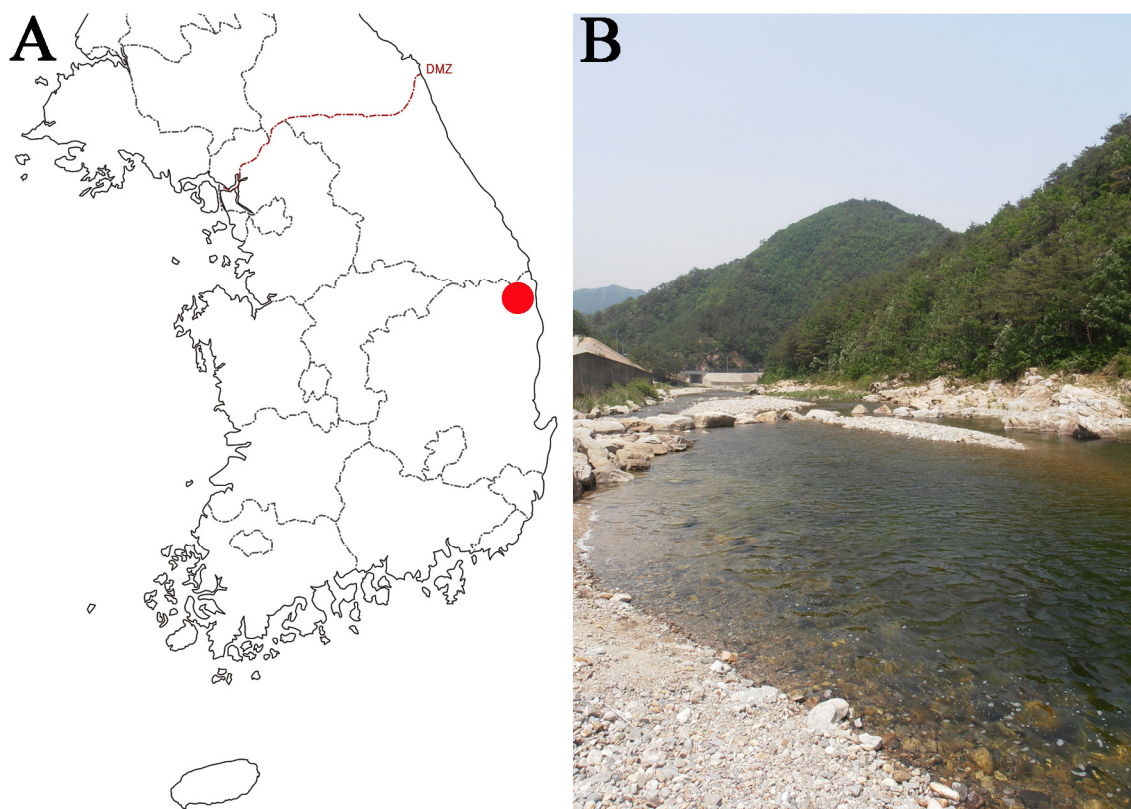


Figure 1. **A** Map of South Korea with marked sampling locality (river at the road to Sobaeksan NP). **B** Photograph of sampling locality. Photo. V. Pešić

Results

Subclass Evaginogenia Jankowski, 1975

Order Discophryida Jankowski, 1975

Family Periacinetidae Jankowski, 1978

Genus *Periacineta* Collin, 1909

***Periacineta hydrochi* (Matthes, 1954)**

(Fig. 2A)

Diagnosis. Loricated, stalked suctorian ciliate. Lorica, much wider than long, flattened but slightly widens in its apical part. The stalk of various lengths, with a grows lines and slightly developed longitudinal striations in its basal part.

The cytoplasm is usually yellowish-brown. Four to six contractile vacuoles are located parallel to the front edge of the cell body. Macronucleus is horseshoe-shaped. Reproduction by inversogemmuc budding.

Measurements (in μm): body length 26-61 (72-118 after Matthes 1954), width 37-69 (91-126 after Matthes 1954); length of stalk 12-71, diameter 10-14.

Remarks. The species was originally described by Matthes (1954) as *Discophrya hydrochi* Matthes, 1954. Later on, this species was transferred to the genus *Periacineta* (Dovgal, 2002, Mariño-Pérez *et al.* 2010). Our specimens from South Korea fits well the description of typical form of *Discophrya hydrochi*.

However, it is worth to mention that Matthes (1954) described aberrant form of this species, called by him in German as articular form ("Gelenkform"). According to Matthes (1954) and Matthes *et al.* (1988) this form is characterized by the following features: the length of lorica is greater than width; the individual as a rule is attached to the host body in such a manner that its body axis is perpendicular to the longitudinal axis of the beetle leg; the lorica mouth of ciliate is deeply curved thus its lateral ends omitted almost to level of junction between stalk and lorica; the stalk is enough wide and clearly separated from the lorica. Further, the cell body of "articular" individuals is dirty as a rule and correspondingly the macronucleus and the contractile vacuoles are poorly visible and the number of contractile vacuoles increased up to 9. Matthes (1954) gave the measurements: body length 113-143, width 85-122 μm .

Later on the "articular" form of *Discophrya hydrochi* was described by Jankowski (1981) as separate species, *Arcodiscophrya heraldica* Jankowski, 1981. Recently, this species was transferred to the genus *Periacineta* under name *P. heraldica* (Jankowski, 1981) (see: Dovgal 2002, Mariño-Pérez *et al.* 2010).

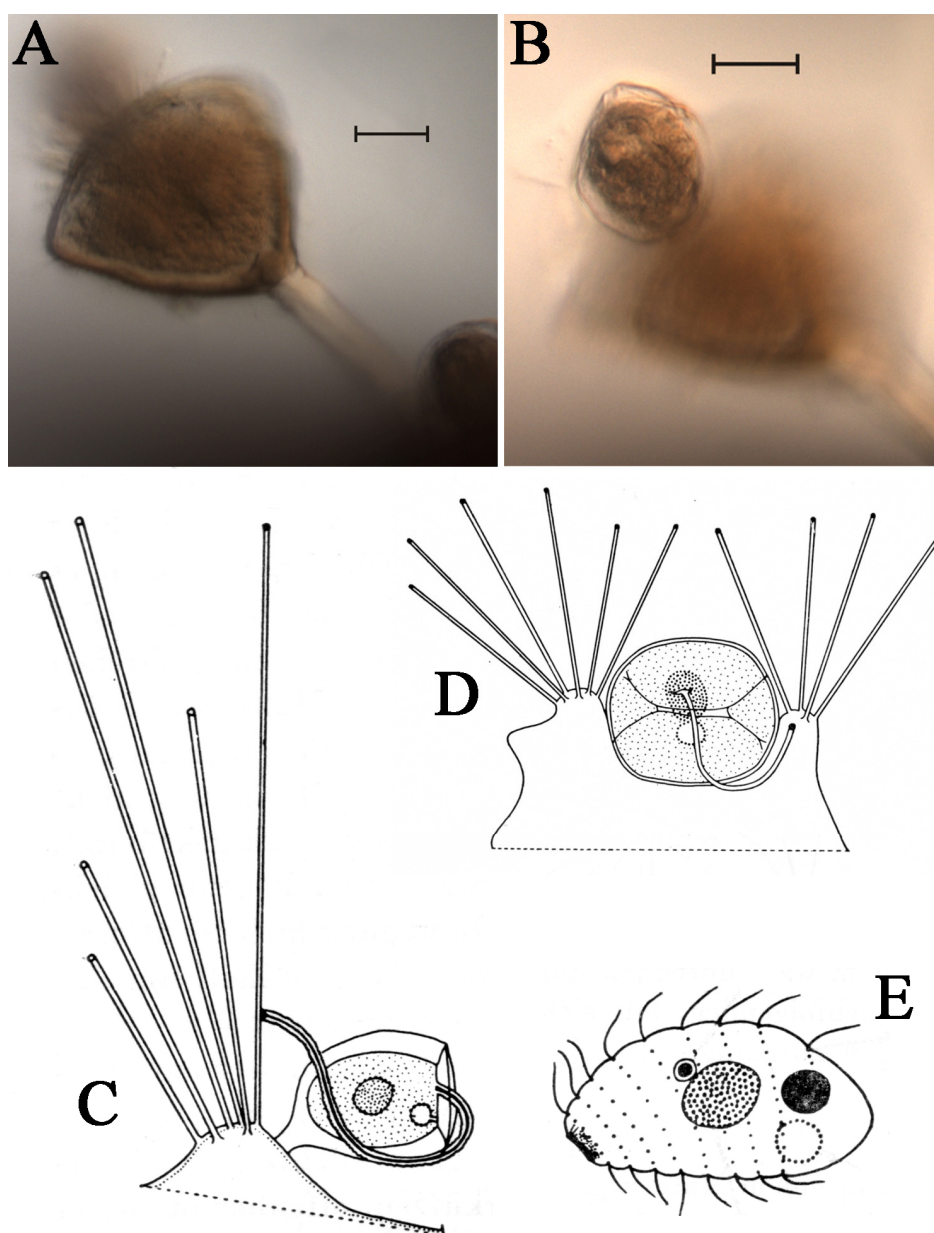


Figure 2. **A** photograph of *Periacineta hydrochi* (Matthes, 1954), from *Hydraena* sp. **B-E** *Urnula turpissima* Kormos, 1958 (**C-E** after Kormos 1958): **B** photograph of specimen attached on *Periacineta hydrochi*, from South Korea; **C** trophont, lateral view; **D** trophont, top view; **E** swarmer (after Kormos, 1958). Scale bar = 20 μm (A-B).

Distribution and host prevalence. The species was described by Matthes (1954) from Germany, and no further record of this species was published after its original description. *Periacineta hydrochi* is epibiont on hydrophilid beetles (Matthes *et al.* 1988), attaching to the head and legs (often in articulation between femur and tibia) of their hosts. The known hosts includes following beetle species: *Hydrochus elongatus* (Schaller, 1783), *H. carinatus* Germar, 1824 and *Hydraena* sp. (new host). The specimens examined from South Korea were found attached on the head and legs of the latter species.

Subclass Exogenia Collin, 1912

Order Metacinetida Jankowski, 1978

Family Metacinetidae Bütschli, 1889

Genus *Urnula* Claparede et Lachmann, 1859

***Urnula turpissima* Kormos, 1958**

(Figs. 2B-E)

Diagnosis. Suctorian ciliate with stylothecca-type lorica. The trophont cell body is spherical or ellipsoidal, clamped to the mouth of stylothecca. Macronucleus central, large, spherical. The tentacle is single, long, flexible and agile. Stylothecca is spherical or slightly elongated. The upper part of the lorica has four processes, which adjoins each other along the entire length except the central part forming a chinked mouth, resulting that the apical edge of the lorica is plicate from the lateral view. Reproduction by semi-circumvaginate budding. The swarmer is ellipsoid with slightly concave ventral surface and with 8 transversal ciliary rows (Fig. 2E).

Measurements (in μm): stylothecca height 30; stylothecca diameter 26 (15-30 after Kormos 1958); body diameter 10-20 (after Kormos 1958); length of tentacle 60-85 (after Kormos 1958).

Distribution and host prevalence. The species was described from a waterbody in Szeged district (Hungary, type locality), and later on found in different parts of Europe and Asia (Jankowski 2007). *Urnula turpissima* is ectoparasitic on suctorian ciliates. The known hosts of this species includes following species: *Dendrosoma radians* Erenberg, 1838, *D. capitata* (Perez, 1903), *Stylophrya polymorpha* Swarczewsky, 1928, *Acineta karamani* Hadzi, 1940, *Metacineteta longipes* (Mereschkowsky, 1877). The specimens from South Korea were found ectoparasitic on *Periacineta hydrochi* (Matthes, 1954) (new host).

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