Morhological record of three soil ciliates (Ciliophora) from Korea

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We collected three soil ciliates, Colpoda maupasi Enriquez, 1908, Tillina minima Alekperov, 1985, and Gonostomum singhii Kamra et al., 2008, in Korea. The two genera, Colpoda and Tillina, belong to the class Colpodea, and the other, Gonostomum belongs to the class Spirotrichea. We describe these species based on observations of live and protargol-impregnated specimens.

Keywords: Colpoda, Gonostomum, Korea, soil ciliate, Tillina

INTRODUCTION

The genus Colpoda was established by Müller (1773), and four species have previously been recorded in Korea (Kim and Min, 2015; Kim et al., 2016a). Colpoda species have the following combination of features: a small to rather large vestibulum; funnel shape; left wall of the vestibulum overhangs right; and right a polykinetid composed of disordered kineties (Foissner, 1993).

Recently, the family Tillinidae was established by Foissner et al. (2011) and is distinguished by large body and the presence of a distinct postoral groove; contractile vacuole with collecting canals extending to or near to the anterior body end; large, conical to tubular oral cavity; several to many roof kineties, and oblong exosomes. The genus Tillina is the type genus of the family, and this designation was confirmed by molecular phylogenetic analysis (Foissner et al., 2011; Foissner et al., 2014).

Four valid species of the genus Gonostomum, established by Sterki (1878), have been recorded in Korea (Shin, 1988; Kim and Shin, 2006; Kim et al., 2016b). Gonostomum has the following combination of features: a shortened undulating membrane; mostly three bipolar dorsal kineties; caudal cirri present; and dorsomarginal kineties and kinety fragmentation lacking (Berger, 2011).

In the present study, we describe Colpoda, Tillina, and Gonostomum species based on observations of live and protargol-impregnated specimens. These three species are new records for Korea.

MATERIALS AND METHODS

Specimens of Colpoda maupasi, Tillina minima, and Gonostomum singhii were isolated from soil samples collected from Jeju-do, Ulsan, and Moonkyung provinces in Korea, respectively. Soil samples were transferred into Petri dishes, mineral water was added, and the samples were allowed to stand at room temperature (20°C). Raw cultures of specimens were used for the present study.

Specimens were observed using a stereo microscope (SZH10; Olympus, Japan) and a light microscope (DM2500; Leica, Wetzlar, Germany) at ×50 to ×1000 magnifications. Protargol impregnation was performed according to Foissner (2014). Classification and terminology followed Berger (2011), Foissner (1993), and Foissner et al. (2011).

RESULTS AND REMARKS

Class Colpodea Small & Lynn, 1981, 콜포다섬모충강
Order Colpodida Puytorac et al., 1974, 콜포다섬모충목
Family Colpodidae Bory de St. Vincent, 1826, 콜포다섬모충과
Genus Colpoda Müller, 1773, 콜포다섬모충속

1. Colpoda maupasi Enriquez, 1908

소두콜포다섬모충 (신청) (Fig. 1A-E)

Material examined. Soil (pH 6) with twigs under a tree, Geonhwa-gil (Sarabong Park), Jeju-do Province, Korea
December 2017
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(33°31’ N 126°32’ E), collected by Dong-Ha Ahn in November 2014.

**Diagnosis.** Body size approximately 65 × 30 μm in vivo and 55 × 30 μm in impregnated specimens, reniform, rigid, preoral portion very shortened, and vestibular kineties and postoral sack lacking. Contractile vacuole at

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Genus *Tillina* Grüber, 1879

2. *Tillina minima* Alekperov, 1985

Material examined. Forrest soil (pH 5) Bangeo-Dong, Ulsan Province, South Korea (35°28′ N 129°25′ E), collected by Kang-San Kim in February 2016.

Diagnosis. Body size approximately 140 × 80 μm in vivo and 120 × 75 μm in impregnated specimens. Body shape broadly to narrowly reniform with a distinct postoral groove. Two postoral sacks. Contractile vacuole with distinct collecting canals extending to or near anterior body end. One macronucleus and one micronucleus. Cytoplasm colorless with oblong exusomes. About 90 somatic and six vestibular kineties. About 55 left and 27 right polykinetids.

Remarks. *Tillina minima* is similar in appearance to *T. magna*. *Tillina magna*, a type species of *T. minima*, can be distinguished from *T. minima* based on the following features: body length (150-400 μm vs. 90-160 μm); number of micronucleus (more than two vs. single); and number of somatic kineties (about 133 vs. 90) (Foissner, 1993).

Distribution. Africa, Australia, Europe, Japan, USA.

Deposition. Two voucher slides with protargol-impregnated specimens were deposited in the National Institute of Biological Resources in Korea (NIBRPR0000107264, NIBRPR0000107265).

Identifiers. Kang-San Kim and Gi-Sik Min.

Class Spirotrichea Bütschli, 1889

Order Sporadotrichida Fauré-Fremiet, 1961

Family Gonostomatidae Small & Lynn, 1985

Genus *Gonostomum* Sterki, 1878

3. *Gonostomum singhii* Kamra et al., 2008

Material examined. Soil (pH 6), Moonkyung, Gyeongbuk-do province, South Korea (36°41′ N 127°57′ E), collected by Gi-Sik Min in July 2016.

Diagnosis. Size approximately 80 × 30 μm in impregnated specimens. Body shape elongated ellipsoid, anterior part narrower than posterior part. Undulating membrane typical of *Gonostomum*. Two macronuclear nodules, two or three micronuclei. Three frontal cirri, two frontoterminal cirri, one buccal cirrus, two frontoventral cirral pairs, two thin pretransverse ventral cirri arranged almost vertically, and four transverse cirri. Approximately 10 left and 15 right marginal cirri. Three dorsal kineties with three caudal cirri.

Remarks. The Korean population of *G. singhii* can be distinguished from *G. lajacola* based on the number of frontoventral cirral rows (two vs. three), paroral cirlia (on average 11 vs. 23), and transverse cirri (four vs. five) (Foissner, 2016).

Distribution. Australia, India, Venezuela.

Deposition. Two voucher slides with protargol-impregnated specimens were deposited in the National Institute of Biological Resources in Korea (NIBRPR0000107264, NIBRPR0000107265).

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Acknowledgements

This work was supported by grants from the National Institute of Biological Resources (NIBR), funded by the Ministry of Environment (MOE) of the Republic of Korea (NIBR201601201) and Mid-Career Researcher Program through NRF grant funded by the MEST (2016R1A2B4014520).

References


