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A Taxonomic Study of Order Arcellinida (Protozoa: Sarcomastigophora: Rhizopoda) from Korea

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韓國産 有殼變形蟲目에 대한 分類學的 硏究 I.
(肉質鞭毛蟲門 : 根足蟲上綱)

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적 요

1990년 9월부터 1991년 6월까지 강원도 대관령 습지의 물이끼류(*Sphagnum*)에서 채집한 유각변형충류를 주사전자현미경(SEM)을 사용하여 동정하였다. 그 결과 *Centropyxis platystoma, Hyalosphenia nobilis, Nebela equicalceus, N. penardiana, Quadrulella symmetrica*의 5종이 한국미기록종으로 밝혀졌다.

Key words: taxonomy, Arcellinida, Protozoa, Korea.

INTRODUCTION

Arcellinids belong to the Rhizopoda. They are characterized by the presence of a discrete shell or test and by having the pseudopodia. These protozoans occur in a wide range of moist and freshwater habitats, and are found especially in *Sphagnum* moss.

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The taxonomic study on the Korean arcellinid protozoans occuring in *Sphagnum* moss has been conducted by Chung and Kang in 1991. The present study adds five species to the Korean fauna of the arcellinid protozoans. Now the total 31 species and one variety in five families are known to occur in Korea.

MATERIALS AND METHODS

Sphagnum mosses were collected from a swamp in Taekwanryŏng from September, 1990 to June, 1991. The protozoans were extracted from moss with micropipette under inverted-microscope and prepared for examination by Scanning Electron Microscope (SEM).

Selected protozoans were first cleaned individually with a single-hair brush. Next, each is placed on a small drop of Araldite on a cover slip. The prepared cover slips were mounted on a stub, and coated evenly with gold in a vacuum coating unit. The photographs of specimens were taken by SEM at 10 kV on Polaroid film.

The classification system in the present study was based on Levine *et al.* (1980) and Ogden and Hedley (1980). Korean name was based on Kang *et al.* (1971) and Kim *et al.* (1992).

SYSTEMATIC ACCOUNT

Class Lobosea Carpenter, 1861 엽상근족충 강
Order Arcellinida Kent, 1880 유각변형충 목
Family Centropyxidae Jung, 1942 베레모벌레 과
Genus *Centropyxis* Stein, 1859 베레모벌레 속

1. *Centropyxis platystoma* Penard, 1890 납작입베레모벌레(신칭) (Pl. 1, Figs. A-B)

Centropyxis platystoma Penard, 1890 [cited from Ogden and Hedley, 1980 (p.60)].

Centropyxis platystoma: Ogden and Hedley, 1980 (p.60, pl.19)

Centropyxis platystoma var. arnata: Laminger, 1973 (p.256, abb.8-1)

Material examined: Taekwanryŏng, 4 inds., Sep. 26, 1990; 3 inds., Jun. 6, 1991.

Description: Shell yellow or brown, oval or elongate in shape with flattened aperture. In lateral view beret-shape, tapering towards aperture. Shell surface rough with sandgrains, except for smooth region. Aperture invaginated, oval or circular in shape, subterminal with wide apertural rim. Length of Shell 64-105μm; Breadth of shell 34-70μm; Diameter of aperture 21-43μm.

Distribution: Cosmopolitan.

Remarks: This species is one of the smallest species in the genus *Centropyxis*. It was reported the three major areas, the degree of invagination of the aperture, the constriction of the neck and the shape of the shell, are variable in this species (recited from Ogden and Hedley, 1980).

2. *Hyalosphenia nobilis* Cash and Hopkinson, 1905 양반투명벌레(신칭) (Pl. 1, Figs. C-D)

Hyalosphenia nobilis Cash and Hopkinson, 1905 (p.92, pl. xxv, figs. 1-3)

Material examined: Taekwanryŏng, 2 inds., Jun. 6, 1991.

Description: Shell translucent, flask-shaped in side view, with long cylindrical neck truncated at aper-

ture. Aperture circular in outline, faintly undulated on margin. Length of shell 140-200μm; Breadth of shell 75-90μm; Diameter of aperture 18-30μm.

Distribution: British Isles, Korea.

Remarks: This large and particular elegant rhizopod occurred in considerable plenty amongst the rootlets of *Aulacomnium palustre* (Cash and Hopkinson, 1905). But Ogden and Hedley (1980) had no description on this species and only two materials were obtained in the present study.

3. Nebela equicalceus (Leidy, 1874) 고른껍질판병벌레(신칭) (Pl. 2, Figs. A-B)

Difflugia equicalceus Leidy, 1874 (p. 156) [cited from Cash and Hopkinson, 1905 (p. 111)].

Nebela equicalceus: Leidy, 1876 (p. 118, ff. 12, 13) [cited from Cash and Hopkinson, 1905 (p. 111)].

Nebela equicalceus: Cash and Hopkinson, 1905 (p. 111, fig. 94).

Nebela hippocrepis: Leidy, 1879 (p. 156, pl. xxv, figs, 9-14).

Material examined: Taekwanryŏng, 3 inds., Sep. 26, 1990; 5 inds., Jun. 6, 1991.

Description: Shell yellow or brown, pyriform in broad view, with thick blunt carina extending round convex crown, except apertural region. Shell surface homogeneous, with transparent circular discs. Aperture transversely oval, convex in outline. Length of shell 181-197μm; Breadth of shell 103-133μm; Diameter of aperture 29-35μm.

Distribution: Cosmopolitan.

Remarks: Leidy (1879) described the horse-shoe-shaped keel as extending below the crown for about two-thirds the length of the test.

4. Nebela penardiana Deflandre, 1936 페나르드병벌레(신칭) (Pl. 2, Figs. C-D)

Nebela penardiana Deflandre, 1936 [cited from Ogden and Hedley, 1980 (p. 106)].

Nebela penardiana: Ogden and Hedley, 1980 (p. 106, Pl. 42).

Material examined: Taekwanryŏng, 7 inds., Sep. 26, 1990.

Description: Shell brown, pyriform or elongate in shape, slightly compressed laterally with small lateral margins. Shell surface composed of mixture of oval, circular and quadrangula shell plates. Aperture oval in outline, concave in lateral view, surrounded by collar of organic cement. Length of shell 130-164μm; Breadth of shell 68-75μm; Depth of shell 35-49μm; Diameter of aperture 25-33μm.

Distribution: Cosmopolitan.

Remark: This species is easily distinguished from *N. equicalceus* by being narrower and having less pronounced lateral margins.

5. Quadrulella symmetrica (Wallich, 1863) 기와집아메바(신칭) (Pl. 3, Figs. A-D)

Difflugia symmetrica Wallich, 1863 [cited from Leidy, 1879 (p. 142)].

Quadrulella symmetrica: Leidy, 1879 (p. 142, pl. xxiv, figs. 20-22); Cash and Hopkinson, 1905 (p. 129, pl. XXIX, figs. 1-3); Ogden, 1979 (p.204, fig. 1); Ogden and Hedley, 1980 (p. 116, pl. 47); Ogden, 1984 (p. 261, fig. 42).

Material examined: Taekwanryŏng, 5 inds., Sep. 26, 1990; 7 inds., Jun. 6, 1991.

Description: Shell colorless and transparent, compressed pyriform in shape, shell surface covered with thin, quadrangular, siliceous shell plates. Shell plates usually arranged in a regular manner, often in rows, with smaller plates close to aperture. Aperture often concave in lateral view, surrounded by thin collar of

organic cement. Length of shell 65-123μm, breadth of shell 33-72μm. Diameter of aperture 17-23μm.

Distribution: Cosmopolitan

Remarks: This beautifully-transparent species is usually abundant in boggy ground, where *Sphagnum* abounds. The disposition of the plates is not always symmetrical; they are sometimes seen pressed out of position, with overlapping edges (pl.3, Fig. C). In the present work, some materials had shell surface covered with quadrangular shell plates and circular plates (Pl. 3, Fig. D). These protozoans are the varieties of this species.

ABSTRACT

The Arcellinida (Protozoa: Sarcomastigophora: Rhizopoda) inhabited in *Sphagnum* at Taekwanryŏng, were taxonomically investigated. Collections of *Sphagnum* were made from September, 1990 to June, 1991 at swamp located in Taekwanryŏng. As a result of the present study, 5 species in two Families were identified, which were newly recorded from Korea: *Centropyxis platystoma* Penard, *Quadrulella symmetrica* (Wallich), *Hyalosphenia nobilis* Cash and Hopkinson, *Nebela equicalceus* (Leidy), *N. penardiana* Deflandre. These five species were redescribed with photographs.

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EXPLANATION OF PLATES

PLATE 1

Figs. A-B. *Centropyxis platystoma* Penard. A, Apertural view; B, View of aperture.

Figs. C-D. *Hyalosphenia nobils* Cash and Hopkinson. C, Broad lateral view; D, Apertural view.

PLATE 2

Figs. A-B. *Nebela equicalceus* (Leidy). A, Broad lateral view; B, Apertural view.

Figs. C-D. *Nebela penardiana* Deflandre. C, Broad lateral view: D, View of aperture.

PLATE 3

Figs. A-C. *Quadrulella symmetrica* (Wallich). A, Broad lateral view; B, View of aperture; C, Part of shell surface to show the arrangement of the siliceous quadrangula plates.

Fig. D. *Quadrulella* sp. Shell surface covered with quadrula plates and circular plates.

PLATE 1

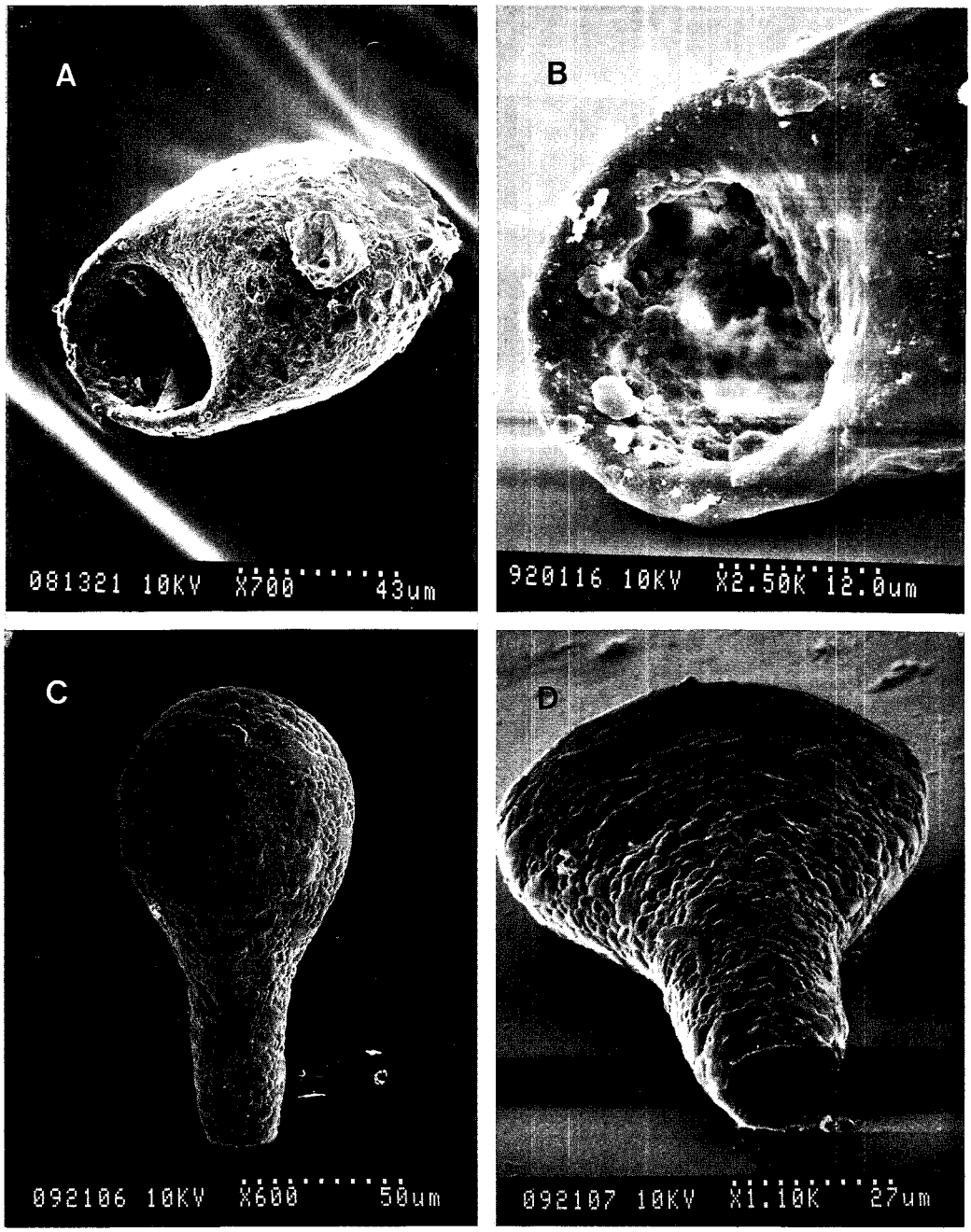

A
081321 10KV X700 43um
B
920116 10KV X2.50K 12.0um
C
092106 10KV X600 50um
D
092107 10KV X1.10K 27um

PLATE 2

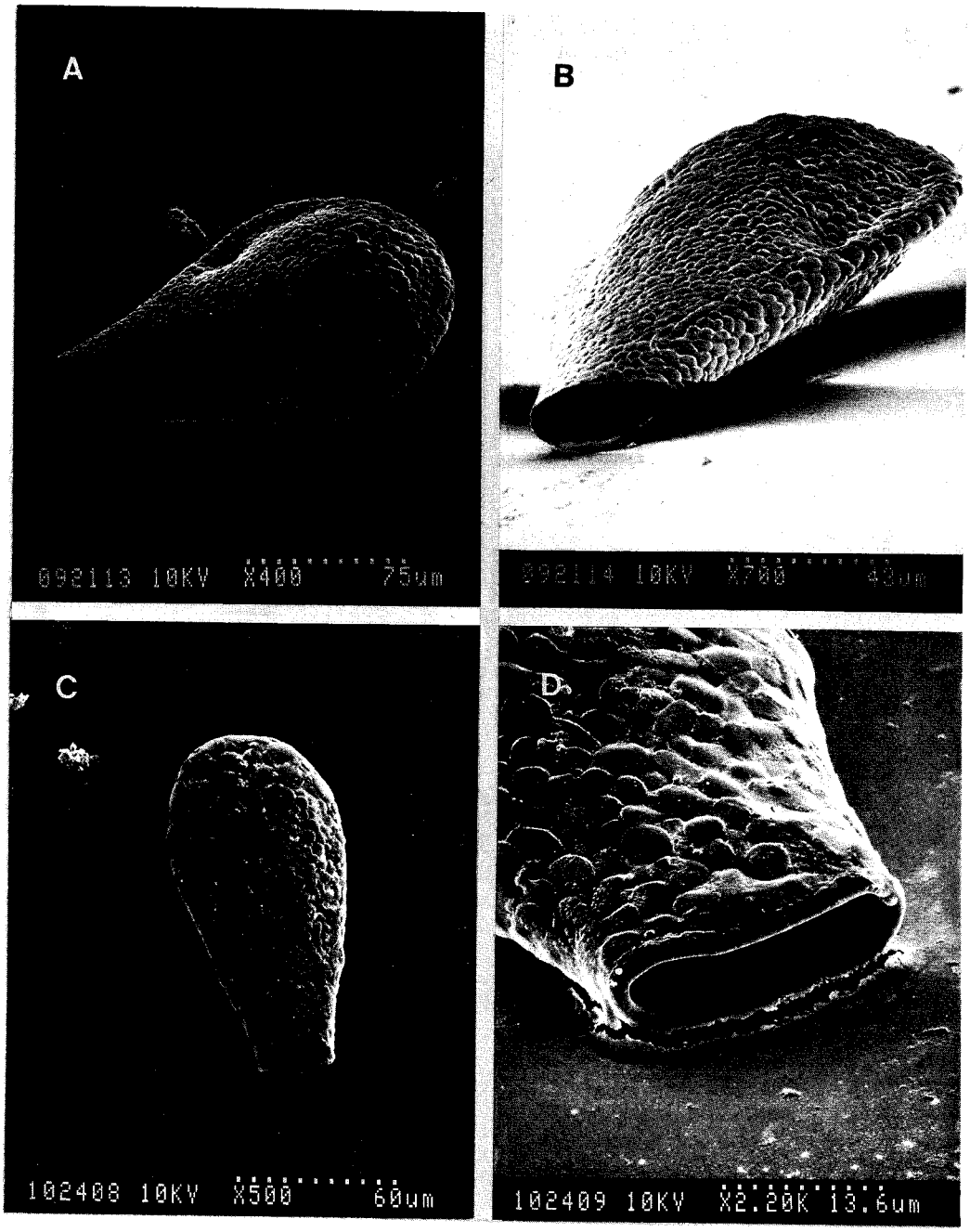
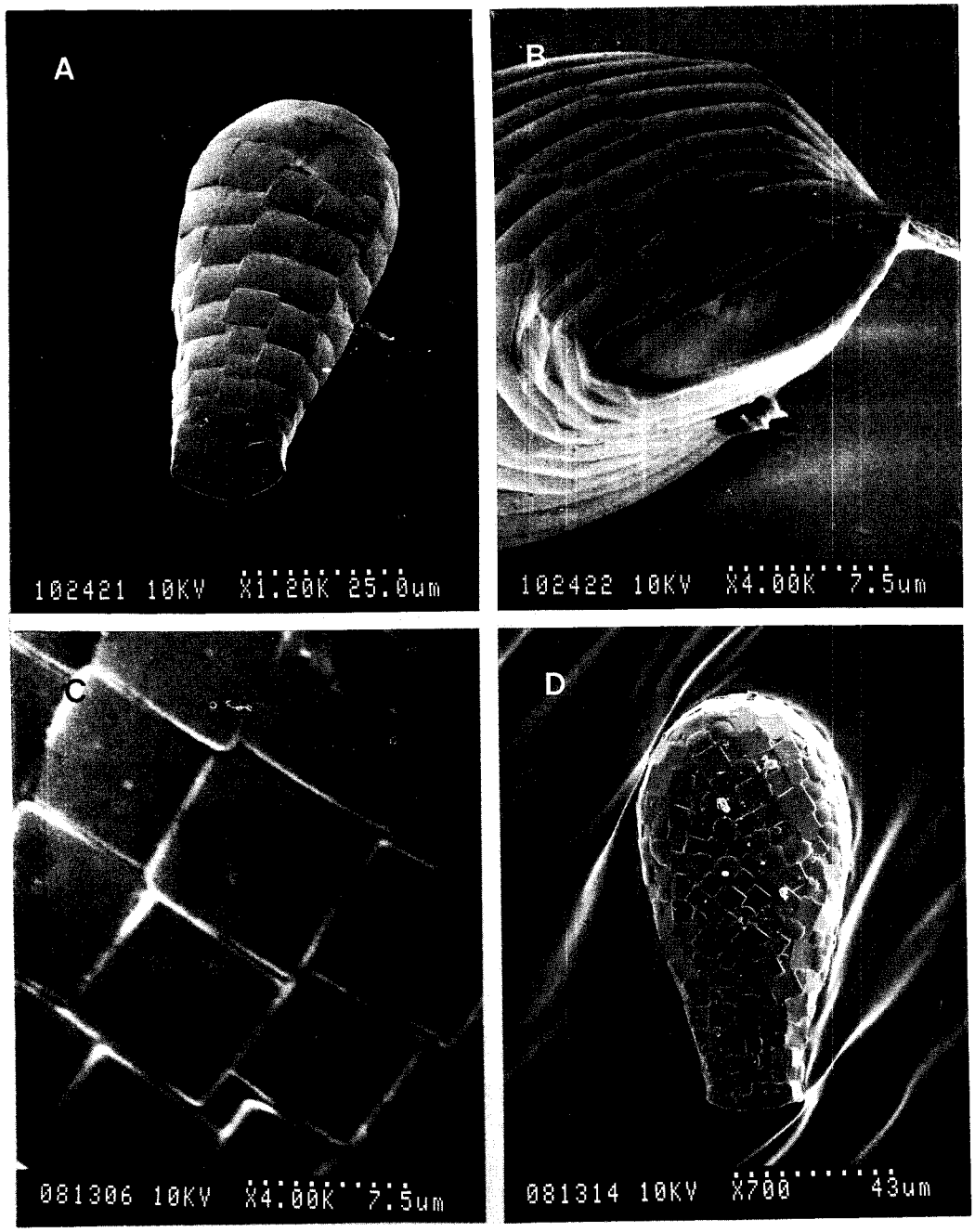

A
092113 10KV X400 75um
B
092114 10KV X700 42um
C
102408 10KV X500 60um
D
102409 10KV X2.20K 13.6um

PLATE 3


A
102421 10KV X1.20K 25.0um
B
102422 10KV X4.00K 7.5um
C
081306 10KV X4.00K 7.5um
D
081314 10KV X700 43um