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Fresh Water Tintinnoinea in Japan.

By

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With six text-figures.

Introduction

Until now, about ten species of fresh water Tintinnoinea belonging to *Tintinnidium* and *Tintinnopsis* have been known to science. The two cosmopolitan species, *Tdm. fluviatile* STEIN and *Tps. cratera* (LEIDY), have already been recorded in Japan. Besides these, three species and a new variety are added to the Japanese fauna in the present paper. The lorica of *Tintinnidium* has the wall viscous or loosely agglomerated and deficient in spiral structure, while that of *Tintinnopsis* is firmly composed and usually bears more or less coarse foreign particles. The materials upon which this study is based were mostly collected in Hokkaido.

1. *Tintinnidium fluviatile* (STEIN) KENT

Figures 1a-c

Tintinnus fluviatile STEIN. 1863.

Tintinnidium fluviatile: KENT, 1882, p. 611, pl. 31, fig. 8; KAWAMURA, 1918, p. 143, fig. 223; SCHOENICHEN, 1927, p. 226, pl. 13, fig. 3; KOFOID & CAMPBELL, 1929, p. 10, fig. 5; KAHL, 1932, p. 516, fig. 24 in p. 505; RYLOV, 1935, p. 30, pl. 1, fig. 5.

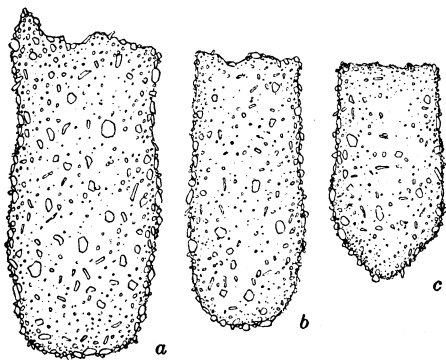


Fig. 1.

Tintinnidium fluviatile (STEIN) $\times 350$
a-c, from bog lakes in Tokati, Hokkaido

Lorica various in shape, often tubular; oral margin irregularly formed; aboral end somewhat flattened, rounded or bluntly conical; wall loosely composed to present a fragile appearance.

Length $52-180\mu$; breadth $38-75\mu$.

Occurrence: - The species has been previously recorded from Lake Biwa by KAWAMURA (1918). In Honshu the writer

collected it from reservoirs scattered east of Kure, Hiroshima Prefecture and ponds at Sendai, Miyagi Prefecture, in Hokkaido in the winter plankton of Lake Akan and from several bog lakes in Tokati Province, and further more from a pond at Hailar, Manchoukuo.

Distribution; - Europe, North America and Asia (Japan, Manchoukuo and Siberia).

The species is one of forms widely distributed in every type of fresh water. In bog lakes of Tokati belonging to the eutrophic type of bog waters, it was more numerous in winter than in summer; it was considerably variable in form and yellowish in color of the lorica. Loricae of specimens obtained at Hailar were composed of viscous fine material only without coarse particles.

2. *Tintinnidium pusillum* ENTZ, jun.

Figures 2a, b

Tintinnidium pusillum ENTZ, jun., 1909, p. 118; SCHOENICHEN, 1927, p. 226; KOFOID & CAMPBELL, 1929, p. 15.

Lorica elongate, tubular, frequently somewhat bent, 2.5-4.2 oral diameters in length; oral margin roughened; sides nearly parallel; aboral end variously formed, rounded or conical with a blunt terminal; wall not so fragile, with rather coarse agglomerated particles.

Length 53-80 μ ; oral diameter 19-21 μ .

Occurrence: - Several specimens were detected from collections taken in water temperatures of 8.6-9.5°C from reservoirs on the coast of the Inland Sea in Hiroshima Prefecture on March 20, 1939.

Distribution: - Hungary and Japan.

The species, though similar to *Tdm. fluviatile* (STEIN), is easily distinguished by its smaller and more slender form and from *Tintinnopsis cylindrata* KOFOID & CAMPBELL also an allied species, by the loose structure of the wall and smaller dimensions. It has been only once reported by ENTZ (1909) from the Danube near Budapest, Hungary.

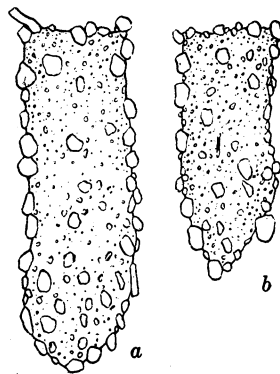


Fig. 2.

Tintinnidium pusillum ENTZ, jun. $\times 600$
a, b, from reservoirs in Hiroshima Prefecture

3. *Tintinnidium semiciliatum* (STERKI) KENT

Figures 3a, b

Tintinnus semiciliatus STERKI 1879, p. 640, pl. 28, figs. 5-9.

Tintinnidium semiciliatum: KENT, 1882, p. 612, pl. 31, figs. 6, 7; KOFOID & CAMPBELL, 1929, p. 15, fig. 4; KAHL, 1932, p. 516, fig. 44 in p. 506; RYLOV, 1935, p. 31.

Lorica more or less irregular in general outline, 1.3–2.3 breadths in length; wall loosely composed, agglomerated particles mainly consisting of minute yellow discs of diameters of 4–10 μ .

Length 70–125 μ ; breadth 30–75 μ .

Occurrence: – This rare species appeared in plankton catches taken from bog lakes situated near the towns of Nemuro and Ikeda, Hokkaido

Distribution: – Europe, America and Japan (Hokkaido).

In the writer's materials loricae of this species are usually dark yellow in color due to numerous yellowish discs attached to the wall, which are shells of living organisms.

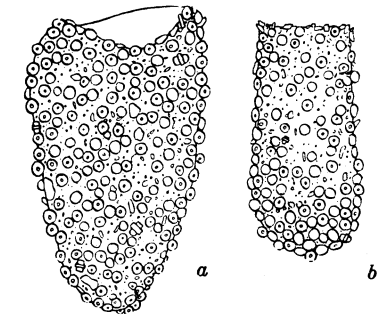


Fig. 3.

Tintinnidium semiciliatum (STERKI) $\times 350$
a, b, from bog lakes in Tokati, Hokkaido

The species is similar to *Tdm. fluviatile* (STEIN) in form and size, but can be readily distinguished by the marked yellow color and minute discs distributed thickly on the wall. It was more frequently observed in winter than in summer as in *Tdm. fluviatile*. Bog lakes from which this Ciliata was secured are of the eutrophic or dystrophic type according to the writer's classification of bog waters.

4. *Tintinnopsis cratera* (LEIDY) HADA

Figures 4a–d

Diffugia cratera LEIDY, 1879, p. 108, pl. 12, figs. 19–21, pl. 16, fig. 35.

Codonella lacustris ENTZ, sen., 1885, p. 195, pl. 13, figs. 10–16; KAWAMURA, 1918, p. 143, fig. 224.

Tintinnopsis lacustris: BRANDT, 1906, pl. 16, fig. 2, pl. 17, fig. 13; 1907, p. 140; MERKLE, 1909, p. 152, pl. 2, fig. 16; Rylov, 1935, p. 31, pl. 1, figs. 6a–c.

Codonella cratera: KOFOID & CAMPBELL, 1929, p. 58, fig. 128; KAHL, 1932, p. 517, figs. 25, 42, 43 in p. 506.

Tintinnopsis cratera: HADA, 1936, p. 7, fig. 11.

Lorica generally flask-shaped, consisting of a cylindrical or conical collar and an inflated bowl. 1.3–2.6 oral diameters in length; oral rim entire, usually

ragged with coarse agglomerated particles; collar various in length and form, often narrowed slightly in diameter towards the bowl and rarely forming an inverted truncate cone, usually having a spiral structure, at least in its upper part, its length from one-fifth to a half of the total length; bowl globose; aboral end generally hemispherical, sometimes roundly conical; wall composed of rather coarse particles.

Length $40-80\mu$; oral diameter $30-42\mu$; greatest diameter of the bowl $32-38\mu$.

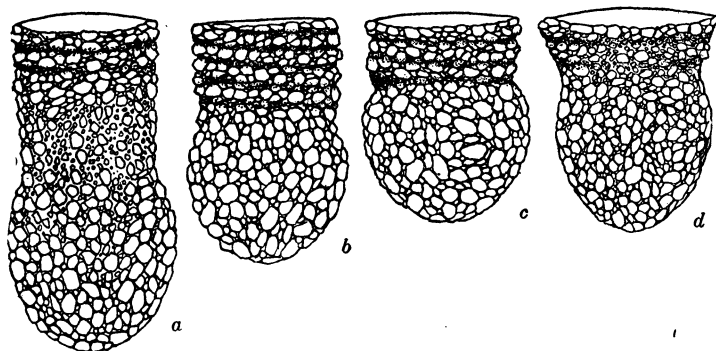


Fig. 4.

Tintinnopsis cratera (LEIDY) $\times 550$

a, from Lake Abasiri; b, c, from reservoirs in Hirosima Prefecture; d, from Lake Akan

Occurrence: - This cosmopolitan species was recorded by KAWAMURA (1918) from Lake Biwa in Honshu, and in Hokkaido from Lake Akan in the Akan Caldera and Lake Ryousi, a small lake lying west of Lake Abasiri, by UENO (1936, '37) and also by the writer (1938) from a lakelet, Taro, connected with Lake Akan. Besides the above localities, there are added in this report reservoirs and ponds scattered in the central costal area of Hirosima Prefecture and Lake Abasiri in Hokkaido. The writer also met with this species in materials obtained from a pond at Suigen, Korea and a reservoir at Hsinking, Manchoukuo.

Distribution: - Europe, North America and Asia (Japan proper, Korea, Manchoukuo).

In Japan the commonest species has been generally found from plankton of meso- and eutrophic lakes and from heleoplankton. Most of specimens collected from Lake Akan have flaring collars. The species is so variable in form that it comprises several varieties, but only a single form which is new to science has been secured from Japanese waters.

The species was first described by LEIDY (1877) as a form of Testacea

named *Diffugia cratera* in America, but he (1879) questioned whether it might be included in *Tintinnus* of the Ciliata from the structure of the lorica. Afterwards, it was removed by Vorce (1881) to *Codonella*. However, ENTZ (1885) reported it under the name of *Codonella lacustris* in Europe, and then it was redescribed by BRANDT (1907) as a species of *Tintinnopsis*. From the construction of the lorica it apparently belongs to *Tintinnopsis*, the present writer agreeing with BRANDT's classification. Therefore, it is reasonable that the name of this species should be *Tintinnopsis cratera*.

5. *Tintinnopsis cratera* var. *fulva* n. var.

Figures 5a, b

Lorica tubular in the upper part, changing gradually to the dilated form in the lower part 2.2–2.5 oral diameters in length; oral margin somewhat smooth; wall with fine foreign particles, more or less thin, colored yellowish, spiral structure rather faint.

Length 62–70 μ , oral diameter 25–29 μ ; greatest diameter 30–33 μ .

Occurrence: – The variety was examined in plankton collections obtained from Lake Akan and bog lakes in Tokati Province, Hokkaido, also from a pond at Hailar, Manchoukuo.

The new variety differs from the typical form and the other varieties in having a yellowish thin wall, very slight spiral organization and indistinct conjunction between the collar and bowl. From Lake Akan it was collected in winter in company with the typical form. It is of more frequent appearance

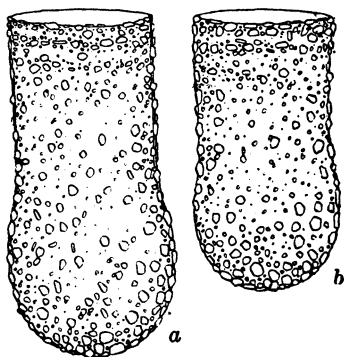


Fig. 5.

Tintinnopsis cratera var. *fulva* n. var. $\times 650$
a, b, from bog lakes in Tokati, Hokkaido

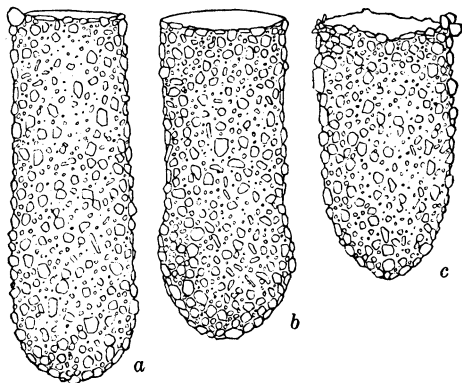


Fig. 6.

Tintinnopsis cylindrata KOFOID & CAMPBELL $\times 500$
a-c, from a pond in Hiroshima Prefecture

6. *Tintinnopsis cylindrata* KOFOID & CAMPBELL

Figures 6a-c

Tintinnopsis cylindrica DADAY, 1892.*Tintinnopsis cylindrata* KOFOID & CAMPBELL, 1929, p. 33, fig. 34; KAHL, 1932, p. 517, figs. 31, 32 in p. 506.

Lorica cylindrical in the main part, sometimes slightly inflated in the posterior region, 2.0-3.4 oral diameters in length; oral margin ragged; aboral end usually rounded; wall somewhat thin, without a spiral structure.

Length 62-108 μ ; oral diameter 30-33 μ ; greatest diameter 32-35 μ .

Occurrence: - The writer met with many specimens in heleoplankton taken from a small pond situated on the coast of the Inland Sea in Hirosima Prefecture on March 20, 1939, When the collection was made the water temperature was 9.5°C.

Distribution: - Europe, America and Japan.

The separation of this species from some forms of *Tps. cratera* (LEIDY) having a slight posterior inflation is fairly difficult, however, it is possible to discriminate them by the following differences: loricae of this species never have a spiral structure and generally take a comparatively neat appearance, but in those of *Tps. cratera* the spiral organization is always seen and the surface of the wall is usually more or less coarse.

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摘 要

日本淡水産有鐘纖毛蟲類

有鐘纖毛蟲類は現在 700餘種報告されてゐるが其大部分は海産で、淡水産は僅かに10種許である。何れも *Tintinnidium*, *Tintinnopsis* に屬する種で、本文には其うちの5種と1新變種が記載してあり、上記 2屬は蟲殻の構造によつて區別される各種類の本邦に於ける分布は次記の如くで、滿洲國よりも 3種類見出された。

- | | |
|---|---------------|
| 1. <i>Tintinnidium fluviatile</i> (STEIN) | 北海道・本州・滿洲國 |
| 2. <i>Tdm. pusillum</i> ENTZ, jun. | 中國地方 |
| 3. <i>Tdm. semiciliatum</i> (STERKI) | 北海道 |
| 4. <i>Tintinnopsis cratera</i> (LEIDY) | 北海道・本州・朝鮮・滿洲國 |
| 5. <i>Tps. cratera</i> var. <i>fulva</i> n. sp. | 北海道・滿洲國 |
| 6. <i>Tps. cylindrata</i> KOFOID & CAMPBELL | 中國地方 |