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Kellicottia bostoniensis (Rousselet), a planktonic rotifer species new to Finland

Pertti Eloranta

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Kellicottia bostoniensis (Rousselet) is a typical planktonic rotifer species in North America but has been reported from Europe only a few times. The first report was from Sweden in Lake Ekholmssjön, where Carlin found it in 1943, and later it has been found in several other locations in southern Sweden.

Kellicottia bostoniensis was found in phytoplankton samples from Lake Tarjannevesi (in the northern part of the Kokemäenjoki river basin) in the summer of 1987. The highest density of species was 560 ind./l in the surface water (1 m). The species was found in samples from four sampling stations along the lake, which is slightly polluted by a sulphite pulp mill on the upper part of the water course.

The species has only four anterior spines and its total length is <410 µm (the average in the material studied was 381 ± 23.7 µm).

P. Eloranta, Department of Biology, University of Jyväskylä, Yliopistonkatu 9, SF-40100 Jyväskylä, Finland.

1. Introduction

Kellicottia bostoniensis (Rousselet) is a common planktonic species in North America. Chengalath et al. (1984) report it in 13% of 109 Newfoundland lakes studied and it occurred in 44.6% of the Adirondack survey lakes (Siegfried et al. 1984).

The first European record of *Kellicottia bostoniensis* was reported by Carlin (1943). The species occurred in a plankton sample taken on 2.8.1932 from Lake Ekholmssjön. The sampling place was polluted by effluents from a sulphite pulp mill (O_2-concentration was 0, pH 5.3 and COD 115 mg O_2/l). Arnemo et al. (1968) reported 11 more lakes and rivers with *K. bostoniensis*. Some of the lakes were very small (0.05–0.09 km^2) but the species was also found in the large lakes Vänern and Mälaren (in the latter at about 80 stations).

According to Arnemo et al. (1968) the species was found remarkably often in waters influenced by effluents from pulp and paper industries. There are many lakes and water bodies in Finland which provide a suitable environment for the species, but in spite of numerous studies on those waters, this species has not been reported before.

This paper is a short description of the environment of the species and gives some results on the morphology of the species.

2. Material and methods

The phytoplankton samples (100 ml) were collected on 18–25.8.1987 from 12 sampling stations in lakes Keurusselkä, Kuorevesi and Tarjannevesi (NE part of the Kokemäenjoki river basin; Fig. 1). The aim of the sampling was to study the phytoplankton communities in the area influenced by effluents from a sulphite pulp mill at the town of Mänttä. The phytoplankton and zooplankton in the same area has already been studied by the author in the 1970s (Eloranta 1980, Eloranta & Kettunen 1979).

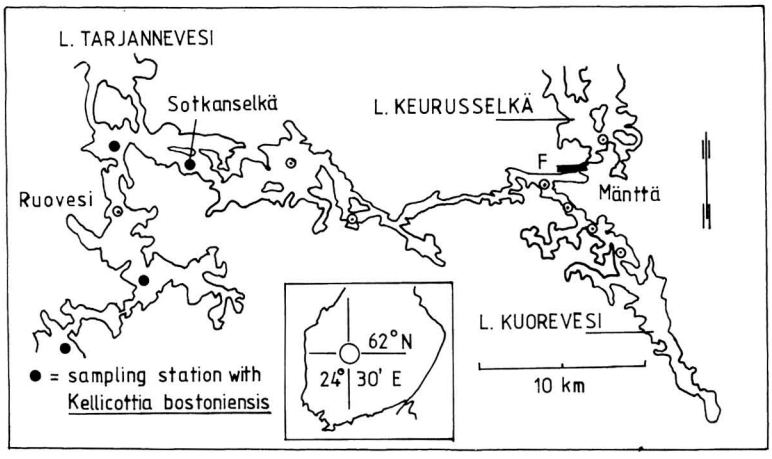

Fig. 1. The location of the study area and the sampling stations where *Kellicottia bostoniensis* was present.

Samples were taken from the surface layer (1 m depth) and preserved with 1 ml of acid Lugol's solution. A subsample of 50 ml from each sample was taken into a sedimentation chamber and the samples were then analyzed the next day using an inverted microscope. The rotifers were counted with the larger phytoplankton forms from the whole of the chamber bottom using a magnification of 150×.

3. Results and discussion

Kellicottia bostoniensis was found in four samples out of the 12 samples studied, whereas *K. longispina* (Kellicott) occurred in every sample. Due to the small water volume of the samples the numbers of individuals were not high; in three samples there occurred only one or two individuals, but in one sample (Sotkanselkä) there were 28 individuals, which is equivalent to a density of 560 individuals/l. Other rotifers recorded in the same samples with *K. bostoniensis* were *K. longispina* (Kellicott), *Ascomorpha saltans* Bartsch, *Keratella cochlearis* (Gosse), *Gastropus stylifer* Imhof, *Polyarthra major* (Burckhardt), *P. remata* (Skorikov), *P. vulgaris* Carlin, *Trichocerca porcellus* (Gosse), *T. rousseleti* (Voigt) and *T. similis* (Wierz.).

Dominating the phytoplankton taxa in the samples were *Cryptomonas* spp., *Rhodomonas lacustris* Pascher et Ruttner, *Melosira ambigua* (Grun.) O.Müll, *M. distans* (Ehr.) Kütz. var. *tenella* (Nyg.) Florin, *Tabellaria flocculosa* (Roth.) Kütz. var. *asterionelloides* (Grun. in V.H.) Knudson, *Synura echinulata* Korsh., *S.petersenii* Korsh., *S. spinosa* Korsh., *Monoraphidium contortum* (Thur.) Kom.-Legn., *M. dybowskii* (Wolosz.) Hind. & Kom.-Legn. and *Gonyostomum semen* Dies.

The surface water quality at the sampling stations with *Kellicottia bostoniensis* was only slightly influenced by the effluents from the factories approx. 40 km upstream:

temperature	(°C)	14.3–14.6
oxygen conc.	(mg/l)	8.2–9.1
oxygen satur.	(%)	81–89
pH		5.2–6.5
conductivity	(mS/m; 25 C)	5.2–6.5
colour	(mg Pt/l)	120–170
COD	(mg O_2/l)	17–24
Na-lignosulph.	(mg/l)	5.5–10
tot. P	(µg/l)	20–35
tot. N	(g/l)	510–580

According to Campbell (1941), *Kellicottia bostoniensis* is hypolimnetic in the early summer but migrates up to the epilimnion when the oxygen deficit is developed throughout the hypolimnion. According to the Swedish data (Arnemo et al. 1968), the species occurs from April to November at a water temperature of >8°C. The pH range of the occurrence was from 4.4 to 7.2 in the Adirondack survey lakes (Siegfried et al. 1984).

The size of *K. bostoniensis* varies much less than that of *K. longispina*. *K. bostoniensis* (Fig. 2) has only 4 anterior spines; one is very long and the others are more or less equal in length. The shape of the body is typically ovoid, while that of *K. longispina* is conical. The average total length of *K. bostoniensis* was 381 ±

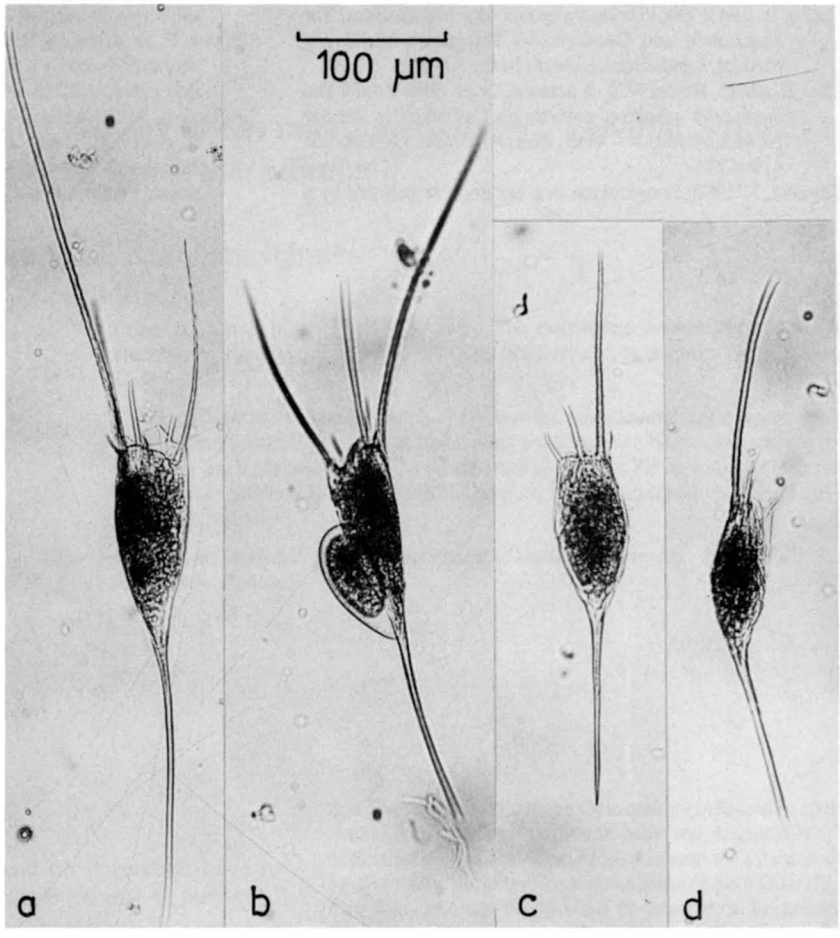

Fig. 2. *Kellicottia longispina* (a, b) and *K. bostoniensis* (c, d).

24 µm (n = 20; range 340–415 µm). The length of the longest anterior spine varied from 130 to 170 µm. The average length of the caudal spine was 125 ± 25 µm (range 100–170 µm).

The history of the dispersal of *Kellicottia bostoniensis* from North America to Sweden is not clear. Ballast fresh water has been put forward as one possibility (Arnemo et al. 1968). How the species has spread to Finland is an open question, but it was neither observed in the 1970s when the phytoplankton was monitored in the same area over a course of several years (Eloranta and Kettunen 1979) nor in a vertical zooplankton sample series studied in 1980 (Eloranta 1980).

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