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Scale-bearing chrysophyte *Mallomonas calceolus* Bradley a new record from Czech Republic

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ABSTRACT

A new record of scale-bearing chrysophyte *Mallomonas calceolus* is reported. *M. calceolus* was found in two localities of Krkonoše Mountains. Structure and morphology of scales and bristles are described. Autecology and distribution are discussed.

INTRODUCTION

The main species specific determining character of scale-bearing chrysophytes is the structure and morphology of scales and bristles. The identification of these species has become more reliable with increased use of an electron microscope. *Synura*, *Mallomonas* and their allies were excluded from the class Chrysophyceae by Andersen (1987) and the new class Synurophyceae was established. They differ from other flagellate Chrysophyceae in several respects: they have chlorophylls a and c_1 (not c_2); they lack the typical chrysophycean photoreceptor apparatus; the long flagellum is covered with tiny organic scales (Hibberd, 1973); they have a different arrangement of flagellar roots and the chloroplast DNA is not arranged in a ring-shaped nucleoid (cf. Hoek van den et al., 1995).

The scope of this study was to contribute to the list of the Czech scale-bearing chrysophycean flora.

MATERIAL AND METHODS

Plankton samples from two localities of the Krkonoše Mountains (nothern Bohemia) were collected in 1998. Samples were obtained by means of a plankton net and were fixed with Lugol's solution either immediately after collection or later in the laboratory. The temperature, pH and conductivity were measured. The pH was measured with a Gryf 107 conductivity/pH meter, conductivity with WTW LF 315 conductometer. Samples were rinsed and centrifuged by

several distilled water washes and centrifugations. Detritus and organic material of some samples were removed by peroxide oxidation (Krammer and Lange-Bertalot, 1986). A drop of the sample was dried on a formvar coated copper grid. Grids were shadowcast with chromium or carbon/platinum in a Polaron vacuum evaporator and examined with a Philips 300 electron microscope.

LOCALITIES

Čertova louka is a peat-bog about 2 km north-west of Luční chalet. It is a spring area of a stream running into the White Elbe. Samples were taken from a small pool of an area of about 6 m^2 and depth of about 2 m. Measured pH, conductivity and water temperature values were 4.4; 43.8 $\mu S/cm^2$; 8 °C and 3.7; 34.2 $\mu S/cm^2$; 17.5 °C respectively. The locality was visited twice (20 June 98 and 15 August 98) and in both samples scales of *Mallomonas calceolus* were present.

Pančavská louka is a spring area of the Pančava river that runs into the Elbe. The sample was taken from a small pool of an area about 2 m^2 and depth of about 1 m in the vicinity of the Pančava stream. Measured pH, conductivity and water temperature values were 4.2; 28.2 $\mu S/cm^2$; 7 °C. The locality was visited only once (23 September 98).

DESCRIPTION OF SCALES AND BRISTLES OF *Mallomonas calceolus*

Mallomonas calceolus is a unicellular scaly (scale-bearing) flagellate. Cells are small (11–18 x 9–12 μm) and ovoid with broadly rounded ends (Starmach, 1985). *Mallomonas calceolus* is covered with typical tripartite scales with a dome. The scales are oval (5.5–6.3 x 3.4 x 3.6 μm). The V-rib is ended with a well developed hood (see Fig. 2 for terminology). One submarginal rib often terminates as a projecting point near the dome border (Figs 2, 4 arrow). The anterior flange is marked with several papillae (Fig. 4), the posterior flange is smooth. The shield is decorated with widely spaced, sometimes regularly arranged papillae. The dome is smooth. Immature scale has also been observed (Fig. 3). The dome is already sharply delimited. Rudiments of anterior and posterior flanges are visible. The V-rib is still not developed.

Bristles are short (4–6 μm), slightly curved and smooth. The tip is bifurcate with branches of unequal length (Fig. 1).

Scales of *Mallomonas calceolus* can be easily distinguished from scales of species of the same section. Sectio Papillosae includes *M. papillosa, M. paxillata, M. rasilis, M. tropica* and *M. guttata* (Asmund et Kristiansen, 1986).

AUTECOLOGY AND DISTRIBUTION

M. calceolus was found primarily between pH 5.0 and 7.0 (Siver, 1988). It was reported once at pH < 5 (Roijackers et Kessels, 1986) and at a pH as high as 8.8 (Roijackers et Kessels, 1981). According to Hustedt's classification *M. calceolus* is an acidophilic species, mostly distributed below a pH of 7.0 (Siver, 1988). In contrast to published results *M. calceolus* was found in a more acidic enviroment in Krkonoše Mountain localities (pH 4.4; 3.7 and 4.2).

M. calceolus is distributed worldwide. It has been reported for example from North America (Wee, Booth et Bossier, 1993), nothern Finland (Eloranta, 1989) and from The Netherlands (Roijackers et Kessels, 1986). But it has also been found in Iceland (Bradley, 1964) and Chile (Dürrschmidt, 1980).

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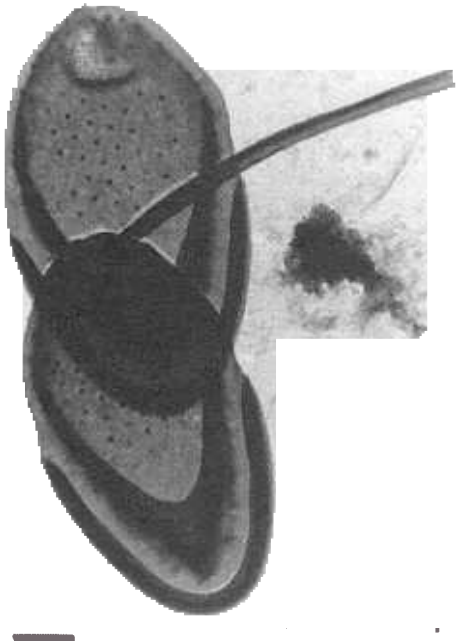

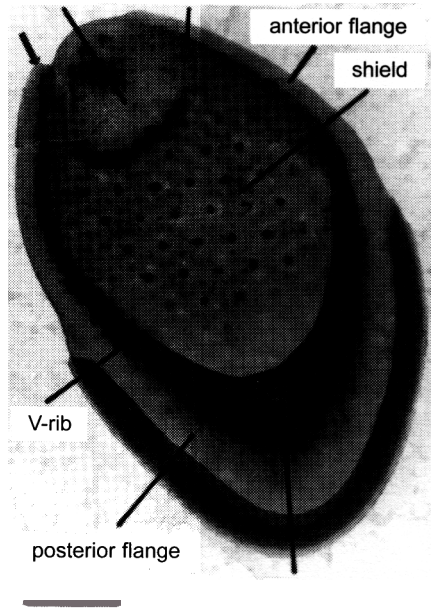
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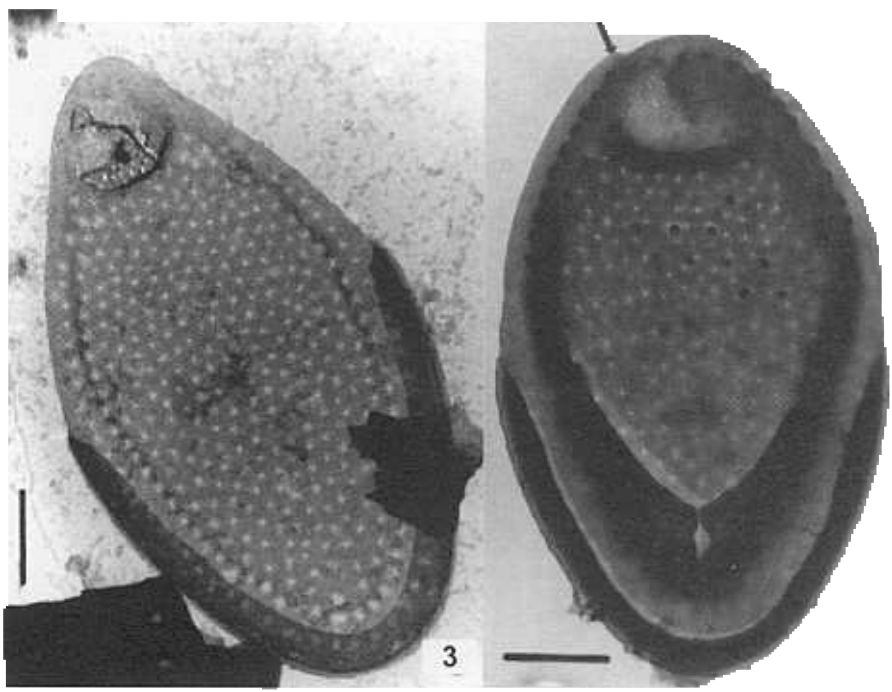
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