NOVIT. BOT. UNIV. CAROL.
Praha 14/2000: 7–11

Mallomonas pumilio var. *pumilio* – a new species in algal flora of the Czech Republic

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ABSTRACT

A new record of scale-bearing chrysophyte *Mallomonas pumilio* Harris & Bradley em. Asmund et al. var. *pumilio* is reported. *M. pumilio* var. *pumilio* was found in two eutrophic floodplain pools in the alluvial ecosystem of the Lužnice river nearby Třeboň, South Bohemia. The structure and morphology of scales are described. Autecology and distribution are discussed.

INTRODUCTION

During the investigation of chrysophycean flora of South Bohemia the population of the *Mallomonas* species from the section *Torquatae* was found in the samples from two of the alluvial floodplain pools of the Lužnice river. The specific determination was carried out by the standard method of ultrastructural investigation of silica-scales morphology using a transmission electron microscope (Asmund & Kristiansen, 1986).

MATERIAL AND METHODS

All water plankton samples from the localities were collected on 3 March 2000. The samples were fixed with Lugol solution immediately after collection. In the field the surface water temperature, pH and conductivity were measured using a portable electronic WTW 330 pH-meter and WTW LF 315 conductometer. The samples were filtered using a vacuum pump. A drop of the matter was dried on a formvar coated copper grid. Grids were shadowcast with chromium in a Polaron vacuum evaporator and examined with a Philips 300 electron microscope.

LOCALITIES

The investigated pools (marked as T2 and T3) are located in the alluvium of the upper Lužnice river, which floods them several times a year. The measured

values of pH, conductivity and water temperature were 6.4; 204 $\mu S.cm^{-1}$ and 5.8 °C for T2 pool and 6.4; 238 $\mu S.cm^{-1}$ and 5.3 °C for T3 pool. The detailed investigation of planktonic algal flora of T2 and T3 pools was carried out by Pithart et al. (1996) and Pithart et al. (1997). The phytoplankton of the pools consists almost exclusively of flagellates. Cryptophyceae dominate from autumn to spring with maxima of biomass below the ice. In summer, green algae become more abundant. Several times the summer bloom of raphidophyte species *Gonyostomum semen* was observed in T2 pool (Pithart et al., 1997). Silica-scaled chrysophytes are abundant mainly in the spring period of the year.

kers
cold

RESULTS

The cells of *M. pumilio* var. *pumilio* are ellipsoidal with dimensions 5–15×3–8 μm. The scales are oval to slightly irregular with dimensions 1.5–3.7×1.1–2 μm. The apical scales form a protruding collar around the basal part of the flagella. The collar scales are asymmetric with a small dome bearing a blunt peak pointing towards the apex. The body scales are of irregular rhomboidal shape, rear scales are provided with small spines.

The shield of the scales is provided with meshes enclosing several (2 – 8) pores. The submarginal rib is broad and sometimes not well delimited against the shield and flanges. The anterior flanges are provided with a transverse rows of dots. Bristles and cysts were not observed.

DISCUSSION

The scales of *M. pumilio* can be distinguished from the related species *M. alata* by having symmetrical anterior flanges and a lower number of pores within a single mesh of the shield. *M. clavus* differs from *M. pumilio* in possessing rear scales with long spines (Asmund & Kristiansen, 1986). *M. pumilio* var. *munda* differs from our material in its regular arrangement of meshes and pores on the shield.

The species found at several localities in Northern Bohemia and determined initially as *M. pumilio* (Kalina et al., 1998) was later redetermined as *M. alata* (Kalina et al., 2000). The occurrence of *M. pumilio* var. *pumilio* in two floodplain pools in the alluvium of the Lužnice river should consequently be considered as the first report of this species from the Czech Republic.

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M. pumilio var. *pumilio* has been reported from temperate and subarctic ecosystems of both hemispheres with localities in UK, Netherlands, Germany,

Denmark, Sweden, Greenland, Finland and Chile (Asmund & Kristiansen, 1986; Hansen & Kristiansen, 1997). With respect to this distributional pattern we can hypothesize that *M. pumilio* var. *pumilio* is a species with probably bipolar distribution.

The observed pH value and early spring occurrence correspond with Roijackers & Kessels (1986) in assuming *M. pumilio* var. *pumilio* as a pH neutral and cold water species.

ACKNOWLEDGEMENTS

This work was supported by the Grant Agency of the Czech Republic, grant no. 206/98/1193 and Research Grant of the Czech Ministry of Education no. J13/98113100004.

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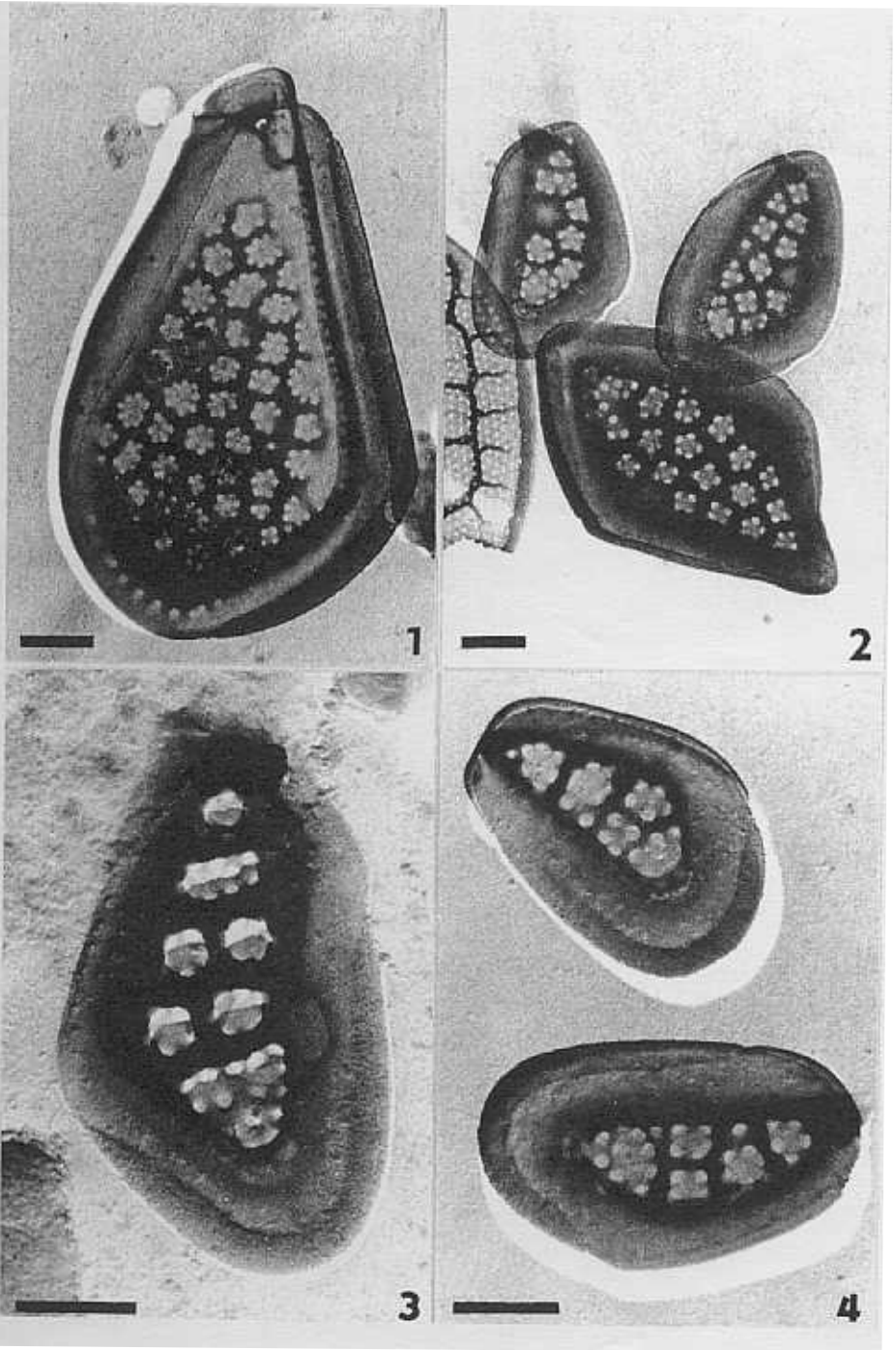
Fig. 1: Collar scale, dome is provided with a forward-pointing short, blunt peak.
Fig. 2: Body scale of a rhomboidal shape, note unequal length of adjacent flanges (lower part of the picture), rear scales with spines (upper part of the picture).
Fig. 3: Rear scale with regularly arranged meshes of the shield and unequal length of adjacent flanges.
Fig. 4: Small slightly curved rear scales with spines. (bar = 0.5 μm)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