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Morphological variations of a manganese-oxidizing microorganism *Metallogenium* observed in the developmental process of cultures collected from Lake Biwa waters

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Abstract

Blackish brown particles of manganese oxide usually derived from the microorganism *Metallogenium* were observed for the first time in November, 2002 at the center of the north basin of Lake Biwa off Imazu (water depth, 90 m). However, the taxonomic position and biochemistry of *Metallogenium* remain poorly understood since a stable culture of this microorganism has seldom been successfully established. Using Lake Biwa water samples, the authors have prepared several stable cultures that continually produce Metallogenium-like particles of manganese oxide. In some cultures, such particles were produced in association with fungi, though only bacteria were found in the other cultures. Since fungi are generally rare in lake waters, the production of *Metallogenium* by bacteria is presumably the major agent for the oxidative precipitation of Mn²⁺ in those waters. *Metallogenium* appeared within 2 weeks after inoculation in the coexisting fungus cultures. However, in the cultures with bacteria only, it took 4-6 weeks before *Metallogenium* could be detected in the medium. In this paper, we mainly reported morphological variations of *Metallogenium* observed by light and scanning electron microscopy during the development of those cultures in which only bacteria were found.

Key Words: [Metallogenium](#), [Lake Biwa](#), [Bacteria](#), [Fungus](#), [Manganese oxidation](#)

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