

Eco-physiological Study of Novel Epiphytic Cyanobacteria on Marine Red Algae in Awaji Island

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Summary

In 2004, we reported a novel chlorophyll *d*-producing cyanobacterium, *Acaryochloris* sp. strain Awaji, which was isolated as epiphytic microorganism on the thalli of macrophytic red seaweed, *Anfeliopsis flabelliformis* in artificial rocky seashore of Awaji Island in Seto Inland Sea (Murakami et al. (2004) Science 303:1633). Molecular phylogenetical analysis depending on 16S-rDNA sequence indicated that the cyanobacterium was closely related to *Acaryochloris marina* isolated as supposed symbiont of colonial ascidian in tropical coral reef in 1996. Very recently, another similar cyanobacterium was discovered at the hypersaline lake (ca. 45‰), Salton Sea in the California state (Miller et al. (2005) PNAS 102:850-855). Moreover, the genuine niche of *Acaryochloris marina* of didemnid ascidians was revealed to be underside of didemnid ascidians by microscopic and spectrometric analyses (Kuhl et al. 2005, Nature 433:820). These results confirmed that *Acaryochloris* spp. have epiphytic, epizoic or epilithic nature as we found in the red algae in 2004.

In this study, microenvironment of red algal thalli such as light condition (intensity and light quality) and microhabitat of epiphytic microalgae in red algal thalli were analyzed by spectroscopic observation of thin section of red algal thalli containing micro-algae. We found that *Dermocarpa*-like cyanobacterium predominantly occupied the surface of the thalli. Our results indicated that this epiphytic cyanobacterium is characteristic in pigment composition and physiological and morphological nature.