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Contents of ultraviolet absorbing substances in the two color morphs of the photosymbiotic ascidian *Didemnum molle* (Didemnidae, Ascidiacea).
(チャツボボヤ群体の色彩2型における紫外線吸収物質含有量の比較)

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Harmful ultraviolet (UV) rays in solar radiation are often a crucial factor restricting the habitat for sessile marine organisms particularly in tropical marine environments. Phototrophic or photosymbiotic organisms are, however, in a dilemma, because they require solar radiation for photosynthesis but should be protected from UV radiations. Some of these organisms possess UV-absorbing substances, such as mycosporine-like amino acids (MAAs), that are opaque to UV but transparent to photosynthetically active radiation. In ascidians, although MAAs have been isolated from many species, only the photosymbiotic species contain MAAs in the tunic (Hirose et al., 2004). Therefore, MAAs in the tunic are supposed to be important to maintain the photosymbiosis.

Didemnum molle (Herdman, 1886) is a colonial ascidian harboring the prokaryotic photosymbiont Prochloron. In *D. molle*, the concentrations of MAAs bathymetrically decreased among the colonies at 10, 15, and 20-m deep (Hirose et al., in press), suggesting that the concentration is regulated depending on the ambient light conditions. Besides MAAs, calcareous spicules and pigment cells in the tunic are also involved in the light protection in *D. molle*. Due to the pigment cells, some colonies are dark gray, some are brown, and some have colored patches. Although Olson (1983) supposed that some color morphs are different species, they are taxonomically regarded as a single species at present (Cf. Kott, 2001). We remarked the two populations of *D. molle* in the shallow reef lagoon off Okinawajima Island, Bise and Seragaki: the colonies are always dark gray at Bise and brown at Seragaki.

Contents of mycosporine-like amino acids (MAAs) were compared between the two color morphs of *D. molle* (*i.e.*, dark-gray and brown colonies). Spectroscopic and chromatographic analyses showed that the densities of Prochloron cells and the concentrations of MAAs in the dark gray colonies were estimated to be 1.4 times and 2.4 times as much as those in the brown colonies, respectively. The significant difference of MAA contents between the color morphs was mainly caused by the difference of shinorine contents ($p < 0.01$, Mann-Whitney U-test). The significant difference of the densities of Prochloron cells and the concentrations of MAAs between the two color-morphs indicates some physiological differences between them. The dark gray colonies with MAAs of high concentration may potentially provide better condition to harbor more Prochloron cells than the brown colonies with MAAs of lower concentration. Since we found the seasonal fluctuations of sexual reproduction in the populations of *D. molle* were much different between the two populations (Fukuda and Hirose, unpublished), the two color-morphs might be genetically discrete. Comparisons of these color morphs will provide valuable information on physiological and taxonomical significances of the colors in the photosymbiotic benthos on coral reefs.