混合栄養（Mixotrophy）

HAE JIN JEONG

School of Earth and Environmental Sciences, College of Natural Sciences, Seoul National University, Seoul 151-747, Republic of Korea

Key words: Growth, Harmful Algal Bloom, Ingestion, Marine, Protist, Red Tide

I investigated the kinds of prey species and the effects of the prey concentration on the growth and ingestion rates of the harmful alga *Cochlodinium polykrikoides*, when feeding on an unidentified cryptophyte species (Equivalent Spherical Diameter, ESD=5.6 μm). I also calculated grazing coefficients by combining field data on abundances of *C. polykrikoides* and co-occurring cryptophytes with laboratory data on ingestion rates obtained in the present study. *C. polykrikoides* fed on prey cells by engulfing the prey through the sulcus. Among the phytoplankton prey offered, *C. polykrikoides* ingested small phytoplankton species that had ESD's $\leq$ 11 μm (e.g. heterotrophic bacteria, the cyanobacteria *Synechococcus* sp., the prymnesiophyte *Isochrysis galbana*, an unidentified cryptophyte, the cryptophyte *Rhodomonas salina*, the raphidophyte *Heterosigma akashiwo*, and the dinoflagellate *Amphidinium carterae*). It did not feed on larger phytoplankton species that had ESD's $\geq$ 12 μm (e.g. the dinoflagellates *Heterocapsa triquetra*, *Prorocentrum minimum*, *Scrippsiella* sp., *Alexandrium tamarense*, *Prorocentrum micans*, *Gymnodinium catenatum*, *Akashiwo sanguinea*, and *Lingulodinium polyedrum*). Specific growth rates of *C. polykrikoides* on a cryptophyte increased with increasing mean prey concentration, with saturation at a mean prey concentration of approximately 270 ng C ml^{-1} (i.e. 15,900 cells ml^{-1}). The maximum specific growth rate (mixotrophic growth) of *C. polykrikoides* on a cryptophyte was 0.324 d^{-1}, under a 14:10 h light-dark cycle of 50 μE m^{-2} s^{-1}, while its growth rate (phototrophic growth) under the same light conditions without added prey was 0.166 d^{-1}. Maximum ingestion and clearance rates of *C. polykrikoides* on a cryptophyte were 0.16 ng C $grazer^{-1}$ d^{-1} (9.4 cells $grazer^{-1}$ d^{-1}) and 0.33 μl $grazer^{-1}$ h^{-1}, respectively. Calculated grazing coefficients by *C. polykrikoides* on cryptophytes were 0.001--0.745 h^{-1} (i.e. 0.1--53 % of cryptophyte populations were removed by a *C. polykrikoides* population in 1 hour). The results of the present study suggest that *C. polykrikoides* sometimes has a considerable grazing impact on populations of cryptophytes.