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# The Life Cycle of a Fish-Killing Dinoflagellate *Cochlodinium polykrikoides* in Korean Coastal Waters

김충재, 오희목
(한국생명공학연구원 환경생명공학 연구실)

Since 1995, a harmful dinoflagellate, *Cochlodinium polykrikoides* has bloomed leading to massive mortality of aquatic organisms in Korea. However, little has been known on the species life cycle except for only the planktonic vegetative stage. It needs to elucidate the life cycle of the species for more adequate red-tide monitoring containing the countermeasure.

To make clear its life cycle, natural seawater samples in mid-October, late-Novembr and late-May were collected, and we captured the species of each life stages. The species life cycle undergoes following typical four steps: 1) planktonic unarmored vegetative cell stage, 2) planozygote stage, 3) resting cyst stage (hypnozygote), 4) planomeiocyte stage. A remarkable characteristic of *C. polykrikoides* life cycle is having morphologically different stages with armored and unarmored processes. The former appeared at the pre- and pro-intermediate stage of the vegetative cell, which linked to planomeiocyte for development into unarmored vegetative stage and planozygote for resting stage, respectively. In addition, the thecate of the species introduced into natural seawater column with low cell density from late-May and developed into vegetative cell or divided into two small-armored *Alexandrium*-like forms. The latter followed planomeiocyte step and continued until the planozygote formation, and the hyaline cyst produced through growth from its decomposition residuals supported its vegetative stage in water column.

A resting cyst in consideration was produced from the armored type when exposed at room temperature after one year culture at 20℃.