

## Growth pattern of the chemosynthetic bivalve *Lucinoma annulatum* based on growthline and isotopic analysis

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Lucinid bivalve has sulfur-oxidizing bacteria in their gills and are known as a member of cold-seep community. Though they are known as edible in Southeast Asia and a large number of fossil records, their growth process are not revealed at all. Therefore, we examined shell structural and stable isotopic analysis using *Lucinoma annulatum* shells to clarify the growth pattern, physiology, and its relationship with environmental changes.

Shell materials are collected by dredge at 50m in depth of Beppu Bay, West Japan, in November 2005. We observed shell structure of polished section along growth direction using acetate peel method. The shell consists of the outer, middle, and inner shell layers. Width and positions of the growthlines in the middle shell layer and concentric rib and growth disturbance rings in the outer shell layer are measured. Powder samples for stable isotope analysis are milled with 80-500 um intervals in the middle shell layer along shell growth direction by high precision micromill system (GeoMill 326).

As a result of measurement of the width of growthlines, disturbance rings, and concentric ribs, shell growth patterns of the species are divided into early, middle and late growth stages. The early, middle and late growth stages are characterized by narrow intervals of concentric ribs and disturbance rings, wide intervals of concentric ribs and disturbance rings, and drastic decreasing width of growthlines, respectively. The positions (about 25mm from umbo) of boundary between the middle and late growth stages are common to examined specimens. The shell structural change indicates that physiological change from juvenile to adult probably happened at this position.

Oxygen isotope value ranging from 0.5 per mil to 1.5 per mil are calculated to seawater temperature between 15 and 20 degree Celcius. It means that shell growth interruptions are occurred during high and low water temperature extremes, considering temperature range at 50m in Beppu Bay. And the profile of the oxygen isotope shows seven cycles of fluctuations, indicating seven years temperature records during shell growing period.

Keywords: growthline, growth pattern, chemosynthetic community, bivalve, stable isotope