

Marine ostracode valve weight (preliminary report)

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Ostracoda is a crustacean taxon to have two calcified valves. They grow from juveniles to adults with 6-8 moltings. Ostracodes form low-magnesium calcite valves, using ambient water carbonate. Their valves are calcified rapidly for several hours to days during a molting. For understanding ostracode calcification, the process of calcification has been observed and valve chemistry has been analyzed. Calcified mass has been seldom measured. In this study, I weighed marine ostracode valves to discuss variety of the valve mass.

From Paleocene to Holocene marine sediments, 82 ostracode valves were collected. I identified 20 taxa, that are composed of 2 orders (Platycoida and Podocopida), 7 families, and 14 genera. For cleaning valve specimens, particles were removed from a valve inside using a wet fine brush. The fossil specimens were sonicated with 2% sodium hexametaphosphate solution for two seconds, whereas the subfossils were penetrated in 2% sodium hypochlorite solution for three hours. After the cleaning, they were weighted with a microbalance. Valve length, height, and width of all the specimens were measured, using a digital microscope. Under the assumption of ellipsoid-shaped valves, valve volume (μm^3) and density ($\mu\text{g } \mu\text{m}^{-3}$) were calculated.

The valve weight ranges from 3.9 to 100.6 μg . The valve length and volume show ranges from 384 to 1304 μm and from 2.07×10^7 to $8.96 \times 10^8 \mu\text{m}^3$, respectively. The valve density indicates a range between 3.48×10^{-7} and $5.72 \times 10^{-8} \mu\text{g } \mu\text{m}^{-3}$.

Comparing with the valve density, platycopids have more densely valves than podocopids. In the mean density, platycopids and podocopids show 2.35×10^{-7} and $1.45 \times 10^{-7} \mu\text{g } \mu\text{m}^{-3}$, respectively. The permutation test with 1000 iterations indicates significant difference in the mean density at 0.01 level ($p = 9.9 \times 10^{-4}$; n of platycopids = 24; n of podocopids = 58).

Applying power regression into the plot of valve volume vs valve weight, the exponential scaling indicates 1.0244 for platycopids and 0.9397 for podocopids. The difference in exponential scaling suggests that calcified mass through ontogeny are different between the two taxa. Platycopids form more densely calcified-valves than podocopids. The result indicates that the calcified mass and density are different in taxa.

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