

# Soft-shelled Foraminifera: their meanings in Geobiology

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Foraminifera are marine protists. They have either agglutinated or calcareous hard shells that have potential to fossilize. The fossils have recorded since 0.54Ba. Because they show morphological plasticities to ambient environments and time, foraminifera are excellent proxy organisms for paleoenvironments or age determinations.

There exist either chitinous or gelatinous tests among foraminiferal groups. They are mainly distributed in deep-sea. As they have no hard tests, we call them as soft-shelled foraminifera. Both soft-shelled and tiny test length indicate that they may adapt to oligotrophic environment and less predators. Molecular phylogenetic analysis indicates that soft-shelled foraminifera consist one cluster group. The branch are calculated to separate from ancestral group at 0.8~1.0 Ba.

Problematic microfossils have reported from the late Proterozoic Era. They have long been identified as a group of tintinids. However, morphological characters indicates close similarities between these fossils and soft-shelled foraminifera.

In this lecture, I try to explain morphological anatomy of soft-shelled foraminifera. I also try to discuss on the Earth's History through this organisms.