

Has the distribution of larger foraminifera *Amphistegina radiata* expanded to the Japan Sea Coast of Ishikawa Prefecture?

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In the seas around the Japanese Archipelago, the larger foraminifera are mainly distributed among the Ryukyu Islands; however, since the 1970s, the larger foraminifera *Amphistegina* has been detected along the coast of the Japan Sea. Based on core samples collected in Tsukumo Bay in the Noto Peninsula, Ishikawa Prefecture, *A. radiata* have been present since the early 1900s. Since *A. radiata* were well-preserved, it is possible that the distribution of *A. radiata* has expanded to the Noto Peninsula. However, since the water temperature in Tsukumo Bay becomes lower than the habitable water temperature for larger foraminifera during winter, abortive migration is a possibility.

Agamont, Schizont and Gamont generations were identified around Sesoka Island based on the test size of *A. radiata*, indicating that *A. radiata* adopts a trimorphic life cycle in this location. Therefore, the size of the proloculus was quantified for each generation using samples collected around Sesoko Island and on the coast of Nago City, and then *A. radiata* generations from the Tsukumo Bay were determined based on their proloculus sizes. Absence of Schizont and Gamont generations may suggest abortive migration in the bay.

The distribution of the proloculus diameter for *A. radiata* from Okinawa Prefecture was bimodal with two peaks at 35 - 42um and 77 - 84um. However, it was not clear to which generations these peaks corresponded. Among the megalospheric-type specimens of *Amphistegina gibbosa* from the Florida Keys, the proloculus size of Gamont was larger than that of Schizont and the size of the second chamber was different between the megalospheric and microspheric types. There were two different shapes in the second chamber of *A. radiata* from Okinawa Prefecture, round- and crescent-shaped, and those with a round-shaped second chamber were fewer in number and had a smaller proloculus. On the other hand, those with a crescent-shaped second chamber had a larger proloculus and the distribution of the diameter of the proloculus was bimodal. Therefore, it was suggested that those with a round-shaped second chamber were Agamont, those with a crescent-shaped second chamber were Schizont, and those with a large proloculus were Gamont. Within Tsukumo Bay, the distribution of the proloculus diameter had only one peak at 35 - 42 um and two specimens had a round-shaped proloculus.

In conclusion, the generations of *Amphistegina radiata* that occur in the Tsukumo Bay are likely Agamont and Schizont and although they reproduce, a trimorphic life cycle has not yet been completed.

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