

Changes in adaptive morphology of scyphozoans in varying concentration of salinity

Yoshiko Kakinuma¹⁾ and Hiroshi Miyake²⁾

1) Dept. of Biol., Fac. of Sci., Kagoshima Univ., Kagoshima

2) Ocean Res. Inst., Univ. of Tokyo, Tokyo

Ocean megaplankton scyphozoans are the same as other living things in that their metabolism and behaviour changes according to changes in their surrounding environment. Scyphozoans adapt to their external environment, functioning to maintain their existence.

This research was carried out in Kagoshima Bay using two types of scyphozoans; *Aurelia aurita* and *Cassiopea andromeda* assuming a natural environment between Spring and Autumn with heavy rain and high temperatures. Changes in adaptive morphology were observed and recorded through this period in four different concentrations of ocean water salinity: 10‰, 20‰, 30‰, and 40‰ of water, with 30‰ assumed as the normal concentration of salinity in ocean water.

The result was that at a concentration of salinity of 10‰, *Aurelia aurita* died within one hour, and *Cassiopea andromeda* within 18 hours: they did not adapt to this concentration of salinity.

At concentrations of salinity of 20‰, 30‰, and 40‰, it was observed that both *Aurelia* and *Cassiopea* showed stressful behaviour within 3 hours of putting them in the experimental sea water.

As for their external morphology, their body size and weight reduced in inverse proportion to the concentration of salinity.

There were also slight changes in their internal morphology and structure over time: umbrella height, tentacles, coelenteron size and organs.

Changes in external saline concentration also caused to scyphozoans' internal environment: water temperature (°C), plus/30 sec., dissolved oxygen ($\mu\text{g/l}$), pH, amount of ammonia (μg - atoms N/l) and phosphoric acid (μg - atoms P/l) were released into the water every hour from between one and 36 hours after immersion in the sea water.

At 20‰ saline concentration a large change was observed in *Aurelia* after 3 hours; they become stable after 6 hours. In 40‰ saline concentration, they reached a level of stability after 10 to 18 hours. As for *Cassiopea*, in both 20‰ and 40‰ saline concentration, the peak of resistance to its environment was reached after 6 hours, and after 12 hours they become stable. This difference between *Aurelia* and *Cassiopea* seems to be because *Cassiopea* lives together with algae. Adaptive morphology and periodic transitions in different concentrations of salinity is a stomy of species environmental survival that has already been reported (in Environmental influence on Medusas' size of *Aurelia aurita* and age indicator.: Kakinuma, Y., Takeda, K. and Miyake, H. (1993)).

We would like to suggest that the morphology and organs of any organs can be environmental indicators.