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BULLETIN OF THE MARINE BIOLOGICAL STATION OF ASAMUSHI,
VOL. XIII, NO. 3. 1969

ON A NEW REARING METHOD OF COMMON JELLYFISH, *AURELIA AURITA*

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In the Ueno Zoo Aquarium the life-cycle of the common jelly-fish, *Aurelia aurita* has been exhibited from August 1967. The ephyras, strobilas and polyps kept alive in Petri-dishes, are exhibited by the three shadow projectors with magnification from 10 to 20 times. The adult medusae, reared from the ephyras, are put in a large table tank with bottom-sand filtration for exhibition.

The rearing of *Aurelia aurita* in the laboratory to determine its life-cycle had been accomplished by many authors in Japan and abroad (Hirai, 1958, and others). Recently, Kakinuma (1961, 1962) studied on the factors of the initiation of strobilation in the same species as mentioned above, and concluded that the treatment of the polyps under a temperature of 15°C with lighting is effective for the initiation, even in midsummer when strobilation is never observed at room temperature.

As Hisada and Abe (1968) reported, we tried to rear the common jelly-fish mainly by these laboratory methods since the end of 1965 and succeeded to obtain some 70 adult medusae in the tank. We have developed some improvements on the rearing method and now can obtain more adult medusae more efficiently. The present paper is a report on the method of rearing the common jelly fish in our Aquarium.

The polyps were usually kept in several table tanks with bottom-sand filtration and fed on sufficient larvae of brine shrimp. From autumn to spring the strobilations spontaneously occurred at room temperature and consequently the ephyras were produced. From late November to December and in April the strobilations were observed frequently. The active strobilations of these periods apparently corresponded to the water temperature 15°C. In the other seasons the strobilations were initiated by Kakinuma's method. At these times the strobilations were effectively initiated on the polyp population over 200 individuals in a Petri-dish of 12 cm in diameter.

1) Contributions from the Marine Biological Station of Asamushi, Aomori Ken, No. 367

The ephyras produced by these treatments were transferred to Petri-dishes of 12 cm in diameter and 9 cm in depth. Ten individuals of the ephyras were kept in every Petri-dish containing 500 ml of sea water and fed on 1,000 to 2,000 larvae of the brine shrimp. The water was renewed once a day. After 30 days some of the ephyras grew to young medusae of which the umbrella measured about 10 mm in diameter. During this period numerous deformed medusae were developed and died, and about 20 per cent or less ephyras were usually grown to normal young medusae (Fig. 1). Owing to being able to make better growth, we made some observations on the rearing condition, dissolved oxygen and the water movement. The dissolved oxygen is consumed by the living and decomposing organisms which consist of the ephyras, the live and dead larvae of the brine shrimp and their excrement. Some analytical experiments showed that the amount of oxygen consumption of the decomposing organisms exceeded that of the living ones, but it was proved that ephyras as well as young medusae never suffered from the decrease of the dissolved oxygen.

Another factor which seemed to affect the growing ephyras in the Petri-dishes, was the motion of the water. In standing water, ephyras swam actively near the surface of the water in their early stage, but in the meantime they sank to the bottom. The ephyras had to pulsate their umbrella to keep afloat and when the pulsations stopped they began to sink.

Browne (1897) reported on the necessity of the water current to keep the medusae alive in good condition. We thought that if the water current is produced by air-lift or some other type of pump might be favourably applied to the rearing of ephyras, and that the filtering apparatus may be used by these pumps. But the ephyras were unable to resist even a weak current and consequently no kind of filter could be applied directly to the containers of them. Therefore we tried to keep the ephyras by using a comparatively large quantity of water supplied with a convective current by air bubbles, and unexpectedly succeeded in rearing them efficiently.

At the same rate as in the Petri-dish rearing, 1,000 individuals of ephyras were kept in a vessel containing 50 l of water and fed on 100,000 to 200,000 of larvae of the brine shrimp once a day. The water was aerated and unchanged during the rearing period (Fig. 2). After 30 days more than 60 per cent of the ephyras grew to normal young medusae. They were measured to be about 10 mm in diameter of the umbrella (Fig. 3). No water change for the 30 days with aeration seemed to be sufficient to the ephyras and young medusae. By the convective current of the water the ephyras or the young medusae were kept afloat and could be continually and equally fed on the food suspended in the water current.

These young medusae were transferred to and reared in another container dipped in a table tank with bottom-sand filtration (Fig. 4). The container is a

plastic tank with many small pores each of about 3 mm in diameter on the sides and bottom. The water was altered very slowly with the outside water. The young medusae during this period could not be kept directly in the tank with bottom-sand filtration because of their weak activity. In the following 30 days they grew to about 50 to 60 mm in diameter of the umbrella and then were transferred to the exhibition tank. They were fed on larvae of the brine shrimp or chopped meat of the clam and shrimp.

Finally, we wish to express our hearty thanks to Drs. Eturô. Hirai and Yoshiko Kakinuma of the Marine Biological Station of Asamushi for their valuable suggestions on the methods of the rearing.

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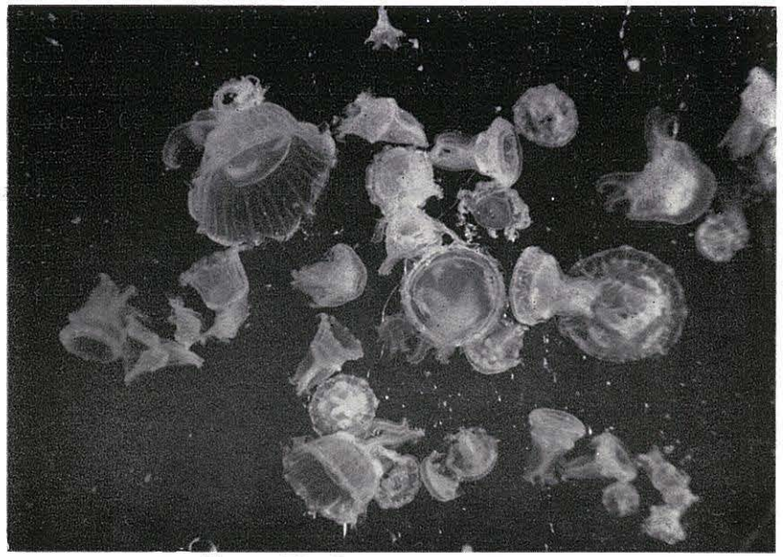

Fig. 1. The deformed young medusae

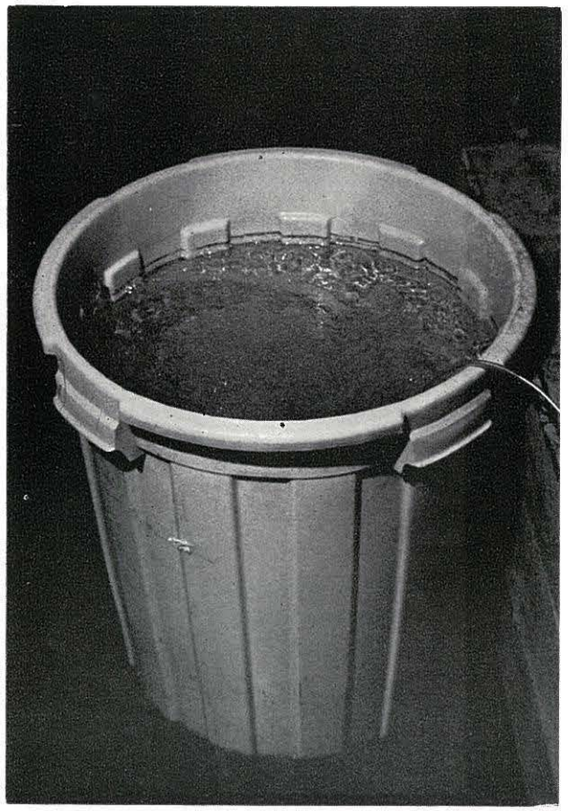

Fig. 2. The rearing vessel (50 l)

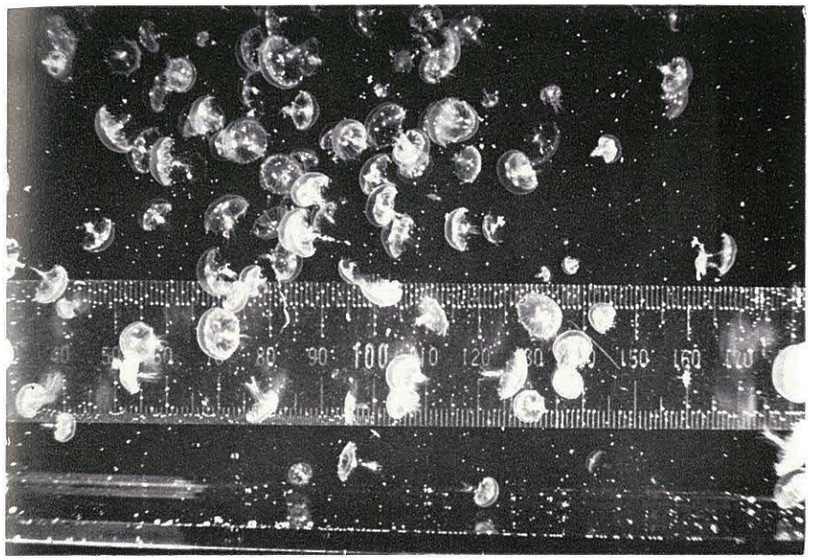

Fig. 3. The young medusae after 30 days rearing in the vessel

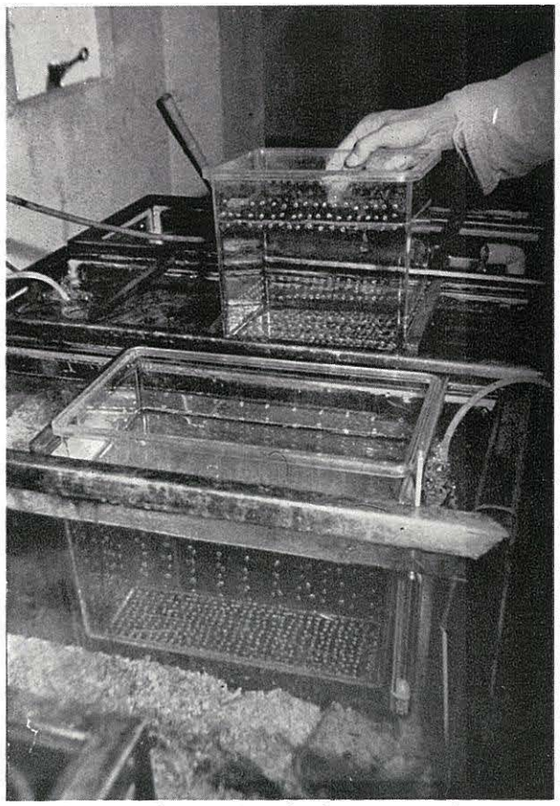

Fig. 4. The container for the young medusae