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Observations on the feeding regime of the sea hare aplysia, *Donabella rumphi* (Cuvier) and its captive spawning and larval rearing trials

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Aplysia occurs in a variety of color patterns that correlate with the seaweed upon which it is feeding and living. Aplysia which is a gastropod mollusc is one of the important candidates for marine aquarium. It also has large ganglion nerve cells. This neuron is very similar to those present in vertebrates, making them good subjects for neurological research, electrophysiological studies as well as studies on conditioned responses. At present, we fully depend on exploitation from the wild. In the present context, spawning of the aplysia *Donabella rumphi* kept in captivity at Mandapam is reported.

On 22-07-05, broodstock of 14 live, *D. rumphi* were collected from the seagrass beds of Hare Island and stocked in four rectangular tanks (75 L capacity each) with recirculating water system at the ratio of 1:2, 1:3, 1:4 and 1:5. The size of the animal ranged from 256 to 462 g. Initially the animals were fed with

seaweed *Ulva reticulata* at the rate 5 g/animal/day. Handling the animals is done gently or minimized as it sprinkles the dark purple dye which causes itching to skin. Normal seawater salinity and temperature were maintained and aeration was provided for 24 h. The tank had a water depth of 35 cm. The details of the feeding trial with different types of seaweeds and their percentage consumption range on wet weight basis are given in Table 1.

After 2 days of rearing, the first spawning occurred on 25-07-05 at 5.45 p.m close to the bottom of Tank 4. The animal stopped feeding a day prior to spawning. Before spawning, the animal slowed down its movement and rose to move its head in a characteristic way repeatedly. Initially side to side movement of head was started for few minutes and then stopped. After few seconds, up and down along with side to side movement of head with body began

Table 1. Feeding trial with seaweeds and their % consumption range for the whole experimental period. Average % composition is given in parenthesis.

Type of seaweed	<i>Ulva reticulata</i>	<i>Hypnea musciformis</i>	<i>Gracilaria corticata</i> var. <i>corticata</i>	<i>Gracilaria cylcornea</i>	<i>Gracilaria edulis</i>
Period	24/07/05 - 03/08/05	04/08/05 - 13/08/05	14/08/05 - 23/08/05	24/09/05- 03/10/05	04/10/05 - 13/10/05
Tank 1	36.41-93.76 (49.76)	55.28-94.48 (74.25)	10.29-37.49 (20.46)	15.23 - 38.4 (30.53)	33.41-78.63 (52.43)
Tank 2	7.64-64.71 (38.62)	67.16-92.6 (85.27)	6.64-22.48 (18.79)	9.8-23.22 (19.37)	28.43-68.89 (66.22)
Tank 3	5.45-64.9 (29.86)	61.7-95.42 (78.62)	8.73-35.41 (28.27)	14.31-39.43 (29.87)	34.1-85.5 (65.37)
Tank 4	9.4-53.79 (31.58)	56.7-87.43 (68.42)	11.2-33.3 (21.47)	7.82-27.59 (18.42)	34.82-66.19 (47.75)

and the egg string in olive yellowish green colour, started appearing from the posterior portion of animal's foot which remained attached to the bottom of the tank. The string was approximately 0.5 mm diameter (Fig. 1). After an hour, a large egg string twined like a ball of yarn was found attached to the bottom of tank. Since this species is oviparous, they

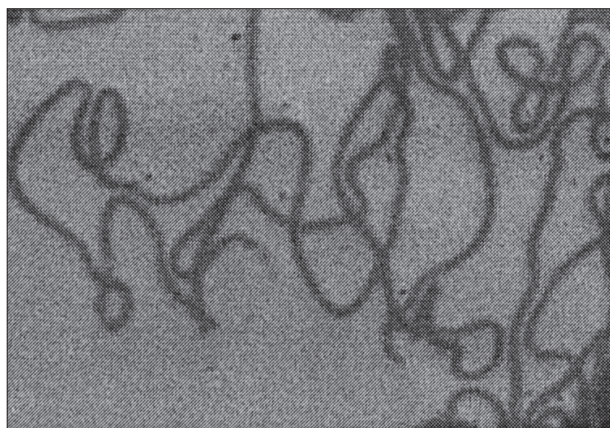


Fig. 1. Egg strings of *Donabella rumphi*

generally deposit the eggs in gelatinous masses (Fig. 2). Fecundity was estimated by counting number of eggs in a small piece of string multiplied by total weight of egg mass (Fig. 3).

The estimated fecundity of *D. rumphi* was 125,000 eggs. Immediately after spawning, the animals were shifted to another rectangular tank. In the tank containing egg mass, mild aeration was given

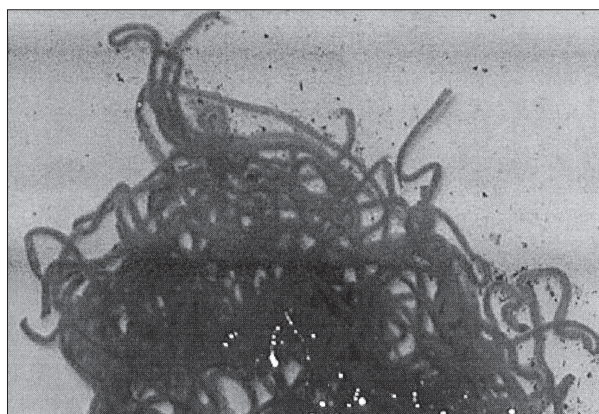


Fig. 2. Egg mass of *Donabella rumphi*

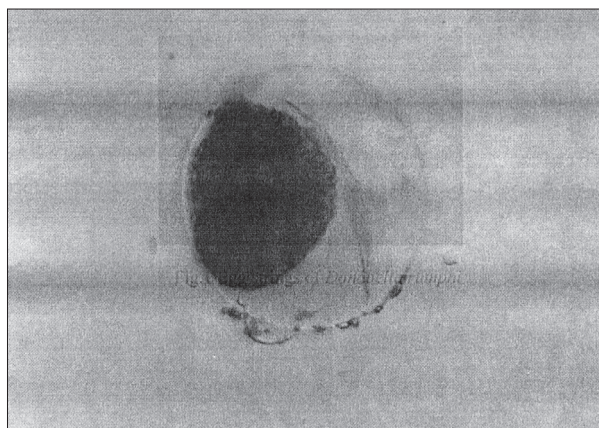


Fig. 3. Egg of *Donabella rumphi*

and tank was partially covered with black sheet to cut off excess light. The egg string composed of a gelatinous layer surrounded with large number of

small densely packed compartments each containing 5-15 eggs (Fig. 4). During the period of incubation, the colour of the egg string changed from olive yellowish green to pale brownish green. The larvae hatched out at night after 7d of incubation (Fig. 5). Shell length of the newly hatched larvae was $174 \pm 2 \mu\text{m}$. Nearly 79% eggs were hatched.

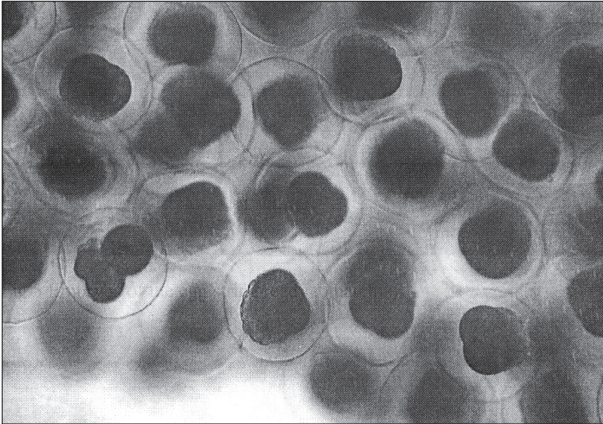


Fig. 4. Eggs in the egg string of sea hare

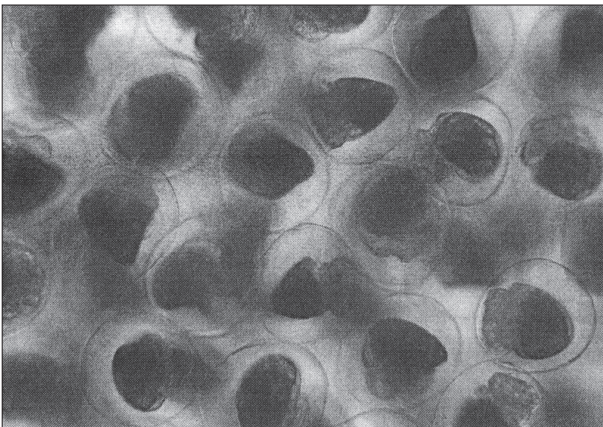


Fig. 5. Embryos inside the egg string ready to hatch

Immediately after hatching, the veliger larvae were found to move up and down very actively in the water and take rest at the bottom for some time by pulling their head with appendages inside. The larvae were light brown in colour with well developed twined shells, operculum, foot, velum and large head with two purplish blue pigment spots (Fig. 6). Larvae were fed with unicellular algae *Isochrysis galbana* at the rate of 10^5 cells / ml. Larvae survived for 8 days when they grew to a maximum shell length of $250 \mu\text{m}$. On

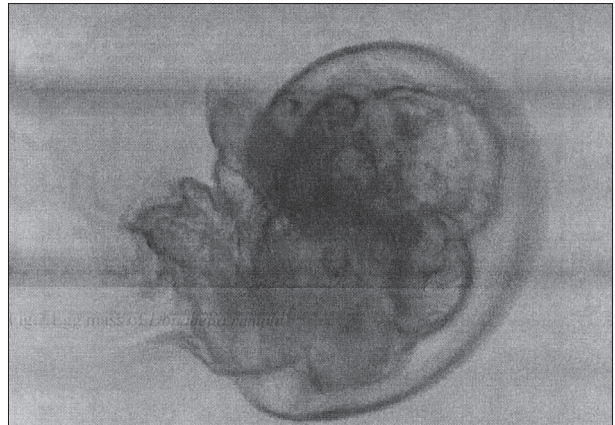


Fig. 6. Veliger of *Donabella rumphi*

an average 10-11% mortality was observed every day till day 6. A survival of 17.5% (i.e., 21,000 nos.) was observed at the end of day 6 and mass mortality occurred on the subsequent days due to the attack by ciliates.

The second spawning was noticed on the 4th day of rearing in tanks. The time of spawning was more or less similar as in the first spawning. The egg mass was kept in the same tank for hatching. Hatching took place on the eighth day and the larvae survived for 6 days. Continuous mortality of larvae stocked was observed throughout the rearing period. Totally 17000 larvae (i.e., 14% of initial stock) survived at the end of 6th day and within last two days, mass mortality occurred.

The third spawning was observed on 7th day of rearing in tank 2. Meanwhile, one of the animal died in tank 1. The time of spawning and duration of larval rearing was same as above and a final larval survival of 10% was noticed. Further spawning was not observed.

From the foregoing observation, it has been revealed that *Hypnea musciformis* is the most suitable diet for the aplysia *D. rumphi* substituted by *Gracilaria edulis*. It is also proved that the spawning is faster in the tank having more stocking density.

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