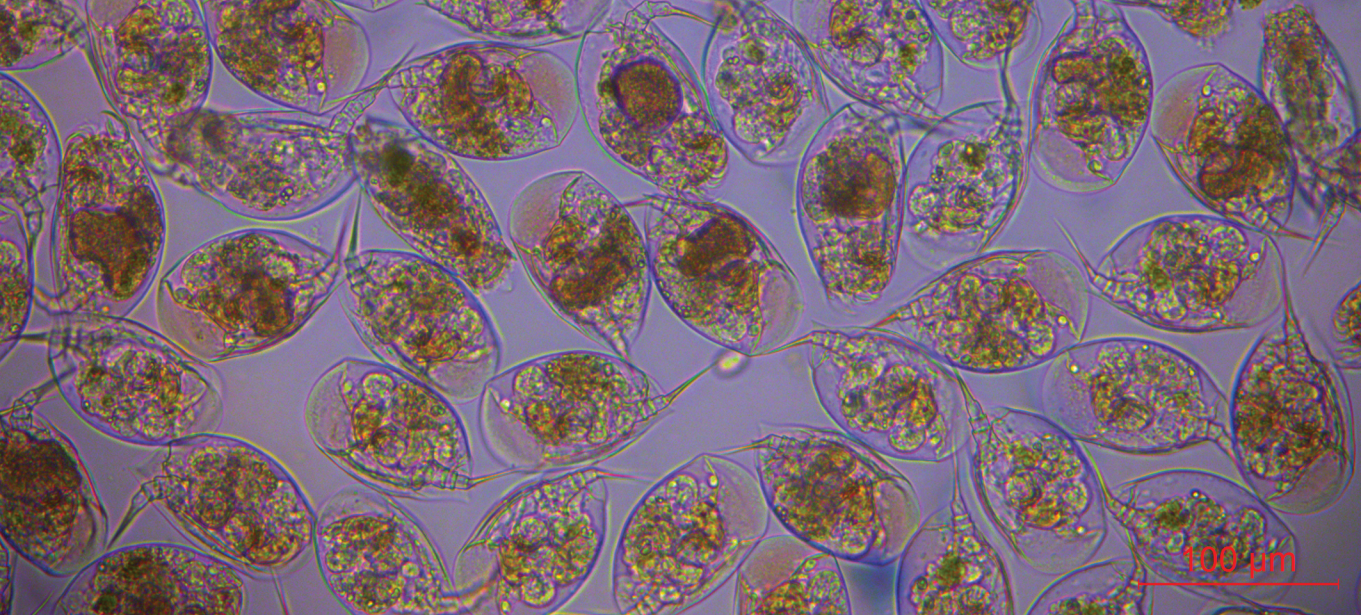


Culture of *Colurella adriatica* : Super Minuscule Rotifer for larval rearing of fishes



Culture Methods

The culture of *C. adriatica* can be carried out at salinity 15 to 22 ppt for mass multiplication using microalgae *Nannochloropsis oculata* or yeast (0.01g/litre) as feed. The culture fed with *N. oculata* can reach a population density of 1000nos./ml on 10th day of culture and in the yeast fed culture the density reaches 650 nos/ml on 15th day of culture.

Lifespan and multiplication

In general, the life span of rotifers has been estimated to be between 3.4 to 4.4 days at 25°C. Generally, the neonates become adult after 0.5 to 1.5 days and females thereafter start to lay eggs approximately every four hours. It is believed that females can produce ten generations of offspring before they eventually die. The multiplication rate of *C. adriatica* is reported as 0.765 ± 0.017 offspring/female/day, whereas it was 0.23-1.15 offspring/female/ day, in *B. plicatilis* and 0.54-1.37 offspring/female/day in *B. rotundiformis*.

Harvesting

Partial harvest can be done from 10th day of culture and with replacement of harvested volume with fresh algae can sustain the culture for a period of 17 days. The harvesting can be done using net having 50 micron mesh size. The harvested biomass of *C. adriatica* was yellowish orange in colour.

Advantages

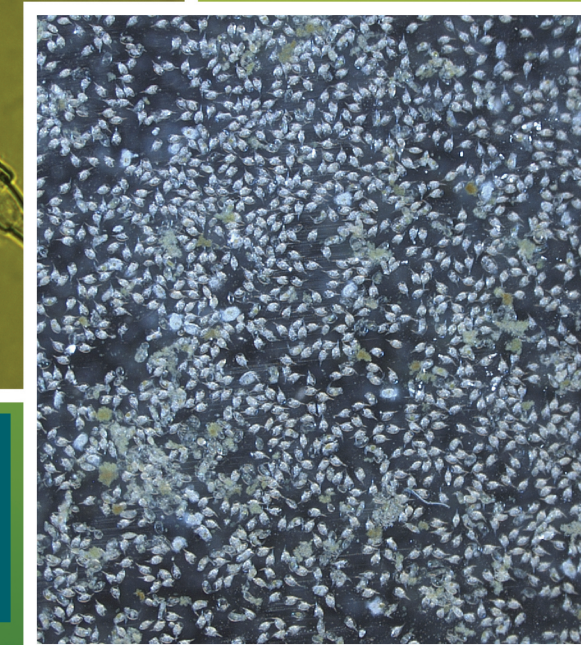
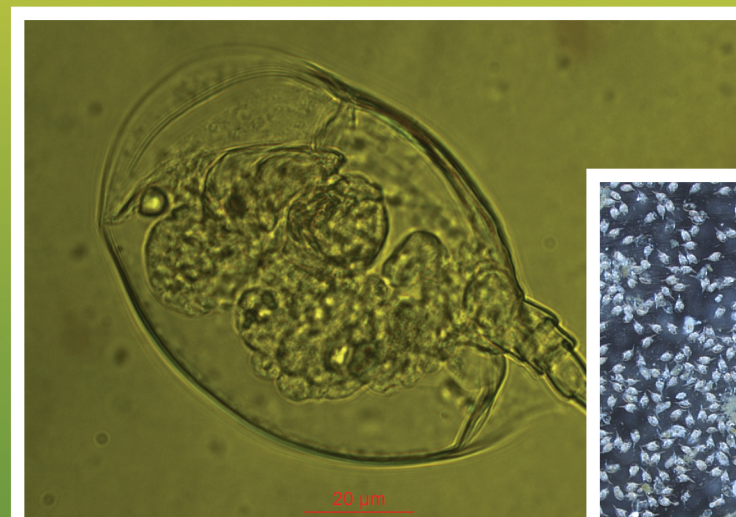
- Extremely smaller rotifer.
- Being a filter feeder, its nutritional quality can also be enhanced with proper enrichment.
- It can tolerate wide salinity range from 15 to 35 ppt.

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Introduction

Micro live feeds are essential for the larval rearing and seed production of marine finfish and shellfish, as the larvae rely on live prey during their initial feeding stage. This dependency on live food sources, such as microalgae, rotifers, and Artemia, is fundamental for ensuring healthy growth and development. These live feeds provide essential nutrients and promote natural feeding behaviour, which are vital for the survival and development of marine larvae. The reliance on live food organisms is growing steadily because, the formulated diets have its own disadvantages such that uneaten feed tend to sink or accumulate at the bottom of tanks which will deteriorate the water quality, whereas live organisms can swim freely in the water column and are continuously accessible to larvae. Additionally, the jerky movement of these live organisms helps to trigger feeding responses in the larvae.

Most marine fish larvae are of the altricial type. A major challenge in larval rearing is the first feeding phase, during which the larvae transition from relying on internal yolk reserves to external food sources. Hatcheries typically use live feed organisms such as rotifer species *Brachionus plicatilis* (L type), *B. rotundiformis* (S and SS types), copepod naupli and brine shrimp (*Artemia* spp.) because of their small size, rapid reproduction, and ease of cultivation. However, larvae of many of the marine food fishes including groupers and high value marine ornamental fishes are unable to consume these live feeds as their first feed due to their extremely small mouth gape. It is also established that prey capture success and percentage of successful feeding strikes is low at first feeding by marine fish larvae but rises rapidly during early development. At this stage, providing an appropriately sized and nutritionally balanced live feed in high densities is crucial for larval survival. If they fail to find and capture food before exhausting their energy reserves, the larvae may starve, leading to mortality. Since the mouth gape of most fish larvae ranges from 50 to 120 μm , it is essential that the live feed be smaller than the gape size to facilitate active feeding, highlighting the importance of feed size in larval nutrition. The species belonging to the genus *Colurella* are extremely smaller rotifers making them as a suitable first feed for larvae.

Colurella adriatica: Identification characteristics

The species *Colurella adriatica* belonging to the Phylum: Rotifera, Class Eurotatoria, Order: Ploima, Family: Lapadellidae. Lorica is very variable in size and shape with characteristic divergence of posterior margin which has a pointed and acute shape. Lorica composed of two lateral plates, strongly compressed laterally and it open along anterior, ventral and posterior margins. So it appears mussel-shaped in side view. Frontal head hood present and the head carries a small, retractable, semi-circular shield dorsal to the corona which is retractable completely within lorica. The foot consists of four segments and two slender toes which are longer than the length of foot. There are two lateral eyes which are red in colour and can be distinguished easily.



Habitat and distribution

C. adriatica is reported as euryhaline and eurytopic species occurring in current water in the littoral zone among macrophytes, it was reported from fresh, brackish and marine water bodies in temperate, tropical regions. It can tolerate wide range of salinity fluctuation, and habitats or ecological conditions.

GenBank

The species isolated were identified as *C. adriatica* and the partial sequence of Colurella sp. CO1 was deposited in GenBank with the accession no: KX387633.

Measurements of C. adriatica under captive conditions

The lorica length of the isolated species under culture period ranged from 47.530 to 98.868 μm and its width ranged from 34.308 to 56.277 μm . The size of the eggs ranged from 53.821 to 62.432 μm length and 37.543 to 44.176 μm width. The lorica length of the neonates ranged from 47.530 to 50.004 μm and their width ranged from 34.308 to 36.702 μm . Size of the adults usually ranged from 70.454 to 98.868 μm lorica length and 54.243 to 56.277 μm lorica width. The length of foot ranged from 25 to 30 μm and the two toes present were slender, long and separated which measured 30 to 40 μm .

Comparison of size of C. adriatica with common rotifers

In aquaculture, the most widely used species of rotifer are *B. plicatilis* (L-type) and *B. rotundiformis* (S-type and SS-type), and the comparison of *C. adriatica* with commonly used rotifer revealed that *C. adriatica* the Super Minuscule Rotifer (SMR) is smaller than the super small *B. rotundiformis*.

Rotifer species	Lorica length (μm)	Lorica width (μm).
<i>C. adriatica</i>	47.530- 98.868	34.308–56.277
<i>B. plicatilis</i> (L type)	130- 340	116–146
<i>B. rotundiformis</i> (S type)	100- 210	98–121
<i>B. rotundiformis</i> (SS type)	58-120	116–146

