Ultrastructure of egg membrane of rohu (Labeo rohita)

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ABSTRACT

The fine structure of the egg envelope and micropyle of unfertilised spawned eggs of rohu (Labeo rohita) was observed using scanning electron microscope (SEM). The outer surface showed regularly arranged pores (dia. 0.20 - 0.25 µm) but was devoid of any filaments, fibrils or wrinkles. The micropyle was funnel shaped which exhibited an outer pit (10 µm dia.) narrowing into a distinct canal (4.5 µm dia.). The larger diameter of the micropylar canal in comparison with the sperm head size of rohu and some other cyprinids make intergeneric and interspecific hybridisation easy in rohu.

Ripe eggs were collected from female rohu spawners by hand-stripping, 6
hours after injection of ‘Ovaprim’ @0.4ml/kg body weight during peak breeding period. The eggs were fixed in ice-cold 2% glutaraldehyde, buffered to pH 7.3 with 0.1M cacodylate buffer over ice for 5 hrs. and osmified in 1% osmium tetroxide in 0.1M cacodylate buffer. The fixed eggs were dehydrated in ethanol series, critical point dried using CO₂ (Polaron E-3000) and sputter-coated with gold. The observations were made using philips SEM 501/B and photographed.

The unfertilised, ovulated rohu eggs (average diameter 750 µm) have a relatively smooth surface, characterised by regularly arranged round pores (Fig. 1) with diameter ranging from 0.20 - 0.25 µm and are distributed at a mean distance of 0.6 µm (range 0.39 - 0.86 µm).

The micropyle of rohu is funnel shaped (Fig. 2) leading into a canal having a diameter of 4.5 µm. The funnel shaped micropyle is characteristic of those species with sub-
merged eggs. Micropyle of pelagic eggs are only small depression of the surface envelope, while the same in demersal eggs are funnel-shaped with a wide outer pit and a canal (Mikodina, 1987). The diameter of the micropyle canal (4.5 µm) of rohu egg is larger than the size of the sperm head of both rohu (1.9 µm) and mrigal (2.2 µm) (Gopalakrishnan et al., 2001), thus giving a clear scientific explanation for the free access of anacrosomal sperms (head diameter less than 4.5 µm) of other cyprinids into rohu eggs producing hybrids. The canal wall of rohu egg exhibited many folds or thickenings. Numerous agglutinates were also observed along the outer rim and canal of the micropyle (Fig. 2, 3). As reported by Mikodina (1987) in other species, the agglutinates seen along the rim and micropylar canal of rohu eggs can be the residues of the cytoplasmic processes of granulosa cells. Mikodina and Makeeva (1980) demonstrated that in spite of a great similarity between the eggs of silver carp (Hypophthalmichthys
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Fig. 3. Agglutinates (Ag) on the surface of rohu eggs. Bars = 10 µm.

molitrix), bighead (Aristichthys nobilis), grass carp (Ctenopharyngodon idella) and black amur (Mylopharyngodon piceus), the structure of their micropyle and egg membranes differed greatly and were species-specific. Further study on eggs of other Indian major carps will reveal whether morphology of their micropyle and envelope differ from that of rohu.

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References


