



OOCYTE DEVELOPMENT IN PIRARUCU *Arapaima gigas* (SCHINZ, 1822)

TORATI, Lucas Simon.*¹, GANECO-KIRSCHNIK, Luciana Nakaghi.¹, LIMA, Adriana Ferreira.¹, MIGAUD, Hervé²

¹ Embrapa Pesca e Aquicultura. Palmas/TO, Brazil, lucas.torati@embrapa.br; ² Institute of Aquaculture, University of Stirling, Scotland.

This work aimed to describe the oocyte development in pirarucu, *Arapaima gigas*, from primary growth to ovulation stages for the first time. To do so, 12 females had ovarian biopsies collected through cannulation at two different moments (16/03/2016 and 17/05/2016). Oocytes were photographed on a scaled dish plate and measured for two perpendicular diameters using imaging software. After, samples were gradually dehydrated in an ethanol series, then infiltrated and blocked in glycol methacrylate resin and paraffin. Blocks were sectioned at 3–5 μm thick using a rotary microtome and slides were stained with hematoxylin–eosin. Given that egg release during sampling is not common in pirarucu, non-fertilized eggs could only be kept frozen in liquid N_2 instead of being fixed with appropriate fixatives and processed for Scanning Electron Microscopy analysis (SEM). Oocyte development was classified in primary growth stage (PGs), secondary growth stage (SGs), oocyte maturation (OM), and pre-ovulation steps (OV). In PGs, multi-nucleoli oocytes were identified by the presence of several nucleoli scattered within the germinal vesicle. Oocyte diameter ranged from 32.2 to 113.1 μm ($72.0 \pm 17.3 \mu\text{m}$). The oil droplet step was initiated with the appearance of few oil droplets at the periphery of the ooplasm and cortical alveoli in the ooplasm. The follicle layer was more evident lining the zona pellucida from secondary growth onwards. Early SGs oocytes showed increase in the number of small yolk globules and oil droplets throughout the ooplasm. Oocyte diameter ranged from 783.5 a 946.5 μm ($892.6 \pm 46.5 \mu\text{m}$). The germinal vesicle started its migration towards the animal pole marking the start of the OM stage. At this stage, oil droplets started to coalesce becoming larger compared to the SGfg stage, and yolk became more fluid and the nucleocytoplasmic ratio decreased. The diameter of these oocytes ranged from 1302.5 to 2354.0 μm ($1923.3 \pm 275.6 \mu\text{m}$). OV oocytes measured from 2394.0 to 2466.0 μm ($2427.0 \pm 21.4 \mu\text{m}$) in diameter. OV eggs are now surrounded by the chorion since they detached from the follicular layer. In these oocytes, the germinal vesicle has reached the animal pole and its membrane has broken down. SEM analyses performed on unfertilized OV eggs revealed the presence of a single micropyle, which has a series of radially arranged ridges leading into the micropylar canal, whose diameter measured $11.3 \pm 0.02 \mu\text{m}$. Overall, this study advanced our knowledge of the reproductive biology of *A. gigas* in captivity, with novel data on ovarian development.

Key words: histology, fish, reproduction.