

# NOTICE OF PUBLICATION

---



AQUACULTURE COLLABORATIVE RESEARCH SUPPORT PROGRAM

## RESEARCH REPORTS

Sustainable Aquaculture for a Secure Future

---

**Title:** The Nature of Exocytosis in the Yolk Trophoblastic Layer of Silver Arowana (*Osteoglossum bicirrhosum*) Juvenile, the Representative of Ancient Teleost Fishes

**Author(s):** Marta Jaroszewska, Konrad Dabrowski

School of Environment and Natural Resources, The Ohio State University, Columbus, Ohio

**Date:** 3 October 2017 Publication Number: AquaFish Research Report 09-A20

The CRSP authors will not be distributing this publication. Copies may be obtained by writing to the authors.

**Abstract:** We have chosen the silver arowana (*Osteoglossum bicirrhosum*), a representative of the most ancient teleost family Osteoglossidae, to address the question of yolk nutrients utilization. Silver arowana have particularly large eggs (1–1.5 cm of diameter) and a unique morphology of the yolk. We present evidence that the yolk cytoplasmic zone (*ycz*) in the “yolk sac juveniles” is a very complex structure involved in sequential processes of yolk hydrolysis, lipoprotein particles synthesis, their transport, and exocytosis. Vacuoles filled with yolk granules in different stages of digestion move from the vitellolysis zone through the *ycz* to be emptied into the microvillar-interspace in the process of exocytosis. The area of the *ycz* with the abundance of the mitochondria must play an important role in providing energy for both the transport of vacuoles and the release of their contents. Therefore, we postulate that the function of yolk syncytial layer (*ysl*) as the “early embryonic patterning center” transforms in fish larvae or yolk sac juveniles into a predominantly specialized role as the yolk trophoblastic layer (*ytl*) involved in yolk nutrients utilization. In addition to discovering the mechanism of transformation of the *ysl* function into *ytl* function, we suggest that the machinery involved in nutrient mobilization and exocytosis in yolk of arowana yolk sac juveniles can be very attractive system for studies of regulatory processes in almost all secretory pathways in animal cells.

This abstract was excerpted from the original paper, which was in the *The Anatomical Record* (2009), 292: 1745-1755.

---

**CRSP RESEARCH REPORTS** are published as occasional papers by the Program Management Office, Aquaculture Collaborative Research Support Program, Oregon State University, 418 Snell Hall, Corvallis, Oregon 97331-1643 USA. The Aquaculture CRSP is supported by the US Agency for International Development under CRSP Grant No.: LAG-G-00-96-90015-00. See the website at < <http://pdacrsp.oregonstate.edu/> >.