

ECOPHYSIOLOGICAL STUDIES OF THE FRESHWATER ANOSTRACA *Dendrocephalus brasiliensis* PESTA, 1921 AND ITS IMPLICATIONS ON ZOOPLANKTONIC AND NEKTONIC COMMUNITIES

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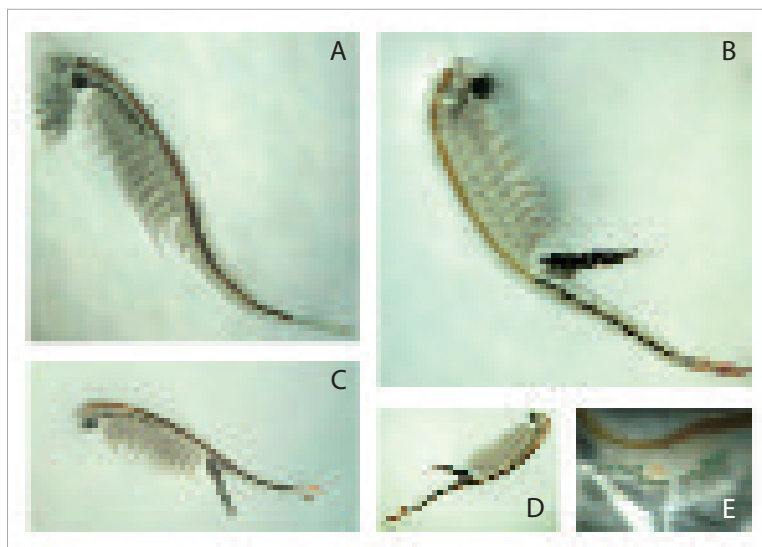


Figure 1. *Dendrocephalus brasiliensis*: A – male; B, C and D – females; E – sac of eggs (Photo by Renata M. dos Santos)

Larval rearing is considered the bottleneck for a sustainable development of aquaculture. Live food availability, particularly zooplankton, is essential for the development of young fishes and crustaceans. Nevertheless, there are serious difficulties to obtain zooplanktonic biomass enough to attend the growing world demand. The native tropical freshwater Anostraca *Dendrocephalus brasiliensis* (Figure 1) has a great potential for utilization in aquaculture due to its size (25mm) and great attractiveness for fishes. So, the present project aims to investigate ecological and physiological aspects of this species, at natural and experimental environments, in order to subsidize the development of technologies to produce resistance eggs and biomass. Its productive potential will be evaluated through studies

of secondary production (ecological and physiological approaches), growth rates, energetic balance, trophic efficiencies, life history characteristics, fecundity, egg viability, number of generations, longevity under different environmental and food conditions, body length and biomass. Studies on fish's food preference and nutritional values of *D. brasiliensis* compared to other zooplanktonic species will be performed, as well as the impact of each one in the production of cultivated tropical fishes. To optimize *D. brasiliensis* cultivation, it will be investigated the influence of microalgae nutritional quality on the animal biochemical composition (proteins, lipids and carbohydrates). Competition, predation and grazing interactions will be also investigated in order to found the real impact of this species on the other freshwater planktonic populations, mainly in São Paulo State environments.

SUMMARY OF RESULTS TO DATE AND PERSPECTIVES

D. brasiliensis is rearing in laboratory to determine embryonic and postembryonic development time, to characterize the different instars morphology, to produce eggs large scale cultures and to analyze the stomach contents (Figure 2).

Microalgae are a source of natural products that support the growth of zooplankton in aquatic ecosystems. The biochemical composition of these photosynthetic organisms are manipulated through the variation environmental conditions, such as micro and macronutrients. Doing this, higher content of reserve molecules are produced and these cells, with higher energetic value, can be used as food source for zooplankton. Further, the zooplankton are used to feed fish larvae in aquaculture. In this project, we are currently investigating environmental factors to manipulate algae cells in culture as to obtain higher lipid content and, at the same time, higher biomass.

Physiological response of *Chlorella vulgaris* to environmental factors is being investigated. This microalgae is exposed to varying levels of nutrients (nitrates and phosphates), trace elements (copper and cadmium) and a combination of both nutrients and trace elements. Lipid class, total proteins, carbohydrates and biomass production are being studied at the set conditions for possible optimized large scale production.

Several zooplankton species (*Daphnia laevis*, *Dendrocephalus brasiliensis*, *Artemia salina*, etc.) are fed with these manipulated algae. Nutritional values of algae and zooplankton, through the different manipulation conditions, is being determined in order to find the better biochemical composition of live food for tropical fishes' larvae.

Furthermore, we are evaluating food selectivity of larvae and young fishes of neotropical carnivores species with aquaculture potential fed with *Dendrocephalus brasiliensis* and other species of freshwater zooplankton, as well as determining feed rate, secondary production, growth and survival of these fishes.

We also are initializing ecological studies of *D. brasiliensis* in its natural ecosystems and competition experiments in controlled conditions.

We expect that the results obtained in this work, comparing *D. brasiliensis* with other native zooplanktonic species, will make possible the use of this Anostraca as alimentary source of young cultivated tropical fishes, improving Brazilian aquaculture. Moreover, we hope that our ecological studies will enable us to evaluate if the use of *D. brasiliensis*, in São Paulo State can be recommended or not for use in aquaculture. Detailed biochemical studies of several zooplanktonic and algae species will generate important information to produce alive food with greater nutritional values for a more efficient fish production.

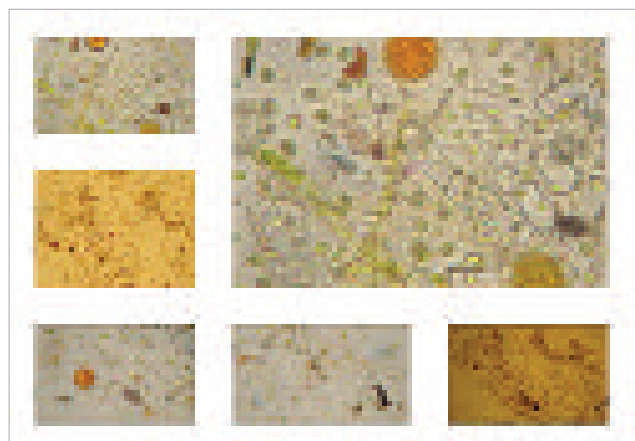


Figure 2. Food items in the digestive tract of *Dendrocephalus brasiliensis* (Photo by Renata M. dos Santos)

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