

Reproductive performance of fairy shrimp *Branchinecta orientalis* (G. O. Sars 1901) (Crustacea: Anostraca), fed with effluent of rainbow trout *Oncorhynchus mykiss* (Walbaum 1792) ponds

N. Pormehr¹  | N. Agh² | L. Beladjal³  | B. Atashbar² | G. Van Stappen¹

¹Faculty of Bioscience Engineering, Laboratory of Aquaculture & Artemia Reference Center, Department of Animal Production, Ghent University, Ghent, Belgium

²Artemia and Aquaculture Research Institute, Department of Biology and Aquaculture, Urmia University, Urmia, Iran

³Faculty of Science, Terrestrial Ecology Unit, Department of Biology, Ghent University, Ghent, Belgium

Correspondence

N. Pormehr, Faculty of Bioscience Engineering, Laboratory of Aquaculture & Artemia Reference Center, Department of Animal Production, Ghent University, Ghent, Belgium.
Email: Navid.Pormehryabandeh@UGent.be

Abstract

Aquaculture production is predicted to increase sharply. In this regard, live feed plays a crucial role in the larval phase of many aquaculture organisms. Hence, a persistent concern in aquaculture is to find low-cost and eco-friendly feed sources to culture live feed organisms. *Branchinecta orientalis* (G. O. Sars 1901), a fresh/brackish water fairy shrimp, was reared using effluent from rainbow trout *Oncorhynchus mykiss* (Walbaum 1792) ponds, either fresh but supplemented with two species of microalgae, *Scenedesmus* sp. and *Haematococcus* sp., or non-supplemented but after “ageing” of the culture medium. The feeding experiment was designed at a density of 100 individuals L⁻¹ in 2-L vessels. The results indicated that differences between final length, survival and most reproductive parameters of the treatment with aged medium and the treatment using fresh medium supplemented with *Scenedesmus* sp. were non-significant ($p > .05$). Better results were obtained for a number of reproductive parameters in the treatment supplemented with *Haematococcus* sp. Thus, for intensive resting egg production of *B. orientalis*, microalgae can be replaced by aged non-supplemented effluent from trout ponds as a nutrient-rich feed source. This consequently can reduce drainage of nutrients into the environment and thus decrease aquatic pollution.

KEYWORDS

Anostraca, *Branchinecta orientalis*, fairy shrimp, large Branchiopoda, resting egg, reused waste water

1 | INTRODUCTION

The fairy shrimp *Branchinecta orientalis* (G. O. Sars 1901) is a non-selective filter feeder of plankton and suspended material like other fairy shrimps (Beladjal, Peiren, Dierckens, & Mertens, 1997), which inhabits vernal pools. These pools periodically dry, particularly during summer, and are very important habitats for large branchiopods (Atashbar, Agh, Van Stappen, Mertens, & Beladjal, 2014), many of which are endangered (Kneitel, Samiylenko, Rosas-Saenz, & Nerida, 2017).

Most Anostracans are characterized by obligate sexual reproduction (Reniers, Vanschoenwinkel, Rabet, & Brendonck, 2013). They reproduce only by producing resting eggs (Reniers et al., 2013), unlike *Artemia* (Leach 1819) which can produce both nauplii and resting eggs based on the environmental conditions. The elongated shape of the brood pouch enables the females to inject the resting eggs into the soil to a depth of almost 10 mm (Kraus, Eder, Møller, & Werding, 2004). The resting eggs are capable of tolerating harsh conditions during drought or freezing, which in most cases is a must before they can hatch (Kraus et al., 2004). When the pools are filled