

# Morphological Abnormality in *Artemia* Leach, 1819 (Crustacea: Anostraca): A Specimen with Three Compound Eyes

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**Abstract:** An abnormal specimen with three lateral compound eyes was found in a laboratory-cultured population of the parthenogenetic *Artemia* from Dongfang Saltern, Hainan, China. The right side of head bears two compound eyes that are smaller than the normal compound eye on the left side. Other morphological or morphometric characters did not show obvious difference from normal individuals of the same population.

**Key words:** abnormality, Crustacea, *Artemia*.

## Introduction

The occurrence of morphological abnormalities have been occasionally recorded in crustaceans, e.g., non-equal length of cercopods and swelled second male antennae in the fairy shrimp *Branchipus schaefferi* (see MILICIC et al. 2013), intestinal prolapse or skeleton breakage in copepods (CRISAFI 1974, MONTÚ & GLOEDEN 1982), non-sexual skeletal abnormalities in the copepod *Acartia lilljeborgii* (see POMBO & MARTINELLI-FILHO 2012) and the deformation of endopod and exopod of the copepods *Boeckella poppei* and *Eurytemora velox* (see PANDOURSKI & EVTIMOVA 2009). As commented by ASEM & SUN (2013), the only abnormality reported for the brine shrimp *Artemia* (Branchiopoda: Anostraca) was gynandromorphy (individuals consisting of distinct male and female tissues whose phenotype is determined by their own genotypes), including bilateral and non-bilateral (mosaic) patterns. Here we report a new type of malformation in genus *Artemia*.

## Materials and Methods

Single female specimen was found in a laboratory-cultured population of the parthenogenetic *Artemia* from Dongfang Saltern, Hainan, China. It was examined and photographed using a Nikon SMZ-800 stereomicroscope.

## Results

The abnormal *Artemia* specimen was an adult female, 9.6 mm in total length. It possessed three compound eyes (two eyes on right side; Fig. 1). The doubled eyes were smaller (the front one 0.09 mm and hind one 0.15 mm in diameter) than the normal compound eye on the left side (0.25 mm in diameter). In addition, some of the visual pigments of the front eye were distributed into its eyestalk. Except for the doubling of the right eye, other morphologic/morphometric characters did not show obvious difference from the normal individuals of the same population.

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**Fig. 1.** Dorsal view of the *Artemia* specimen with three lateral compound eyes.

## Discussion

Various biological and non-biological causes are among the probable reasons for morphological deformities. For instance, intestinal prolapse or skeleton breakage of copepods was attributed to unfavourable abiotic conditions in natural habitats (CRISAFI 1974, MONTÚ & GLOEDEN 1982); aberration in the appendages of some copepods was interpreted as a result of hybridisation or mutation (ADAMOWICZ et al. 2007), or a result of the expression of genetically unstable morphological characteristics under the combined effect of the specific sub-arctic and Antarctic abiotic environmental factors (PANDOURSKI & EVTIMOVA 2009). Some malformations in crustaceans and insects were referred to environmental contaminations (GAVIRIA & FORRO 2000, LOPEZ GRECO et al. 2000, SOUSA et al. 2011). Gynandromorphic abnormality of *Artemia* was referred to the loss or damage of *W* sex chromosome during cleavage (ASEM & SUN 2013). The doubling of the compound eye in *Artemia* is likely a result of a mistake of organ formation during the early stages of development. However, why and how this development error has taken place remain to be studied.

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