

## Effect of food density on male appearance and ephippia production in a tropical cladoceran, Moina micrura Kurz, 1874

## **ABSTRACT**

A study was conducted to investigate the effects of different food concentrations consisting of Nannochloropsis oculata ( $4 \times 102$ ,  $4 \times 104$ ,  $4 \times 106$  cells ml 1 and control) on male and ephippia production in a tropical cladoceran, Moina micrura. The highest number of males  $(186.7 \pm 13.4 \text{ males } 1 \text{ 1})$  was produced in cultures fed with  $4 \times 102$  cells ml 1 of N. oculata (FC 3) when the population density reached > 1600 individuals 1 1. Similarly, the highest total mean number of ephippia (160.0  $\pm$  0.0 ephippia 1 1) was achieved in M. micrura culture supplied with 4 × 102 cells ml 1 of N. oculata (FC 3). The second highest ephippia density was found in M. micrura cultures fed with  $4 \times 104$  cells ml 1 of N. oculata (FC 2) which produced a mean total of  $93.3 \pm 13.4$  ephippia 1 1 in a population density of > 3000individuals 1 1. However, with a population density of > 4000 individuals 1 1, but fed with the highest food concentration of 4 × 106 cells ml 1 N. oculata (FC 1), no ephippia was produced although males were present in the culture. This study illustrates that ephippia were produced in high density cultures with the presence of males and insufficient food supply. Crowding could trigger the production of males, but was not an adequate stress factor for inducing the formation of ephippia. Similarly, food limitation alone did not induce the production of males and ephippia without crowding.

**Keyword:** Cladoceran males; Ephippia; Resting eggs; Moina micrura; Parthenogenetic reproduction; Tropical zooplankton