Abstract
Generally zooplankton growth is often limited by the quality of their algal diet. A cheaper common practice in aquaculture, is to culture algae with fertilizers; however, the demography of zooplankton when fed these algae has not yet been evaluated. We studied the population growth and life table demography of the rotifers Anuraeopsis fissa and Brachionus rubens, and the cladoceran Moina macrocopa. For this, the algae Scenedesmus acutus or Chlorella vulgaris were cultured on defined (Bold’s basal) medium or the commercial liquid fertilizer (Bayfolan). Experiments were conducted at one algal concentration 1.0x10⁶ cells/mL of C. vulgaris or its equivalent dry weight of 0.5x10⁶ cells/mL of S. acutus. The population dynamics were tested at 23±1°C in 100mL transparent jars, each with 50mL of the test medium, with an initial density of 0.5 indiv/mL, for a total of 48 test jars (3 zooplankton 2 algal species × 2 culture media × 4 replicates). For the life table experiments with M. macrocopa, we introduced 10 neonates (<24h old) into each test jar containing the specific algal type and concentration. For the rotifer experiments, we set 5mL tubes with one neonate each and 10 replicates for each algal species and culture medium. We found that the average rotifer life span was not influenced by the diet, but for M. macrocopa fed S. acutus cultured in Bold’s medium, the average lifespan was significantly lower than with the other diets. The gross and net reproductive rates of A. fissa (ranging from 18-36 offspring per female) were significantly higher for C. vulgaris cultured in Bold medium. Regardless of the culture medium, Chlorella resulted in significantly higher gross and net reproductive rates for B. rubens than S. acutus diets. The reproductive rates of M. macrocopa were significantly higher in all the tested diets except when fed with S. acutus in Bold medium. The population increase rate, derived from growth experiments of A. fissa and B. rubens, ranged from 0.1-0.25/d and were significantly higher on C. vulgaris cultured in liquid fertilizer as compared to the other diets. The growth rates of M. macrocopa ranged from 0.1 to 0.38/d, and were highest with diets of C. vulgaris cultured in Bold medium and S. acutus cultured in fertilizer. Thus, regardless of the culture medium used, the growth rates of the evaluated zooplankton species were higher with Chlorella than with Scenedesmus. The peak population density was highest (2800 indiv/mL) for A. fissa fed Chlorella that was cultured on liquid fertilizers, while B. rubens and M. macrocopa had peak abundances of 480 and 12 indiv/mL, respectively under similar conditions.

Keywords
Rotifera, Cladocera, algae, fertilizer, diet, population growth, zooplankton.