EFFECTS OF MICROBIAL COMMUNITIES IN AXENIC CULTURES OF *Brachionus plicatilis sensu strictu*

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Introduction

Rotifers (*Brachionus spp.*) have been found to be valuable and indispensable food organisms in the industrial larviculture of fish and crustaceans throughout the world (Lubzens et al., 1997; Lee and Ostrowski, 2001; Liao et al., 2001). In recent years, research has focused on the bioencapsulation of rotifers and other live food organisms with selected bacteria, which can favour the growth and survival of the predating fish larvae. Axenic rotifers were used as a tool for studying the role of specific bacterial strains or microbial communities, in both nutritional and probiotic aspects.

The aim of this study is to evaluate the effect of different microbial communities on the rotifer growth performance, using axenic rotifers hatched from disinfected amictic eggs.

Materials and Methods

Clone 10 of *Brachionus plicatilis sensu strictu* was used in the study. It was obtained from CIAD (Centro de Investigación en Alimentación y Desarrollo, Mazatlan Unit for Aquaculture) in Mexico.

To feed the rotifers, an axenic inoculum of *Chlorella sp.*, strain CCAP 211/76, was obtained from the Culture Collection of Algae and Protozoa (Dunstaffnage Marine Laboratory, Dunberg) in Scotland.

Fig.1. Axenic culture of *Chlorella*

The wild-type strain of baker's yeast (*Saccharomyces cerevisiae*) and its isogenic mutant strain mnn9 were obtained from EUROSCARF (Institute of Microbiology, University of Frankfurt) in Germany.

Two types of microbial community (MC) were used in the study. They were isolated either from normal-performing or from crashed rotifer cultures (clones L1, L3, 10).

Rotifers (clone 10), hatched from axenic amictic eggs, were used in all experiments. Disinfection of amictic eggs was done using 100 ppm of glutaraldehyde with 2 h exposure time at 28°C.

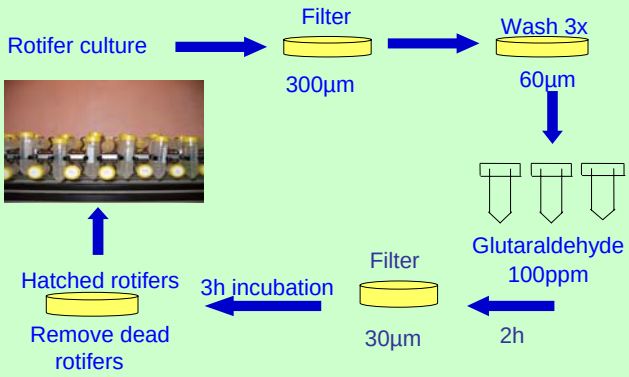

Fig. 2. Procedure for obtaining axenic rotifer culture from amictic eggs

Table I. Outline of experiments. MC: Live and freshly-collected microbial community. MCR: Live microbial community, which was preserved at -80°C and regrown on MA.

Axenic – No bacteria	Xenic 1 – MC from clone 10 normal culture	Xenic 2
Exp. 1.1	Exp. 1.5	MC from L1 crashed culture (Exp. 1.9)
Exp. 1.2	Exp. 1.6	MCR from L1 crashed culture (Exp. 1.10)
Exp. 1.3	Exp. 1.7	MCR from L3 crashed culture (Exp. 1.11)
Exp. 1.4	Exp. 1.8	MCR from clone 10 crashed culture (Exp. 1.12)

Results

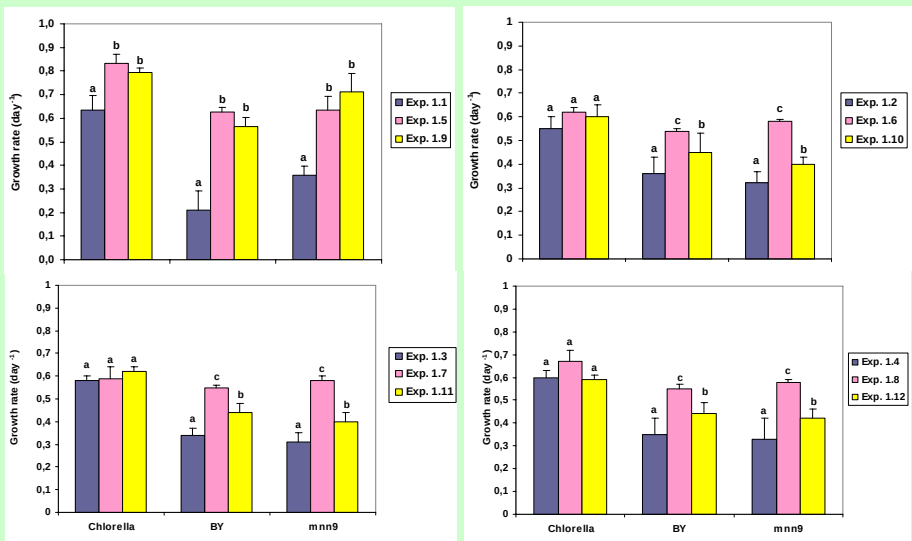

Fig. 3. Growth rate over 5 days of *Brachionus plicatilis sensu strictu* (clone 10) hatched from disinfected amictic eggs and fed three types of food, in the presence of live MC's.

Conclusions

It was proven by the study that the presence of an "endogenous microbiota" is essential for the growth of rotifers, especially when low quality food (yeast) is offered. Such an effect could be obtained with a microbial community originating from a normal or a crashed culture, but not with a MCR, namely MC regrown in the lab on rich medium.

The results further suggest that the MC isolated from one particular crashed rotifer culture was probably not responsible for the crash, as no negative effects were observed by adding this MC to axenic rotifers. This of course does not exclude the possibility that crashes in other rotifer cultures are due to the presence of certain microorganisms.

References

Lubzens, E., G. Minkoff, O. Zmora and Y. Barr. 1997. Mariculture in Israel - past achievements and future directions in raising rotifers as food for marine fish larvae. Hydrobiologia 358:13-20.

Lee, C.-S. and T. Ostrowski. 2001. Current status of marine finfish larviculture in the United States. Aquaculture 200:89-110.

Liao, C., H.M., Su and E.Y. Chang. 2001. Techniques in finfish larviculture in Taiwan. Aquaculture 200:1-31.