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Different rotifer (*Brachionus*) size in firstfeeding of cod (*Gadus morhua*)

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Introduction

The nutritional quality of rotifers fed to larvae during the initial period of first feeding is important during intensive production of Atlantic cod (*Gadus morhua*). The food value of rotifers as prey for marine fish larvae generally depends on their biochemical

composition, but also on their size and energetic content. In addition prey density in the fish larval tanks is important for larval ingestion rates and growth. In this experiment two different *Brachionus* strains were tested in first feeding of cod.

Material and Methods

Rotifer strains of two different sizes were tested as prey for larval cod. *Brachionus plicatilis* (B.p., lorica length: ca. 270 µm) and *Brachionus rotundiformis* (B.r., lorica length: 180 µm). Three experimental treatments were performed. First and second group of cod larvae were fed same density of "B.p" and "B.r" rotifers (5000 ind. per litre), and the third group was fed 12000 "B.r" rotifers per litre (corresponding to the biomass of 5000 "B.r"). "B.p" and "B.r" rotifers were cultivated, fed and enriched in the same way. Cod larvae were fed rotifers from day 4 until day 20 after hatching, at 12°C. The concentration of prey was adjusted several times per day. In all treatments larvae were fed equal amounts the brine shrimp *Artemia franciscana* from day 17 to day 43.

Br. Bp.

Dry feed was introduced at day 31, and the experiment was terminated at day 45.

Results:

Survival

The survival rate at the end of the first feeding experiment was high in all tanks, and highest survival rate was observed in larval groups fed "B.p." (Fig 1.). In this group (day 45) the survival rate was $37,2\pm0.8$ %. Significantly lover survival rate was observed in groups fed "B.r." 5000 and "B.r." 12000, being $32,7\pm2,5$ % and $33,7\pm1,1$ %, respectively.



Growth

Feeding of cod larvae in this experiment was started at day 4 after hatching, and no significant differences in larval dry weight between the groups was observed at day 5 (p>0.05, Fig 2.). At day 10, the groups fed "B.p." 5000 had a significantly higher dry weight than cod larvae fed "B.r." 5000 and "B.r." 12000 (p<0.05). However, at this time no significant differences was measured between "B.r." 5000 and "B.r." 12000.

The larval dry weight at day 17 was higher in the group fed "B.p." rotifers than in the group fed "B.r." 12000, which again was significantly higher than in group fed "B.r." 5000.

During the initial first feeding of cod larvae, feeding with the large "B.p" resulted in both higher growth rate and survival rate compared to feeding with the smaller "B.r".

Capture of prey is an energy consuming process, and larvae require fewer individual prey when feeding on larger prey compared to smaller sized prey in order to gain equal amount of energy.



Figure 2. Dry weight of cod larvae at day 5, 10 and at day 17 (n=36)



High initial growth rate during first feeding of marine fish larvae is important for the normal development of larvae. In this experiment the growth rate between day 5 and 10 was 8.9 % in groups fed "B.p." 5000 (Fig 3). In the group fed "B.r."5000 the growth rate was negative the first period, indicating starving larvae. In the group fed "B.r."12000, the growth rate was 3.3%. The growth rate during the whole rotifer period (day 5 - day 17) was calculated to 10.1% in the "B.p." 5000 group, 5.9 % in "B.r." 5000 and 8.9 % in "B.r." 12000 group. No significant differences in specific growth rate was observed between day 10 to day 17.



Figure 3. Specific growthrate(%) at day 5-10, day 5-17 and day 10-17



Conclusion