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SUCCESSFUL FEEDING OF DACE, *LEUCISCUS LEUCISCUS* LARVAE USING AN ARTIFICIAL DIET

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Abstract

A feeding trial was conducted to study the effect of different diets on growth and survival for larvae of dace, *Leuciscus leuciscus* under controlled culture conditions. Two days after hatching, the larvae were exposed to different feeding conditions: (i) freshly hatched *Artemia* nauplii, (ii) dry decapsulated *Artemia* cysts, (iii) crumble carp starter, a commercial diet (200-300µm) used for 5 days and then switched to a larger size of diet (300-500µm), (iv) *Artemia* nauplii used for 7 days and then switched to crumble carp starter (300-500 µm), and (v) *Artemia* nauplii used for 14 days and then switched to crumble carp starter (300-500µm). After four weeks feeding trial, the highest survival rate was obtained with the larvae receiving decapsulated *Artemia* cysts and *Artemia* nauplii. Direct feeding of the larvae (immediately after yolk resorption) with carp starter resulted in high survival that was comparable to the other treatments. However, the larvae fed on carp starter were significantly lower in length and weight (wet and dry) compared to the larvae receiving *Artemia* nauplii and decapsulated cysts. The results show that dace larvae may directly be fed on carp starter at onset of exogenous feeding.

Introduction

The dace *Leuciscus leuciscus* (L.) is typically a fish that can be found in clear, fairly fast-running streams and rivers, but are occasionally found in lakes and lowland rivers. The dace is common in the whole of Europe except the Balkans, Italy and the Iberian Peninsula**.** Little is known about the larviculture of dace.

Several freshwater fish species such as *Clarias gariepinus*, *Cyprinus carpio*, and *Heterobranchus longifilis* can be exclusively reared on artificial diet from the start of exogenous feeding. However, many freshwater fish need live food for several days before switching to artificial diets.

The use of decapsulated cysts has been suggested as an alternative to *Artemia* in the larval rearing of several fish species (Vanhaecke et al. 1990; Shiri Harzevili et al., 2003). Despite the encouraging results, commercial application of decapsulated cysts in aquaculture industry is restricted to only a few shrimp hatcheries.

An experiment was carried out to evaluate different feeds on growth and survival of dace larvae.

Materials and methods

Dace eggs were obtained from broodfish held at the Fish Culture Centre (Linkebeek). Fertilized eggs were incubated in 300-ml mini-incubators (10°C) using flow-through system. To accelerate the hatching process, the eggs were transferred to 16°C (48h before hatching). All larvae were hatched after 24h. Two days after hatching, the larvae were exposed to different feeding conditions: (i) freshly hatched *Artemia* nauplii ($4.ml^{-1}$), (ii) decapsulated *Artemia* cysts, (iii) crumble carp starter, a commercial diet (200-300 µm) used for 5 days and then switched to a larger size of diet (300-500 µm) (manufactured by Coppens International), (iv) *Artemia* nauplii used for 7 days and then, switched to crumble carp starter (300-500µm), (v) *Artemia* nauplii used for 14 days and then, switched to crumble carp starter (300-500 µm). The stocking density was kept at 200 individuals per aquarium (10 $larvae.l^{-1}$). Water temperature ranged between 18 and 20°C. There were three replicates per treatment. Growth parameters (length and wet and dry weight) were measured on days 1, 7, 14, 21, and 28 of the experiment. The initial average total length (mean±S.D.) and wet body weight were 8.89±0.27 mm and 2.55mg. For the measurements, 10 larvae were randomly collected from each replicate. Survival of the larvae was recorded by counting the fish in the aquaria on d14 and at the end of the experiment.

Larvae were fed with dry diet and decapsulated cysts based on 20% of their body weight for 3 weeks, then the food reduced to 10% of their body weight.

Results and discussion

At d7, no significant differences in length and dry and wet weight were found among the treatments. (Figs. 1, 2, and 3). At d14, the mean size (length, wet and dry weights) of the larvae receiving dry food was significantly ($P<0.05$) lower compared to the larvae fed on *Artemia* and decapsulated cysts (Figs. 1, 2, and 3). The dry weight of larvae feeding with decapsulated *Artemia* was significantly ($P<0.05$) higher than the larvae fed on *Artemia* nauplii. On d21, larvae receiving decapsulated *Artemia* had significantly higher growth in terms of length, wet and dry weight in compared to the other treatments. At d28, the mean size (length,

wet and dry weights) of the larvae receiving dry food was significantly ($P<0.05$) lower compared to the larvae fed on *Artemia* and decapsulated cysts. Feeding larvae with carp starter from d8-15 did not produce higher growth compared to the treatments receiving *Artemia* nauplii and decapsulated cysts.

Fig I. Length (mm) of dace larvae measured on day 7, 14, 21, and 28 of the experimental course.

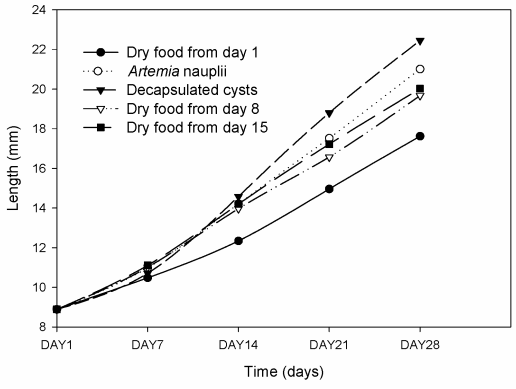


Fig II. Wet weight (mg) of larvae measured on day 7, 14, 21, and 28 of the experimental course.

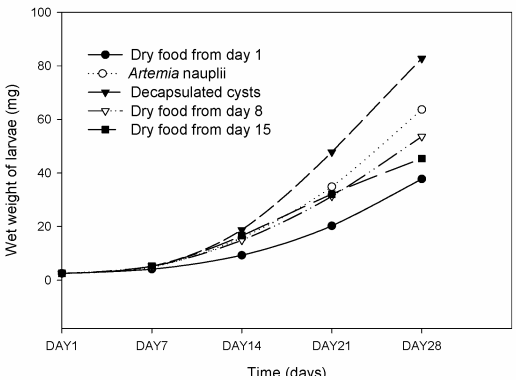
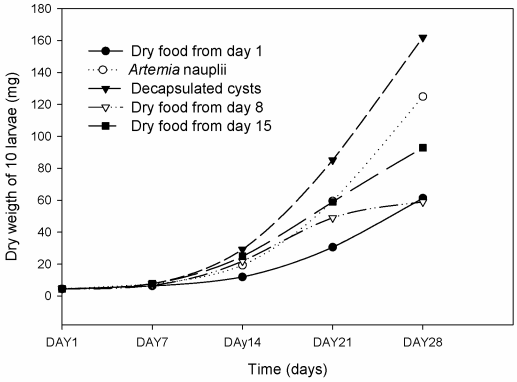
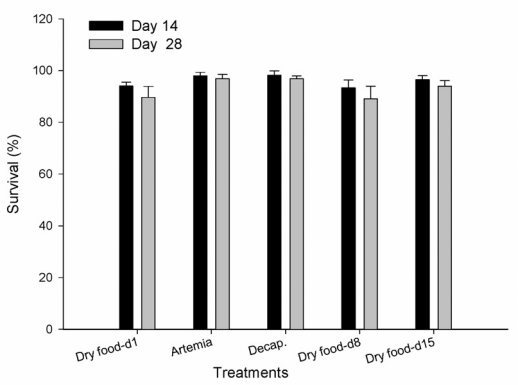


Fig III. Dry weight of 10 larvae (mg) measured on day 7, 14, 21, and 28 of the experimental course.



At d14, the survival of larvae fed on *Artemia* nauplii were not significantly different (P>0.05) from those receiving decapsulated cysts (Fig. 4). The larval survival was significantly (P<0.05) lower in treatments receiving carp starter as compared to the other treatments. No significant (P>0.05) difference was found between the larval survival fed from d1 and those fed from d8 on dry diet. At the end of the experiment, the highest survival rate was obtained with the larvae receiving decapsulated cysts and those larvae fed on *Artemia* (Fig. 4). Larval survival fed on dry food (from d1) was 89.6% and this was significantly lower than the treatments receiving decapsulated cysts and *Artemia* nauplii.

Fig IV. The survival rate of larvae counted on day 14 and the end of experiment.



Good growth and survival of dace larvae fed on decapsulated cysts indicated that the decapsulated cysts were well accepted and ingested even after 30 days continuous feeding with decapsulated cysts. This is in contradiction to our previous findings (Shiri Harzevili et al., 2003; Shiri Harzevili et al., 2004) with chub and dace larvae.

Direct feeding of dace larvae with dry diet resulted in a better survival and growth as compared to other cyprinids (chub and ide), although no similar diets were used for ide and chub larvae.

References

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