

WEANING OF BURBOT *Lota lota* (L., 1758): FIRST RESULTS AT AQUA-ERF.

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Introduction

The Belgian Aquaculture industry can be described as very small. Nevertheless fish consumption is increasing, partially thanks to the positive image fish has as a healthy food source. To be able to respond to this demand, the European Interreg IV project "AQUAVLAN" has been set up in 2009 to determine the possibilities for an economic viable, sustainable and diversified aquaculture in Flanders and Holland. As a partner in this project, the Flemish University College KaHo Sint-Lieven is investigating the culture techniques of burbot (*Lota lota*) in its new Aquaculture Education and Research Facilities (AQUA-ERF).

This species is regarded as a potential candidate for aquaculture because of the superb quality of the meat and the high prices in local markets (Zarski et al., 2009).

The focus of the research is the grow out of this species in RAS. However, the unavailability of weaned fingerlings was identified as a major threat for the development of the aquaculture of this species. Therefore Aqua-ERF has started larviculture in 2011.

Materials & Methods

Two consecutive batches of burbot larvae were stocked in the larval rearing system at 5 DAH. The first batch was a small amount to gain experience with the larvae.

Larvae were stocked in 2 rectangular tanks of 250l, part of a RAS system. Artemia nauplii were fed when the yolk sack was absorbed.

For the weaning experiment, inserts (23 l of total culture volume) in salmonid hatching trays were used. In this way, the fry did not come into contact with feed waste which causes mortalities due to their bottom dwelling behaviour (Jensen et al., 2009).

After 72 days of culture, the fry were stocked in 6 inserts at a density of 47 fry l⁻¹.

Two weaning protocols were tested:

1) Co Feeding (CF): over the first 15 days the amount of artemia was gradually reduced from 28 nauplii ml⁻¹ to 10 nauplii ml⁻¹ and the amount of dry feed was gradually increased.

2) Direct Feeding (DF): only dry feed was administered from the start.

Each protocol was conducted in triplicate. Artemia and dry feed (Aglonorse, Tromso Fiskeindustri) were continuously fed over 24h. Water quality was monitored.

Larvae were weighed and counted at stocking in the trays. After 32 days the larvae were weighed, counted and graded (3mm). Survival, sgr and % small and large fry after grading were calculated.

Results

Larval rearing:

Hard lessons were learned during the larval rearing period in the 250 l tanks:

Batch 1: OF artemia nauplii were given as first feeding. After high mortality it became clear that these nauplii were too big for the larvae. High mortalities during the first

culture week occurred due to starvation. Only 968 fry remained, too few for a weaning experiments with replicates.

Batch 2: AF nauplii were fed at first feeding and larval survival was high (50%) up to day 30. At day 30 larvae that had inflated bellies and floated on the surface were observed. The incidence of this phenomenon increased and high mortality started. The oral presentation of Rekecki et al. (2011) deals with this hyperinflation of the swimbladder.

Weaning experiment:

After 29 days the survival for CF and DF was respectively $16.65 \pm 0.66\%$ and $15.16 \pm 0.63\%$ (average \pm se) ($p > 0.05$). The sgr for CF and DF was respectively $3.10 \pm 0.25\%$ and $3.44 \pm 0.19\%$ (average \pm stdv) ($p > 0.05$). For CF and DF the amount of small fry was resp. $46.28 \pm 2.15\%$ and $37.70 \pm 2.19\%$, the amount of large fry was resp. $53.72 \pm 2.15\%$ and $62.30 \pm 2.19\%$ (average \pm se) ($p = 0.05$). Mortality due to cannibalism was $29.98 \pm 9.16\%$ and $29.38 \pm 5.54\%$ (average \pm stdv) ($p > 0.05$).

Fry from the first batch were further grown without mortality and cannibalism. After 120 days of culture, the average weight is 1.71 g.

Discussion

Larval rearing of this coldwater species starts at 12°C. This low temperature had a strong impact on the functioning of the biofilter which resulted in elevated levels of ammonia and nitrite. When performing larviculture of burbot in RAS, the dimensioning of the biofilter has to take this lower performance into account. With the improvement of the larval rearing unit and thus health status of the larvae, an improvement in survival and growth can be expected. Burbot larvae can be fed artemia at first feeding if an artemia strain with small instar 1 nauplii is used.

Both protocols result in an equal survival rate, rate of cannibalism and sgr. The fraction of larger fry is higher for DF than for CF. In practical fingerling production, the DF protocol will be preferred because of equal or better performance compared to the CF protocol. In terms of economics (artemia cost and labour cost for artemia production) the application of direct feeding is recommended. This is in contrast to Trabelsi et al., 2011 who found that a longer co feeding period results in better performances.

Conclusion

A successful weaning protocol is essential for the development of the aquaculture of this species. With this first results, the proof of concept of the weaning protocol is established and Aqua-ERF will upscale the weaning efforts in the coming years. This is the onset of a practical weaning protocol that will be available for the industry. In this way, the unavailability of weaned fry is no longer a threat for the development of the aquaculture of *Lota lota*.

References

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