

Age and growth information from otolith analysis may seem superfluous in marine juvenile fish production where the age of the offspring is already typically known and population growth can be derived from easily accessible size-at-age data. However, the use of repeated samplings within the same population or tank readily facilitates the estimation of size selective mortality during important life history transitions like the onset of external feeding, metamorphosis or weaning onto formulated feeds. An example is provided from a study where larval cod were subject to two different feed types, enriched rotifers (R) and live natural zooplankton (Z), and two nominal initial larval densities, Low (L) and High (H).

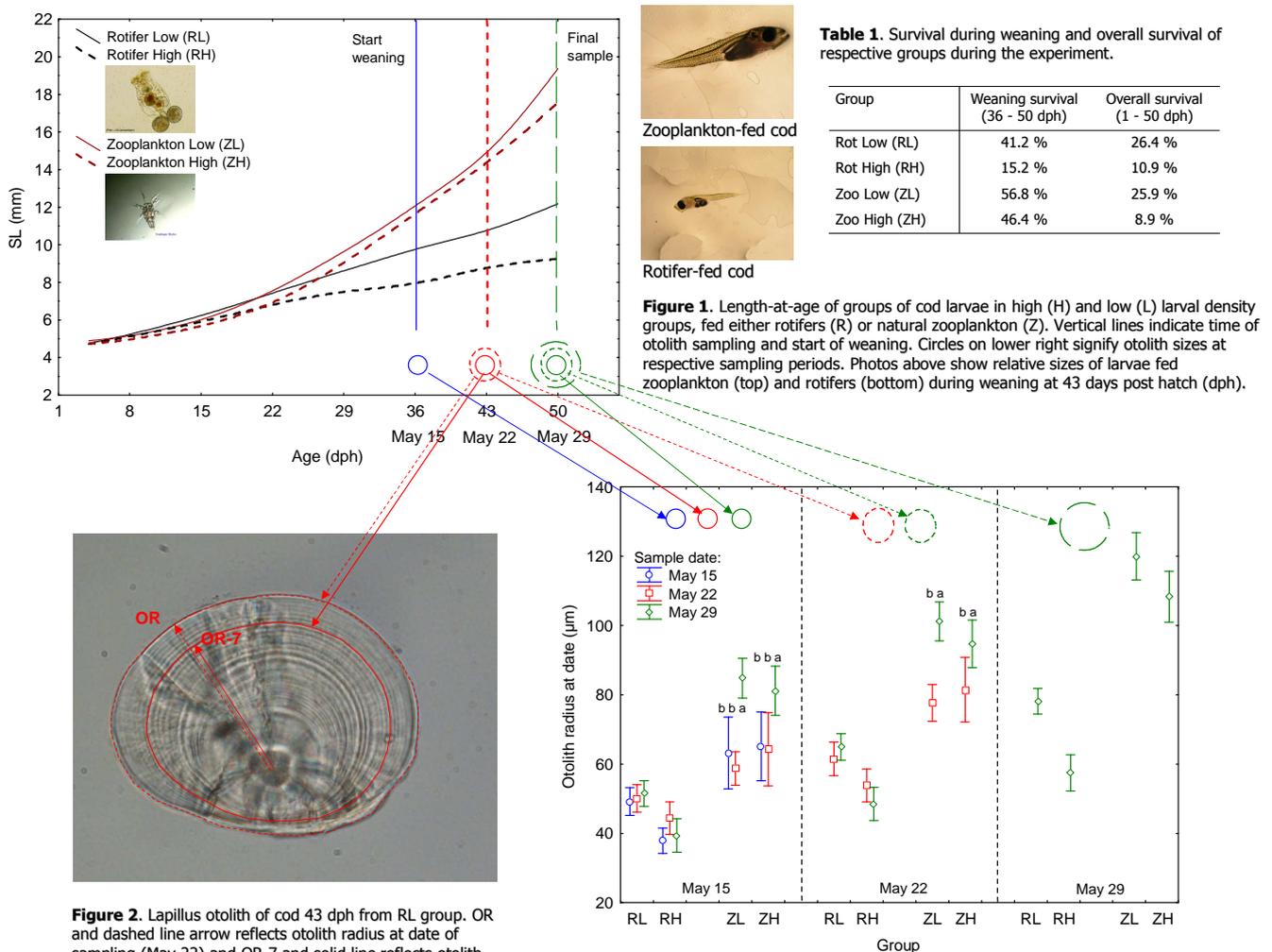


Figure 2. Lapillus otolith of cod 43 dph from RL group. OR and dashed line arrow reflects otolith radius at date of sampling (May 22) and OR-7 and solid line reflects otolith radius 7 days prior (May 15). (OR = 64 µm). Arrows from Figure 1 indicate otolith size at respective sampling periods.

Figure 3. Otolith sizes from groups of cod larvae sampled at different time periods and corresponding ages. Different letters at respective groups indicate significantly different otolith sizes-at-date of larvae sampled at different time periods. R and Z represent rotifer and zooplankton groups, and L and H low and high density groups respectively.

Larval cod fed live zooplankton eventually grew faster than those fed enriched rotifers (Figure 1), and higher larval rearing densities yielded lower survival (Table 1, Koedijk et al. *subm.*). The otolith analysis enabled estimation of fish (otolith) size at previous sampling periods (Figures 1 & 2). The results clearly indicate the onset of size selective mortality during the second week of weaning in both groups of larvae initially fed live zooplankton, while no such trend was apparent for those fed enriched rotifers (Figure 3). A higher selective mortality in the Z-groups may be due to the larger absolute size and size differences in these groups at onset of weaning as well as a greater acceptance of formulated feeds in the R-groups (Koedijk et al. *subm.*). In conclusion, the otolith analysis revealed size selective mortality not evident from the overall survival figures.

References

Koedijk, R., Folkvord, A., Foss, A., Pittman, K., Stefansson, S.O., Handeland, S., and Imsland, A. submitted. The influence of first feeding diet on the Atlantic cod phenotype; survival, development and long term consequences for growth.