Growth of juvenile Atlantic cod Gadus morhua in land-based recirculation systems: Effects of feeding regime, photoperiod and diet

The combined effect of feeding regime and photoperiod on the growth of juvenile Atlantic cod Gadus morhua in land-based recirculating aquaculture systems (RAS) was examined using three different commercial diets. Fish of 8–10 g were reared in 1 m³ tanks at an initial density of 10 kg m⁻³ for 78 d. Three RAS units were used to simultaneously test three feed/photoperiod regimes that might be encountered in the wild or aquaculture; LightDark (LD) 24:0, LD12:11 (+ 1 h crepuscular periods) and LD6:6 (+ 12 h crepuscular periods). Feed was administered during the light period every 30 min for a 3 min feeding duration. In each RAS unit three diets (A, B and C) were tested, which were broadly similar in composition but from different manufacturers. Water exchange rate averaged 10–19% in the three recirculation systems, and key water quality parameters such as NH₄⁺ and CO₂ remained at low effect concentrations (<0.4 and <3 mg L⁻¹, respectively). Final stocking densities were 45–60 kg m⁻³. There was a significant influence of both feed/photoperiod regime and diet on specific growth rate (SGR). Fish receiving the LD12:11 and LD6:6 regimes and Diet A grew best (SGR 2.59 and 2.54% d⁻¹ respectively). Fish fed Diet B and C also grew best under the LD12:11 and LD6:6 feed/photoperiod regimes (SGR range of 2.41–2.46% d⁻¹). Conversely, fish kept in the LD24:0 feed/photoperiod regime grew relatively slowly irrespective of diet type (SGR range of 2.26–2.32% d⁻¹). The feed conversion performance of the feed/photoperiod regimes and diets followed the same pattern.