

COMPENSATORY GROWTH FOLLOWING LONG TERM MULTI-PHASE CYCLIC FEEDING IN RAINBOW TROUT (*Oncorhynchus mykiss*)

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Compensatory growth (CG) during recovery from feed deprivation is a well-known phenomenon in fish, making the practice of cyclic feed restriction-refeeding a possible tool for aquaculturists to optimize growth performance. While earlier studies in this direction focused on relatively short single feed restriction-refeeding protocols, the present trial was designed to evaluate the impact of different repeated cyclic feeding schemes on the zootechnical response of rainbow trout (*O. mykiss*) over a complete growing phase up to the commercial size.

Three hundred trout (body weight 72 ± 6 g) were randomly distributed among 12 tanks, each of 0.5 m^3 capacity and supplied with 8 L min^{-1} of well water at a temperature of $12.7\pm 0.8^\circ\text{C}$. Triplicated groups of fish were subjected over 27 weeks to one of the following treatments: C, control, continuous feeding to visual satiety 6 days a week; T1, cyclic feeding regularly alternating 1 week starvation (S) and 3 weeks refeeding (F) (1S+3F); T2, cyclic feeding consisting in 3 consecutive phases: 1S+3F, 2S+6F, and 3S+12F; T3, where a feed restriction (70% of the satiety level observed in the previous week) was applied instead of starvation with the same schedule as T2. The same trout feed (45% crude protein, 28% crude lipid) was used throughout the trial.

At the end of the trial the different cyclic feeding protocols resulted in the same zootechnical outcome ($P>0.05$). A nearly complete convergence of body mass was evident as no significant differences were found among treatments in individual weight (543 ± 28 g), specific growth rate ($1.06\pm 0.03\%$), feed conversion ratio (0.84 ± 0.03) and protein efficiency ratio (2.64 ± 0.12) despite a lower feed consumption in treatments T1, T2 and T3 relative to controls (357 vs. 390 g fish^{-1} , $P<0.05$). All protocols imposing fasting or feed restriction resulted in CG at the end of each re-feeding phase. Hyperphagia was a major cause of CG. Both phenomena were emphasized with treatment T3 after recovering from the last 3-week fasting period, when they were associated to a marked improvement of feed conversion ratio relative to controls (0.75 vs. 0.85 , $P<0.05$).

The results obtained so far suggest repeated cyclic feeding as a reliable practice in trout farming, provided fasting or feed restriction periods are followed by refeeding phases of suitable length to allow recovery of body mass. This could result in improved profitability and environmental sustainability.