

OPTIMIZING SPAWNING AND GROWTH PERFORMANCE OF LARVAE AND JUVENILES IN *Barbus altianalis* (BOULENGER, 1900)

Abstract

Barbus altianalis is an indigenous cyprinid that lives in lacustrine-riverine environments with limited distribution to Victoria Nile; and lakes Victoria, Edward, George and their associated rivers and tributaries. The species is a delicacy in Uganda and surrounding regions and it is vulnerable to over exploitation. *B. altianalis* is cultured by very few farmers and the biggest challenge has been lack of seed for its commercial propagation. This study was conducted to determine optimal spawning conditions, larval weaning, juvenile growth and survivals with a view of producing massive quality seed for propagation. Two field studies and 17 experiments were conducted to improve hatchability, growth and survival of larvae and juveniles. Results showed that the suitable class size at maturity for spawning was 30-34.9 cm and 35-39.9 cm fork length for males and females respectively. Fish treated with catfish pituitary extracts performed much better than those treated on Dagin with respect to fertilization rates at 80% ($U=66.5$, $p < 0.001$) and working fecundity at 2314.40 ± 882.04 ($U=59.5$, $p < 0.05$). Differences with hatchability was not significant ($p > 0.05$), but the number of hatchlings were higher with catfish pituitary extract. Therefore pituitary extracts are equally effective and cheaper for inducing *B. altianalis* to spawn. During breeding season the hatchability and working fecundity were significantly better when fish was striped after 4 hours (100 degree hrs) of running water than those striped after 10hrs (250 degree hrs). Optimal temperature range for embryo hatchability was $24^{\circ} \text{C} - 27^{\circ} \text{C}$. Better hatchability of embryos was attained when re-circulating (84.3%) and glass tank systems (80.3%) were used ($p > 0.05$). Optimal larvae growth and high survival was attained at 30°C and 27°C when the larvae were $195.03 \pm 47.62\text{mg}$ ($78.96 \pm 2.04\%$) and $158.61 \pm 33.43\text{mg}$ ($81.24 \pm 1.55\%$) respectively. The digestive tract of *B. altianalis* was simple and valve-less and on average it is 2.22 ± 0.37 times longer than its body length. It showed a strong ability to utilize and assimilate every diet but also showed preference of food items at early stages becoming all inclusive in its diet as it matures. Ontogeny of digestive structure and related enzyme activity confirmed that microdiets were acceptable at exogenous (6-7 DAH). But better growths and survivals were obtained with combination diet (*Moina* + microdiet). Outdoor larvae nursing and microdiet manipulations for better growth and survival were successful at ≥ 15 DAH. When prevalence of aquatic parasites was anticipated, outdoor nursing and or stocking was delayed until after or during larvae squamation process at 48 - 75 DAH. This study has now been able to determine the optimal spawning and growth performance conditions of larvae and juveniles in *B. altianalis* and it will now be possible to produce massive quality seed for propagation.