

INSECT MEALS AS INNOVATIVE FEED COMPONENTS IN JUVENILE IDE *Leuciscus idus* NUTRITION

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Introduction

The ide (*Leuciscus idus*) is native European species of rheophilic cyprinid fish, which wild populations are dependent on conservation efforts, in particular regular restocking. For this reason, it is necessary to develop effective methods of rearing for stocking material. One of the important elements of this process is the nutrition of juvenile stages in controlled conditions, requiring the optimization of diet composition in terms of specific nutritional and behavioral requirements. At the moment restocking facilities raising ide juveniles are using commercial feeds for carps which are not balanced in terms of specific needs of ide. The aim of the experiment was to evaluate the effects of insect meal inclusion into the ide diet on fish growth performance and feed utilization in comparison with fishmeal based diet.

Material and Methods

For the production of feeds three insect species larvae meals were used. Four diets were formulated: HI – diet with 20% *Hermetia illucens* meal inclusion, TM – diet with 20% *Tenebrio molitor* meal inclusion, ZM – diet with 20% *Zophobas morio* meal inclusion. The control group (CON) was a diet based on fishmeal with no insect meals. The growth trial lasted 60 days and 200 individuals of ide with an average body mass of 30 grams were randomly assigned to four experimental groups, five replicates each (10 fish/tank). The fish were kept in a recirculation aquaculture system with controlled conditions (water temperature 22°C, photoperiod 14h light, 10h darkness). The effects of the diets on the efficiency of rearing of ide juveniles were assessed based on fish growth parameters such as: mean individual body weight gain (BWG), specific growth rate (SGR), percent weight gain (PWG); and feed utilization parameters including: feed conversion ratio (FCR), protein efficiency ratio (PER); and somatic indices: Fulton's condition index (CI), viscerosomatic index (VSI) and gastrointestinal tract to fish total length ratio (GIT:FTL).

Results

The highest values of BWG, SGR, and PWG were observed in the HI and TM groups and they were nearly 30% better than the control group. The decrease of FCR was observed in HI (by 0.62) and TM (by 0.63) groups in comparison to CON. There were no statistically significant differences in terms of PER, CI and GIT:FTL. No mortality of the fish occurred during the experiment. In case of VSI it was highest in the control group and lowest in ZM group.

Conclusions

The results indicated that the use of black soldier fly and mealworm insect larvae meals in the diets for ide juveniles has a positive effects on their growth performance and feed utilization, with no adverse effects on fish condition and gastrointestinal track development. Up to date, there is a very little knowledge regarding ide juveniles nutrition and still further studies are needed to correctly define proper feeding strategy and diet requirements of cyprinid rheophilic fish.

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