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## Contribution to the Study of the Nutritional Requirements in the Larvas and Juveniles of the River Perch (*Perca fluviatilis* L.)

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### Summary and conclusions

The aim of the present work has been to design an feeding program for river perch in intensive culture conditions. The good capacity of adaptation of the river perch *Perca fluviatilis* to a wide range of ecological conditions, led us to investigate for the optimal conditions of its rearing. Effectively the growth of the perch, like it is the case for other species, will be the result of a series of behavioural and physiological processes, which begin with the consumption of feed and end with the synthesis of body matter (1). The study of nutritional needs in the river perch, implies the knowledge of the optimal conditions of its growth (breeding sites, ecological preferences) to better appreciate the quality of the nutrients foodstuffs to be given. It is known for example that an increase in temperature fastens the speed of digestion and so increases the ingestion rate of the food. A good oxygenation also facilitates the metabolism of the feed consumed, and favours both growth and survival of the fish (2). On the other hand, since the perch cannot be reared in a efficient way with only live preys, like it does in its natural environment, the size at which it can switch to an artificial feed had to be studied before its nutritional requirements could be investigated. So, all our studies on nutritional needs were done on young perches which are perfectly adapted to artificial dry diet. Considering the time we had for our study, our main work was based on the determination of the daily ration and on the proteins and amino acids requirements.

Overall, the extensive production of juveniles size of river perch in fertilized ponds seems attractive due to the little efforts it requires and to its low cost for those who have their own ponds, but the survival at the end of the breeding process is low (7%) and cannot be controlled. But, semi-intensive or the intensive production in green water in canvas covered ponds using the live feed *Artemia*, progressively replaced by dry feed seems the more reliable method (3, 4). It allows a good control of the aquatic environment (temperature, dissolved oxygen pH etc.) and a higher survival rate (40%), which was not the case in pond production. They have the inconvenient to be too expensive because of the high consumption of *Artemia*. Also, the intensive production in canvas covered ponds is sensitive to the outbreak of bacteriological epidemics.

The zootechnical parameter obtained at the end of the breeding process for the weaning at different weight of the perch larvae to an artificial dry diet, showed that a late weaning improves the survival rate. Early weaning induced a high mortality, but the fishes which survived, showed a great adaptation, characterized by a growth rate similar to fishes reared with live prey. Early weaning can thus be used to select resistant strains for breeders and juveniles in perciculture. The study of the digestive capacities of larvae weaned at different weights, showed that a good stability of digestive enzymes for the switch from *Artemia* to dry aliments is obtained from 300 mg of average weight on. This observation, combined with the high survival and growth rates at the end of breeding period for the switch at this weight (300 mg), shows that this is a effective weaning weight of the river perch to artificial dry diet.

Like other species of fish culture, the weight of the river perch has an effect on its optimal ration. The optimal ration varies with its weight following the equation:

$\text{Log (optimal ration)} = -0.283 (\text{Log (weight)}) + 0.734$  where:

$\text{Optimal ration (\%)} = 5.42 \text{ weights (g)}^{-0.283}$

This relation is in the same range of the one reported by Mélard *et al.* (5) for perch of the same weights ( $\text{ration}_{\text{opt}} (\%) = 3.30 \text{ weight (g)}^{-0.24}$ ).

The contents in proteins and amino acids in its diet has a highly significant effect on its zootechnical performances and on its biochemical body composition. Its proteins requirement studied at three different stages, showed a rate of 50% of the dry feed in the young fish of 0.5 g of average weight, but from an average weight of  $\pm 3$  g and more, its need stabilized at  $\pm 40$  % of dry feed.

The composition of amino acids in the whole body of river perch juveniles, reared in fertilized ponds with zooplankton does not vary during its development and is very similar to the one recorded in rainbow trout, Atlantic salmon and cat fish. But, its amino acids requirements estimated by the method of Ogino (6), modified by other nutritional approaches which are more reliable, bring the river perch closer to rainbow trout (*Oncorhynchus mykiss*).

The results obtained in this study can be used as accurate information to establish an alimentation program for feeding of river perch in intensive breeding.

Further studies will be recommended to increase the knowledge of nutritional requirements of perch to ensure the possibilities of its intensive breeding. It can imply for example:

- the study of lipids and fatty acids requirements,
- research of the maximal rate of tolerance for incorporating carbohydrates in river perch feed, to increase the benefit of fish farmers
- and especially the predictive study of epidemic in closed breeding conditions of the river perch and the search for potential curative methods.

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