



## Fine tuning of feeding practices for hatchery produced Persian sturgeon, *Acipenser persicus* and Beluga sturgeon, *Huso huso*

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### Abstract

In this work, we investigated the effects of various feeding treatments on the survival and growth of *Huso huso* and *Acipenser persicus* larvae during a 20-day culture period. Three replicate groups (250 fish/replicate) of first-feeding larvae were fed according to four main feeding regimes: (1) live food (live nauplii of brine shrimp *Artemia urmiana*); (2) indirect transition (5–7 days live food followed by gradual transition to formulated diet); (3) direct transition (using different combinations of live and formulated diet from the start feeding onwards); and (4) formulated feed (FD) from the start of feeding. In *H. huso* larvae, combining live food and manufactured diets (co-feeding) from the first feeding stage onwards (direct transition) resulted in significantly higher weight gain than the other regimes. Survival was significantly higher in *H. huso* larvae fed solely live food or the direct transition regimes compared with indirect transition and FD. In *A. persicus* larvae, growth and survival were higher in the indirect transition feeding regime than in the other regimes. On the basis of the results of this study, we recommend co-feeding of *H. huso* immediately from the commencement of exogenous feeding, but co-feeding of *A. persicus* should start 7 days after prior feeding with live food.

**Keywords:** *Acipenser persicus*, *Huso huso*, *Artemia* nauplii, formulated diet, co-feeding

### Introduction

The Persian sturgeon (*A. persicus*) and Beluga sturgeon (*Huso huso*) are migratory fish that are espe-

cially adaptable to changes in their environment and in food supply; thus, they can occur and attain satisfactory growth in various climatic zones. Sturgeon fish are mainly cultured for the production of caviare, as a result of the sharp decrease in production capacity of caviare from natural resources such as the Caspian Sea. In addition, they are also an important source of commercially valuable fish meat. However, the feeding patterns of these species on natural food have only been studied on a small scale. This is especially true for the larval and juvenile stages, which are the most critical stages in the commercial production of these species.

There are five specially designed hatcheries and culture centres in Iran involved in propagation, weaning and resource restocking of the sturgeon fish. The broodstock fish are caught in the wild and maintained in concrete ponds, until induced breeding is done. The fertilized eggs are incubated in Yushchenko incubators for hatching. The hatched larvae are transferred into circular tanks and fed on *Artemia* nauplii and *Daphnia* during the early stages of growth. The fry are then released into fertilized earthen ponds containing a varied zooplankton population, mostly *Daphnia* and Chironomidae. As no formulated diets are used during the early stages of growth, considerable expenditures and labour are required for the production of live food. Moreover, huge mortality has been reported on the sudden transition from feeding live food in earthen ponds onto formulated diets in concrete grow-out ponds.

At the onset of exogenous feeding, different sturgeon species possess an anatomically complete digestive tract with a marked specialization of each