AQUACULTURE IN AZERBAIJAN: THE RESULTS OF REARING OF COMMODITY FISH IN THE ADAPTED WATER BODY

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AKVAKULTURA U AZARBEDŽANU: REZULTATI GAJENJA RIBA U ADAPTIRANIM VODENIM POVRŠINAMA

Extended abstract

In the second half of the 20th century and in the beginning of the 21st century the intense development of industry and agriculture, the reduction of rivers flow, pollution of the Caspian sea by the industrial and domestic wastes and biological pollution led to the deterioration of the ecological environment, abrupt reduction of the fish stocks and decrease the catches of the food fish. While during the 70's and 80's of the last century in the Caspian sea the catches of fish were 450 thousand tones out of which 50 thousand tones of them were in Azerbaijan. Currently the catches are 39 thousand tones on average out of which 3.5 thousand tones are caught in Azerbaijan. The major part of fish catches consists of sprat which is mainly used for production of fish meal. At the same time, according to norms which are recommended by food specialists, the average annual consumption of fish products per person in the Azerbaijan republic should be 10.5 kg. Taking into account that the number of population of the republic is 9 million people at present, the catch of fish should increased to 95 thousand tones per year, which seems unrealistic taking into consideration the present condition of fish stock in the Caspian Sea. These figures powerfully illustrate the necessity of development of aquaculture and in particular marketable fish farming in the conditions of decreasing fish stocks of the Caspian Sea, reduction of arable lands and steady growth of a number of populations.

There are a lot of closed reservoirs in Azerbaijan, most of which were former stream canals of rivers. All of them practically are overgrown and don't have fish-farming importance. We have decided to use the potential opportunities of such ponds and to adapt them for breeding of marketable fish.

In order to realize the above-mentioned goal we have rented a drainless pond situated 120 km west from Baku city which was a former stream canal the Kura River. The reservoir with an area of 25 hectares stretches from south-west to north-east with

the length of 1000 meters and the width of 250 meters and has a falcate contour. The reservoir was completely overgrown and during summer time algae were entirely covering its water surface. Canadian waterweed (*Elodea Canadensis*), coontail *(Ceratophyllum demersum)* and curly pondweed *(Potamogeton crispus)*, were prevailing from soft aquatic vegetation. Of hard aquatic vegetation the prevailing ones are reed mace *(Typha latifolia)* and reed (*Phragmites communis*).

Earlier the reservoir was a water supply and later on the water was used for irrigation of farmer's fields and vegetable gardens. When the water level in the pond declined, the smell of sulphuretted hydrogen and ammonia was appearing. In the beginning of 2009 that reservoir was used by us for fish farming purposes. Due to this, water was lowered as maximum as possible, and as a result at both ends of the reservoir ground appeared, one in the northern end with the area of 4 hectares and the other one in the southern end with the area of 2 hectares. All vegetation and roots left in the bottom were removed and pits were filled. Then the planning of pond bed was fulfilled and dams were constructed. Two ponds with the area of 2 hectares of each were built in the northern part with the purpose of breeding of marketable fish. In the southern part a pond with the area of 2 hectares was build with the purpose of breeding young fish.

The ponds are filled with water independently of each other. In the end of each ponds water discharging facilities were constructed. The water was not drained into a waste ditch, as the construction of such a ditch would be very expensive. Therefore it was decided the water from the ponds are drained into the to the reservoir and thereby supply them with water and improve hydro chemical regime.

For breeding of stocking material in May 2009 the fish farm purchased three-day larvae of common carp (*Cyprinus carpio*), silver carp *(Hypophtalmichthys molitrix)*, bighead carp (*Aristichthys nobilis*) and grass carp (*Ctenopharingdon idella*). In the first stage the larvae were bred during 14 days in 2 land fish-wells with 100 sq. m area of each. The larvae were fed every 2 hours during the bright part of the day.

The feed consisted of fish meal, dried milk and yolk. After 15 days the sluice was opened and larvae together with the water stream were transferred to the pond with 2 hectares area. In this pond young fish were bred until the stage of the under yearlings and were kept there for overwintering. Feeding tables made of galvanized iron were installed for feeding. Young fish were fed 2 times per day using previously wetted and fine splintered wheat and barley.

In the first days of March 2010 half of each grow-out ponds were filled in order to achieve fast heating of water. Previously bags made of kapron sieve with 2 mm mesh size were installed on the water delivering pipes in order to prevent the coarse fish, hardroe and larvae from getting into the pond. The ponds were kept without fish ten days in order to get rid of most of the parasites. At mid March 2010, the transfer of the yearlings to the grow-out ponds began. Before transfer the young fish was treated using against ectoparasites with metrifonate in the amount of $1g/m^3$.

The density of fish placed in the grow-out ponds was 2438 ind/hectare of common carp with the average weight of 46 g, silver carp 602 ind/hectare with the average weight of 60 g and grass carp 301 ind/hectare with the average weight of 55 g. In total 13 367 yearlings were stocked with the average density of 342 ind/hectares. Feeding places were marked in the ponds on the basis of 300 fish per one feeding point. Feeding of fish began from the 1st of May 2010 when the temperature of water reached +18ºC. The fish feeding norm was established taking into account the intensity of eating, water temperature and oxygen content. Common carp was fed with crushed wheat and barley.

During the first 10 days of feeding as preventive measure from parasites and bacteriosis vitamin additives with antibiotics "biovit 120" were added to the feed on the basis of 1 kg of biovit per 100 kg of carp. When fish increased to the average weight of 300 g, feed was done with previously wetted whole grains of wheat and barley. From the beginning of June 2010 carp was fed twice a day. The feeding of fish was conducted till the end of October 2010. In total 62 tones of wheat and barley was delivered. Taking into account the high placing of grass carp, they were fed in additional with freshly mowed alfalfa. For these purposes two walls with 15 m^2 surface were erected over the water using boards and canes in the middle of each pond. In order to prevent grass carp from eating feed of carp, first forage (alfalfa) was given 30 minutes after common carp was fed. Grass carp was also fed twice a day on the basis of 50% of the body mass.

In order to raise the natural food of silver carps and bighead carp the ponds were fertilized three times with ammonium nitrate, once at the end of April and twice in May with 25 kg/hectares. The overall amount of chemical fertilizers used within a season was 75 kg/hectares. Later on due to algal blooming, fertilizing was not possible. Liming was performed once, in August, using 100 kg of burnt lime per hectare. Two days a week flowage was happening in the ponds. On carrying out these measures as guidance the instructions were used (Vlasov, 2001; Ganizade et al., 2005). In order to follow the growth rate of carp and prevent the diseases two times per month test fishing of reared fish was carried out.

At the beginning of November 2010 the water was discharged from the ponds and the sale of reared marketable fish began. In total, 8551 kg of marketable fish, of which 4672 kg of common carp with the average weight of 0,542 kg, 1890 kg of silver and bighead carp with the average weight of 0,888 kg and 1989 kg of grass carp with the average weight of 1.730 kg were produced. The average fish capacity of reservoir was 2138 kg, of which carp was 1168 kg, silver and bighead carp 473 kg and grass carp 497 kg.

By piece outcome of marketable fish was equal to 88,3% on common carp, 88,3% on silver carp and bighead carp and 95,6% on grass carp. The consumption of the yearlings amounted to 156 pieces per 100 kg of reared fish. Feeding rate on common carp taking into account the deduction of placing weight was equal to 5,34 pieces. For grass carp 15 tones of alfalfa was brought.

The experience revealed that the given reservoirs can be used effectively for breeding of marketable fish. The development of commodity fish farming in the drainless reservoirs will allow using rationally the land resources. By using new spaces of drainless resservoirs and their relevant reconstruction the production of marketable fish can be increased in the republic for ten thousands of tones.

Key words: *drainless reservoir, pond, grass carp, bighead carp, silver carp.*

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