

SUMMARY

The main activities of the aquaculture practitioner, are in fact actions on the food chain of the ecosystem, primarily to target circuit material through preferential support such as food for species cultivated to produce the best quality spectrum for each stage of growth and development, but also with a view to the exclusion of competitors, predators, parasites. In the aquatic habitat there grow plants (macrophyte algae in particular) and animal bodies.

Aquaculture should be seen as an integrative unit of information on ecosystem receiver (natural or created by humans, the model of the kind) and the knowledge on environmental requirements of species introduced into the breeding. Technologies that contribute to this desideratum aim at increasing the efficiency of breeding (profit ultimately) by lowering the highest cost of operations in which the man gets involved in the ecosystem he creates. In aquaculture there are two basic types of breeding: the intensive (industrial) and extensive (traditional) (Oprea, 2000).

Fish production in our country is carried out exclusively in classical arrangements of the lake and pond type, in which technologies of extensive and semi-intensive breeding are applied. Bioproductive and technical potential of this type of planning is limited, which is why they cannot constitute a solution to align Romanian aquaculture to European and world standards.

In own research, analysis and data processing, it can be concluded that the population of river fish species of sturgeon *Polyodon spathula*, may be a viable alternative to revive Romanian fish. Studies had as main objective of establishing how the species of sturgeon has valorificat given additional food, along with natural food consumed.

The study literature specialist, it is noted that the species *Polyodon spathula* recover fine natural food, but given the animal feed combined results regarding the parameters of growth are

superior to those obtained with natural food.

Using additional food in the nutrition of *Polyodon spathula* sturgeon species of the experiment no. 1, resulted in a higher increase of weight.

Analyzing the results, experimental plots that received the combined fodder as their nutrition, have made additional higher increase in growth, also the main indicators of growth being higher than those of the group. That is to put in evidence that the species of sturgeon studied, effectively exploited effectively the additional food.

After a period of 123 days of breeding there was achieved an individually weight gain of 2720 g/pattern based on consumption of combined food and of 1830 g/pattern based only on natural food.

During the whole conduct of the experiment the physical-chemical and biological parameters of the fishery waters, didn't suffer disruptions, they have exploited effectively the ecosystem by populating the fish species with both natural and supplementary nutrition.

The administration of mixed extruded fodder in the nutrition of *Polyodon spathula* species is compatible with the species' way of feeding, that is food that is in the water table.

To track the evolution of physical-chemical parameters of the river water taken in study, monthly, during the conduct of the experiment, there were carried out chemical analysis according to the methodology described by STAS 4706/1988.

Sampling water from each pond was conducted in 3 different points (food, the middle basin and exhaust), within the depth of 30 cm.

After conducting the experiment and the bibliographic study, it was found out that additional food administration gave results comparable to expert literature.

For the water in the breeding basins, there resulted the following parameters: the composition of the food, the change of calcium ions, chlor changes, changes in water temperature, changes in the concentration of dissolved oxygen, changes in pH, magnesium ions change, water change in nitrogen, water change in organic substance.

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basin and exhaust), within the depth of 30 cm. To compose an average sample solvit concentration of oxygen in the water was within the limits set by rules of force, except for July, when the amount of solvit oxygen fell below 5mg O₂/l, and further suppliance of oxygen in water occured (aeration).

This decrease in the concentration of solvit oxygen in water is due to temperature increase in water.

PH of the water in fish tanks was slightly alkaline. To the sample group, the pH value was 7 in May, in the following few month, growing up to a value of 7.4, then falling within the limits (6.5 – 8,5).

As regarding for the water content of main macroelements (calcium and magnesium), in the studied ponds, the values determind (40-60mg/l for calcium 18-29mg/l for magnesium) were well below the maximum allowed (200mg/l for ions of calcium and 100mg/l for magnesium ions).

For achieving higher growth results in terms of weight and dimensions of the species *Polyodon spathula*, other than the natural food, you can use the administration of combined fodder, and the results obtained in terms of increased growth, are higher than for food natural.

For all experimental groups there was noticed a higher rate in growth, in May and June, on the account of the backdrop of zooplankton abundance in May and June, and on the outside increased temperature during July and August the amount of zooplankton decreased, the pace of fish growth, also registering an obvious decrease.

In thee xperiments, there were determined the following parameters:

- - monthly average growth of weight gain
- - the increase in daily average weight gain
- - the monthly average weight of fish in experiments
- - biochemical composition of meat
- - Fulton coefficient
- - the index of circumference, the index of quality

- - specific rate of daily increase
- - physico-chemical characteristics of water.

Plankton samples were obtained by filtering plankton through the filter, and the filtrate obtained was processed qualitatively and quantitatively.

In May cladocerans have the largest share of zooplankton (71%) followed by copepod (25%) and larval insects (2%). The same distribution was determined in June (88% cladocerans, 7% and 1.5% copepod insect larvae).

In July the amount of rotifers increased to reach 10% as a share of zooplankton, because in the months following, it decreased to 0.5% in August and to 0.2% in September. This is due to environmental conditions favorable to the development of rotifers in July, when temperatures get higher and the food is plentiful.

To track the increase of both the achieved and pace of the growth, and the state of maintenance, there have been done decadal supervising fishing throughout the experiment. To appreciate, as objectively as possible, the maintenance condition of the material, there were carried out biometric measurements and Fulton index was calculated at the end of the experimental period.

Calculating the values in percentage, the monthly average increase in weight, of the copies in the experimental batch E1 is of 13% higher than the monthly average increase for copies in the batch experimental E2 and 20% higher compared to group copies. The relative difference between the experimental group and E2 group is of 8%.

The increase of *Polyodon spathula* sturgeon species in polibreeding along with the carp and the bloody species, and the management of combined extruded fodder, causing growth progresses of 22 g a day compared to the group of 14.8 g a day.

For *Polyodon spathula* copies of experiment 1, the E1 lot, starting from the initial weight of the populars of 2150 g/ex (May) it was reached in September that of 4870g/ex, arriving at an abundance of growth of 2720 g/ex, much more worthy than that recorded for group copies (1830 g/ex) and batch copies of E2 (2030 g/ex).

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In copies of carp lot E1 increased weight gain was 96 g/ex in September, far below the value determined for the group copies (220 g/ex) and closer in value to the growth recorded for copies batch E2 (103 g/ex).

The female cornel increased weight gain, for copies in lot E1, was of 1090 g/ex, more than the value determined for copies in batch E2 (1033 g/ex) and well above that recorded for group copies (320 g/ex).

The amount of biomass increased in September compared to May. Thus the river populated with *Polyodon spathula*, the quantity of biomass varied in May, between 44 – 155 kg/ha, because in September the amount of biomass was of 82 – 278 kg/ha.

For the pond populated with carp, the amount of biomass increased from 168 – 704 kg/ha in May to 178 – 2669 kg/ha in September.

During the experiment, there were not registered phenomena of sickness in bukk fishery materials. At the *Polyodon spathula* species and *Cyprinus Carpio*, there was found on the gills, copies of *Dactylogirus sp.* the number of 1-2 parasites on a host with an extensivity of 10 - 15%. He was identified carrying *Argulus foliaceus* shellfish copies to experiment E1 and M1, from the end of July.

Argulaza is the most frequent parasite infection (determined by crustaceans) and appears at fish within small area. On the surface of the fishbody, argulii is always set frontly in the direction of the fish head (up water). Infested fish is recognized as presenting on the surface of the body stains or bleeding wounds of approximately 0,5 - 1cm size, with irregular contour and stretched more on the surface than in depth.

Often, as an effect of the action arguli, there were found some small papillomas of oval contour, disseminated on the fin and on the surface of the body.

Prophylactic measures aimed primarily at pond destruction and maintaining the land and

river treatment with chloride of lime and slaked lime. To carry out bathing with Triclorfon 10 mg / l for 1 hour by aspersare directly with fish ponds and repeated after 4 weeks.

Polyodon spathula species was discovered with pathogen *Aeromonas salmonicida*, which caused furunculosis.

The form of the disease was subacute, fish showing severe globule of different sizes, distributed on the rugged sides, back and caudal region. Furunculosis manifests itself strongly in water temperatures of 15-18⁰C, and temperature under 7 ⁰C becomes latent to over 21 ⁰C, the disease diminishing in intensity.

Furunculosis is known to be carried out through direct contact between the sick fish and those reported by the disease, but the remaining carriers of pathogens.

As a treatment, there has been used oxytetracilină, 50 mg / kg fish weight for 10 days in basin in which the disease was detected, were disinfected after the experiment with chloride of lime (400 kg / ha) and were left dry for 10 days.

Considering the copies of *Polyodon spathula* at the end of the experiment, it came out that they were healthy and well developed.

Under the influence of further food on different protein levels, the data obtained in the experiment no. 2, highlights the fact that the species of sturgeon *Polyodon spathula*, exploited effectively, supplementary food with different protein levels.

The influence of feeding additionally on different protein levels is evident when compared increase of the growth variations between the fish that has been fodder feeded combined with a protein level of 30% crude protein, and the batch with protein content of 25%.

Experiment no. 2 was conducted over a period of 138 days, and there were highlighted the following issues: the final weight at the end of the experiment at E3 group was of 5400 g/sample and experimental batch E4 was of 4630 g/copy and the average weight for an individual in lot E3 is higher with 14.8% compared to that in the E4 group and 34.1% higher compared to group. In June the increase of weight gain was 84g/ex for the group and 123g/ex lot for E3. Lot E4 had an abundance of weight increase of 90g/ex.

Fulton coefficient values show a good increase in the experimental material studied, and a corresponding assimilation of the combined expanded fodder as managed. In experimental variations in which there was used expanded combined fodder, higher values of this coefficient can be noticed.

Analyzing the indicator of specific growth rate (SGR) we remark that the experimental group E3 which consumed as supplementary food combined extruded fodder of 30%PB, there was the amount of 0.09% / day, followed by batch E4 0.08% / day of combined expanded fodder consumed 25% PB.

A proper nutrition in terms of protein, quality, confer dietary meat and fish taste better due to a higher content of protein and saturated fats, to the detriment of the percentage of water. Fishery experimental material falls into the category of fish with good state of maintenance and high food value (the value the water / protein is between 3.5 - 4.20) (report / p = 3.76).

Analyzing the results obtained from blood chemistries at *Polyodon spathula*, fishing harvest, there can be appreciated, according to the classification of *George V*, quoted by *Beşchia M*, 1997, that experimental fisheries fall under the category of fish with good state of maintenance and high food value (according to criteria set out, the amount of water / protein is between 3.5 - 4.20) (report / p = 3.76).

Given the fact that in feeding the *Polyodon spathula* species there was used in combination extruded food, costs have not increased for carp for 2 years, for buying other types of combined fodder and the amount of sturgeon meat per hectare reported bright water increased from 231 kg / ha sheen of water, at 263 kg / ha sheen of water (for batch E3), there are all the premises for these species to be increased in polibreeding and in addition to natural food that you consume, to be administered supplementary food, also.

Increase species only on natural food provides good conditions for survival and growth, but this type of food implies at industrial quantities, high costs and difficulty in supply, purchase and collection.

In the case of experiment II, the colouring of water from the river has been increasing in May, to green brown. With the development of green algae, water colouring was changed so that

in June and July, it was green. In the months of August and September the colour of the water was greenish yellow. Transparency water considered optimal for the development zooplanktonului is 25cm.

In May transparency water transparency was of 25 cm for the next few months to fall, arriving at 18 cm in September, water temperature oscillated between 18 °C in May and 28 °C in August. The amount of dissolved oxygen in water is inversely proportional to water temperature. The greater the temperature of the water, the higher the decrease of the dissolved oxygen amount in the water.

The minimum quantity of oxygen in water dissolved for a fish to develop normally is of 5 – 6 mg /l; this value was reached only in August when water temperature was higher. For May, the quantity of dissolved oxygen in water was 7.6-8 mg/l, optimum development of fish, pH to hover around 7 falling within the range of 6,5-8,5 by recommended literature.

The highest ion Mg was determined in May for all the experimental ponds, within limits ranging between 20 and 80 mg/l. Higher values were determined for the basin where has been an increased group (170-180 mg/l).

In May there were recorded the highest values of the concentration of chlorine tanks for all the range, between 179 mg/l and 190 mg/l. Higher values were determined in basin group (about 179 mg/l). Since June the amount of chlorine in the water has began to fall, being situated in the range 108mg / l – 180 mg / l.

In May and June they have resulted in a higher concentration of nitrogen limits ranging from 0.25 mg / l and 0.30 mg / l, normal for this period. During the summer, phytoplankton is very abundant in the ponds due to the intake of fertilizers and because of disappearance of cladocera or high consumption by fish. In a first step, the proliferation are determined in general by the green algae.

Green algae are the consequence of nitrogen impoverishment in the environment and create conditions favorable of the appearance and then to the massive development of cyanobacteria, against which, no satisfactory solutions have been found, to prevent their occurrence or to remove them without environmental degradation.

To combat the phenomenon of flowering water, copper sulphate was added (CuSO_4), the amount of 1-2 g/m^3 water and chloride of lime. Proceeded to the location of the jute bags containing CuSO_4 in a few points of ponds.

Analyzing the biochemical composition of zooplanktonic bodies, they were found to have a low content of nutrients.

In experiment II, the supplement with nutrients from the mixed fodder was put into practice.

There was used as additional food, combined extruded fodder for carp in two summers, with different protein levels, the receptiveness in manufacturing combined extruded fodder has used the following materials: corn, soybeans, full fat soybean, sunflower groats, calcium carbonate, fishmeal, oil sunflower, methionine, lizin, dicalcium phosphate, salt, and zoofort ingredient that provides floatability.

In both recipes of combined extruded fodder in the experiment there were made the following observations: in the crude protein content, gross fat, carbohydrate, ash and fiber raw. Proteins were determined by the Kjeldahl method, fats were determined by the Soxhlet extraction in petroleum ether method, complete glucids by colorimetric method and water by drying it at the drying stove to 105°C . gross ash and fiber were calculated by difference.

The polyodon consumes what finds in water and can be filtered. In September the copies consumed a 76% cladocer, because they are easily filtered and fish burnt less energy for their purchase. This month cladocerele are in the maximum period of reproduction. Therefore, they will be plenty and fish will consume greater quantities compared to other genres.

The coefficient Fulton indicates a good material fisheries (0,5-0,8), the optimum value of 2.

The administration of combined fodder brings about greater weight. The group that has not benefited of additional feeding, reached in September an average weight of 3.880g/ex, while copies of lot E1 reached 4.870 g/ex and the E2 lot to 4.230 g/ex.

Quality meat has improved at the end of the experimental period. If the May rate of

protein was 15.6% reported to dry substance, in September the rate was 17.5% of dry matter.

Following the completion of the two experiments it was found out that the species of *Polyodon spathula* sturgeon is a species of interest to fisheries in Romania. Through the application of technologies of optimal breeding, there can be achieved a quantitative and qualitative increase in the production of fish and an efficient recovery of the ecosystem.