REZUME

The acvaristic (the ornamental pisciculture) studies the exotic fish, raised in captivity,. In the last period of time this discipline got an important value.

The most important production centers from the acvaristic market are in Thailand, Singapore, Indonese, Hong Cong, Florida, but also in some european countries as France, Great Britain, Austria. Farms of different sizes can be found all over the globe. In our country, the acvaristic commerce is practiced at a smaller scale, because the smaller producers are still using empiric tehnics, for producing the biological material, its calitative value being low.

The majority of the breeders are using their own house as a space for the culture of the ornamental fish, and only few of them have special halles for this. Different sizes for aquariums can be found in institutes from our country too, and the request for exotic species is continuously increating,. The alive food is necessary for the breeding and the development of the larves, the whelps, and the adults. The alive food assures nutritionally all the elements necessary for each species, and it can't be totally replaced.

The alive food is really important for spermatogenesis and ovogenesis, with repercussions on the future development of the larves and the welps. The researches in this domain are only few, and that’s why this written papers is reffering to some aspects concerning the way in which different types of food, having animal origin are having positive and negative effects on the performances of *Poecilia reticulate (Lebistes reticulatus)*.

Poecilia reticulate is a fish frequently seen in aquariums, because it's a specie easy to be take care of without being fastidions in what councerns the food and the breeding conditions. This specie is originally from South America (Venezuel, Barbados, Trinidad, Guyana), but can be found on the African continent too, in Namibia.

Guppy (*Poecilia reticulate*) was brought for the first time in Europe in 1860 by Robert John Lechmere Guppy, and now can be found all over the continent. Exemplaries from this specie can be found in the termal lake at Băile Felix too Oradea.

This paper was structured on two parts, one bibliographic, and one with personal researches. The bibliographic part has sixt chapters in which are presented dates reffering to the species of the digestive system, nutritional diseases, factors that can influence the feeding, nutritional requests, the alimentation and the nutrition of de aquarium fish.

The second part, the one with personal researches, has seven chapters in which are presented: the aim of this paper, the experimental material, the followed parameters, metods of working, results obtained in experiments. Mode on my own researches, and after an important study of the speciality literature data, this written paper has as an aim to determine the influence of the alive food on some important parameters in acvaristic colours, survival, the increaseof the length and weight prolificity, precocity and body index (the maintenance index, the weight increase spore, the ratio of the multiplication of the medium weight).

The experiments were mode in the Aquaculture Laboratory of UŞAMV Iaşi, and the chemical determinations in the Laboratory of Chemical Analises of UŞAMV Iaşi and also at the Direcția Sanitar Veterinară Iaşi. The researches were structured on three experiments and 11 lots. Each lot was formed by 16 larves, old on day after eclosion, which were fed differently.

Experiment A

In this case there lots were formed each group having 16 individuals of *Poecilia reticulate* one day after eclosion. The individuals were ontaining from 10 females, and were fed as it followrs: lot $M_{1.1.L}$ was fed with complete granulated food, lot $A_{1.1.L}$ was fed with nauplius of *Arthemia salina* and lot $A_{1.2.L}$ with mixed food (nauplius of *Arhemia salina* and complete granulated food). The breeding aquarium had three compartiments, one for each lot. The aquarium had neon type illumination, with a system to air the water, formed by a loudspeaker and a diuse whitch were connected to a rubber tube and a mechanic filter. The mineral base was formed by quarz sond, and the vegetal one by plants as *Valisneria and Elodea.*

In the first three mouths we have observed the survival of the larves and whelps, their colours, the increase of weight and length. This parameters were observed for the second generation too, the lots being noted as $M_{2.1.L}$ (complet granulated food), $A_{2.1.L}$ (nauplius of *Arthemia salina*) and $A_{2.2.L}$ (nauplius of *Arhemia salina* and complete granulated food).

The individuals from the second generation were introduced in a similar aquarium, to the one for the first generation. Starting with the age of 4-5 mouths the guppy reach the sexual maturity and become reproducers. To make a diference in between larves and whelps, these lots were noted as $M_{2.1.R}$ (complet granulated food), $A_{2.1.R}$ (nauplius of *Arthemia salina*) and $A_{2.2.R}$ (nauplius of *Arhemia salina* and complete granulated food).

At the reproducers were observed the survival, the increase of the length and weight, the colours, the prolificity, the precocity and the body index for three mounths.

The fish used for this experiment were fed in the first three weeks with infusorians and after wards they received the food mentioned previously. Nauplius of *Arthemia salina* and infusorians (*Paramaecium caudatum*) were obtained from personal culture in the Aquaculture Laboratory of UŞAMV Iaşi.

The culture of *Paramaecium caudatum* can be obtained in 2-3 glass containers, with 8-10 liters capacity. This containers are filled up with hay infusion, made as it follows: 5-10g of hay are infused in 2 liters of water, the water is left to get cold, and when the infusion a stagnant the infusorians collected from a stagnant water, or from an older culture are introduced. The container is covered, and the temperature is kept at 18 – 20 °C. After some days, in all the water in the container, infusorian can be found.

In good conditions, the infusorians have multiple divisions on a day. When water is lower than 18°C, thei anchylose, and then they rezume their normal life when the conditions become favorable again. For a foster multiplication, the culture has to contain daphnes or other predator infusors (*Tărtăşeanu, 2005*).

The infusorians were fed with powder milk, or vegetal material. The harvest is mode in glass ballons, with light meck, and with a 0,5-2 liters volume, in which is introduced the liquid with infusorians, close to the level corresponding to the beginning of the meck. At the base of the meck, around a wire ring which is honged by the superior margin of the balloons neck, a cotton cork is mounted, or another material which permittes the infusorians to pass from one side to another. The balloons neck is filled up with clean water, taken from an aquarium, kept al 20-25°C. In between the liquid from the ballon, and the fresh water it shouldt be air, because it would stop the migration of the infusorians in the upper part. After some hours, the infusorians have consumed the oxygen inside the balloon, and have passed throught

the cork inside the neck of the balloon. The liquid from inside the neck is poured in a glass, and this water is poured into an aquarium with larves. The water inside the balloon, which has no infusorians, is thrown away, and in the container used for an aquarium, and that is why is recommended to have 2-3 containers for the infusorians culture (*Oprea, 2000*).

A first step when talking about obtaining nauplius of *Arthemia salina* is the separation of the embryons and the membrane. The reason in the first place is that the peels are not digestible and second of all because these can cause obstructions of the digestive way at the fish welps.

Follow four operations:

- their rehidratation;
- the usage of the solution;
- the washing and the de-activation of the residual chlorine;
- the incubation of the eggs.

The dry eggs have a cavity in the membrane, and are harder to be removed in these conditions. Because of this they have to be rehidrated until they reach the spheric shape. The eggs are rehidrated in soft water or distilled at 25°C, for 60-90 minutes. If the water is colder, the hydration time is longer. No matter what temperature is the eggs shouldn't be left mare than two hours, because this decreases the percentage of decapsulation and eclosation.

The hidration was mode in a container similar to the one used for eclosione. The hydrated embrions were filtered and washed on a sieve with loops of 100 – 125microns. Its better if the decapsulation is immediately, but they can gest colder for some hours if me need to.

While the rehidration tokes place, we havw to prepare the chlorine solution. A liquid chlorine solution or a lime chlorine powder is mixed with a saline solution. While preparing for decapsulation, the eggs are placed in a buffer solution chilled at 4°C, and with are pH around 10, containing 0,33 ml solution 40% NaOH and 0,67ml marine water for each gram of egg.

The buffer solution can be prepared dissolving 40g NaOH inn 60ml fresh water. The decapsulation starts after 10ml of chlorine are added to the buffer solution. A thermometer is needed, because we have to keep the temperature for the solution at 20-30°C. The temperature can be controlled using the marine water, already chilled (*www.acvariu.com*).

The second method consist of treating the eggs with lime chlorine, the proportion is 0,7g lime chlorine for 1g of arthemia eggs. In this case, the buffer solution contains 0,68g sodium carbonate and 13,5ml of water. The water has to be divided in two halfs. We add lime chlorine ta the first one as it is requested, and sodium carbonate to the second one, and to react, and afterwords a hasten will appear. Botle solutions are chilled first, are mixed together, and than we add the hidrated eggs. While decapsulation, we stir continously to stop the forming of the foom, and the spread of the heat. At the biginning, the solution is dark-brown, then grey, white, and finally light orange. This reaction lasts for 2-4 minutes.

Using the lime chlorine, the lenght increases, to 4-7 minutes, and the colour stops at grey. The eggs are filtered as fast as we can, after reaching the final colour (orange or grey), and are washed throught the sieve with clean water, until the chlorine smell dissappears.

The residual chlorine gets attached to the decapsulated eggs, and has to be neutralized fast, using a 0,1% sodium tiosulfate solution, which has 0,1g sodium tiosulfat in 99,9 grams of water, for 1 minute. The first mothod has better results, the second one is easier. The eggs are washed again, and are placed in incubatory for eclosion. They can eclose immediately, or can be kept in the refrigerater up to 7 days. To keep them longer, the eggs have to be dehidrated again. This can be mode using the immersion in a saturated saline solution gets air for 18 hours, cleanging it at every 2 hours. The eggs lose their water in the solution because of the osmosis, and that is why the solution has to be saturated all the time. After 18 hours the eggs lose aproximatively 80% of the cullular water, moment when the air is stoped, and then it's filtered. These eggs are placed in a container, are covered with saturated solution, and then are kept in a refrigerator or freezer. The eggs with 16-22% cellular water can be kept a few months, without decrease of the eclozion factor. For a longer period of time, the cellular water has to be decreased to less than 10% (*www.acvariu.com*).

For eclosion we have used a special aquarium, with 3 separated compartments: A, B,C, each a 5 liters volume of water. The aquarium is being placed in a biger aquarium, which has another compartment D, surrounding the 3 spaces A, B and C. This compartment is neccesary because it is filled with regular water, and maintance a hingher temperature in the compartments A, B and C, this happens because of a heater with termostat wich is set up for a temperature of 26-28°C. To have the some temperature, a rock un aerator is bieng used. In the compartments A, B and C we

added 4 liters of water in which we have dosolved big salt (30 – 32g for 1 liter of water), depending on the salinity of the water from where de arthemia eggs are coming from.

In each compartment a rock of air from the aerator is being introduced to help the breaking of the peels of arthemia eggs. When the water reaches 26-28°C, with a lot of air, we place 5-6g of arthemia eggs. After aproximatively 30-40 hours, the eggs eclose.

Afterwards, we take the rock out, and after 3-4 minutes we observe that in the sharper top of the compartment, orange nauplius of arthemia can be found all together, and close to the surface are the peels of the eclosed eggs. To harvest the nauplius, we will use a glass tube, inside of a rubber hose. In the some time with the salt water we will take aut the nauplius in a dense sieve. After we reinse them with clean water, we can use the nauplius as food for the fish. The advantage is that the nauplius are very soft and rich in nutritive organic substances. The licking water is being placed back in the compartment with the ai rock.

It is necessary that this battery used for the eclosion of the arthemia eggs to be mode as a water fall, starting compartment A, then after 3-4 days compartment B, and after another 3-4 days compartment C, in order to have food all the time (*Oprea, 2000*).

The males of the second generation have a biger diversity of colours, in compareison to their parents. The males from the first generation are all colored the same bleu marine on the tegument, and orange on the swimming parts, the individuals belonging to lot $M_{2.1.L}$ are colored in blue, yellow, and red tones.

The males, from grey to black and silver, withont having 2 males with the same colour. The females have transparent swimming parts, an exception being the caudal swimmer which has different colours (yellow, black, multicolours, yellow and orange, orange and black green), while the males have all the swimmers coloured (an exception is the anal swimmer which is usually transparent).

The individuals from the second generation had a better survival in comparison to the first generation (37,5 – 56,25%), its value being double. Having the sufficient quantity of nutrients, the larves and the wheleps had a better development, being resistant to diseases and having in this way a better survival (84,21 – 90%).

Starting with the same average weight (6,9mg) in the first three mounths from the eclosion, an average spore of biger weight was obtained in the case of lot $A_{1.1.L}$

(221,1mg), lot which has received nauplius of arthemia, in comparison to the control lot (196,2mg).

In the first three mounths from eclosion the larves have a faster increase of lenght, in comparison to the reproducers. The reproducers grow more in weight, especially close to the reproduction period. The average prolificity at the first birth is 4 larves/female for the lot with complete food, 8 larves/female for the lot fed with nauplius of arthemia, and 10 larves/female for the lot fe with mixed food. The individuals belonging to the lot fed with mixed food have the bigest prolificity. The females from this lot have given birth to 11-15 larves.

Experiment B

This experiment is similar to the one presented before, the difference is that we have formed 4 experimental lots, fed as it follows:

- Lot $M_{1.2.L}$ – with complete granulated food;
- Lot $B_{1.1.L}$ – with alive *Paramaecium caudatum;*
- Lot $B_{1.2.L}$ – with dry *Daphnia pulex;*
- Lot $B_{1.3.L}$ – with alive *Tubifex rivulorum.*

The followed parameters are the same as for experiment A the breeding aquarium was splitted in 4 compartments, one for each lot. In the first rhree weeks, the fish were fed with infusorian, and afterwards they had in their diet the food mentioned previously. The individuals from the second generation were noted with $M_{2.2.L}$ (complet granulated food) $B_{2.1.L}$ (alive *Paramaecuim caudatum*) $B_{2.2.L}$ (dry *Daphnia pulex*) $B_{2.3.L}$ (alive *Tubifex rivulorum*). The lot of reproducers were noted with „R", instead of „L". The alive food was obtained in the Aquaculture Laboratory of UŞAMV Iaşi, from own cultures. The daphns are fished with a planctonyc fileu, that we pull against the water current. Planctonyc fileu can be mode of brass or steel were, with a 3-5mm diameter, having a circle shope, on which is fixed with a screw, a wooden handle having 2m lenght. Planctonyc fileu is fixed on the round frame with small rings made aut of a material that doesn't rust. The diameter of the frame is 25-35cm. When we gather the plancton, we move the fileu slowly, in the shape of eight. The fishing net shouldn't be too dense, because in this case the water passes harder throught it, and caches less planctonyc animaes. The most appropiate sieve is the silk on used for the mills, number 13, with the loops having a diameter of 105 thousandths of mm, and 49 wires/cm (*Kaszoni, 1970*).

The alive food is sorted with a flowing sieve, or a sorting glass, specialy made. The daphns can be kept for more days in inameled containers, with a biger diameters, with a lazer of 5-6cm of water, in a cold place. Can be kept also for the winter, if they are soaked at the sun previously, layed in a thin layer on top of a sieve cloth, pulled on a wooden frame. The daphns are placed in paper bags, in a dry place, with a lot of aer. In a hot summer of 80/50cm, up to round of daphns, or the ones kept in a damp place, are moulding. The water fleas can be secured on winter time too, by making a hole in the ice (*Kaszoni, 1970*).

There are species of fish that are not eating dry food, reason why it is recommended to have our own nursery of daphnes. This can be achieved as it follows in a cold place, we place a tall container (around 15-18cm) with a biger surface. The container is filled up with water, and it is left like this for 3-4 days, afterwards it is added (at 50 liters of water), a fist of old dejection, moulded coming from cow, sheep or bird.

After two weeks, in the content prepared like this we add a spoon of yeast which can be dry too. The clean envirounment will be populated with alive daphnes, which are gonna multiplicate throught parthogenesis. These have a prolific increase because of the abundent food, when from only one daphnes around milion individuals can be obtained. The feeding is made with fresh milk, amall quantities of yeast or yolk of egg, which can bring about an easy trouble of the water. The feeding process will be restorted only after the water will become clear again (*Buzenche, 2005*).

For the administration of tubifex are used plastic flooting feeders, having a funnel shope, with a dense sieve as the bottom. The worms are getting aut throught the loops of the sieve in the water, were are eaten by the fish. To feed the sanitaries (fish that eat from the bottom of the aquarium), small glass trays are used, which contain a lunch of tubifex.

Before using them as food, the worms have to be cleaned. The alive worms are placed in a container with water, with a biger surface, a little bit deep, and few drops of water clean and fiesh are left to lick inside. After 4-5 days, the worms eliminate the mud from the digestive tube, being better now as food (*Oprea, 2000*).

The harvest of the tubifex can be made with a shovel, taking in the some time all the mud with thousands of individuals stock in it, afterwards are placed in abucket, under a tap with clean water, licking slowly. After some hours, the worms are cleaned, without mud. Using a spoon with holes this quantity of tubifex is taken, and

it will be placed in a flot container, similar to a tray that can be filled up with water. Holding the worms under the water is neccessary, and in this phase we can avaid the detachment of one from the other one (*Buzenche,2005*).

The big fish (5-6cm leght) are fed with whole worms, whill the for the whelps, the worms are cutted in pieces having 3-5cm. The quantity of food given has to be 3-5g for each meal, hen if the number of fish from the aquarium is biger. The tubifex can be cutted with a blade, or with a special machine that can be bought in comerce, used for slicing the vegetables. This machine has a handle, in a tuning folk shape, having axe, and 5-6 cutting discs. The tubifex can be dried after the Lovas method. The worms are thrown in a container with boiling water, and are hold in there until they die. Afterwards they are taken aut, then are placed on a glass plate, the sun until they dry and are hard. To take them aut the plate, a knife is used, the worms are crushed, then the obtained powder is sifted, and it is kept in a dray place (*Kaszoni, 1970*).

The infusorians determine weaker colours for the individuals belouging to lot $B_{2.1.L}$, in comparison to the larves fed with tubifex, but more intearse in comparison to the individuals fed with dry *Daphnia pulex.* The individuals belouging to the experiment B were less coloured without having the tones of blue not even at one individual. The orange tones were obsedved at both lots. The individual fed with infusorians had the best survival (94,67%), being close followed by the ones fed with tubifex (94,19%). The weakest survival was observed at the individuals that were fed with complete granulated food (82,86%).

The lot fed with tubifex had the bigest increase in weight (250mg), being followed by the lot fed with infusorians (214,9mg), and the one fed with dry daphnes.

The larves fed with tubifex and the ones that ate complete granulated food have increased more in lenght (2,6cm), in comparison to the similar lots belonging to the first generation (2,5cm). The reproducers that were fed with dry *Daphnia pulex* had the smallest prolificity at the first birth (6 larves/individual), while for the other lots the prolificity was 8 larves/individual.

The some situation was observed at the second birth too. The reproducers fed with dry *Daphnia pulex* had an average prolificity of 6 larves/individual lower than the ones determined for the other lots. The bigest prolificity at the reproducers that were fed with *Tubifex rivulorum* (14 larves/individual).

Experiment C

In the case of this experiment, we have formed 4 experimental lots, which were fed as it follows:

- Lot $M_{1.3.L}$ with complete granulated food;
- Lot $C_{1.1.L}$ with larves of *Drosophila melanogaster;*
- Lot $C_{1.2.L}$ with larves of *Chironomus plumosus*;
- Lot $C_{1.3.L}$ with alive *Daphnia pulex.*

The observed parameters were the some used for experiment A. The breeding aquarium was splitter in 4 compartimants, one for each lot. In the first three weeks, the fish were fed with infusorian, and afterwards they hat the diet mentioned previoesly.

The individuals from the second generation were noted with $M_{2,3.L}$ (complete granulated food), $C_{2.1.L}$ (larves of *Drosophila melanogaster*), $C_{2.2.L}$ (larves of *Chironomus plumosus)*, $C_{2.3.L}$ (alive *Daphnia pulex*). The lots of reproducers were noted with „R", instead of „L". The alive food was obtained in the Aquaculture Laboratory of UŞAMV Iaşi, from own cultures.

For the culture of *Drosophila melaogaster* we put an enameled container with 150g of corn flour, 300ml of water, and 200g fruits without seds, until we get a paste. After it got cold, the paste is moved in a glass container, and itis left until the flies of gather in the container. From this moment, the top of the container is kept at temperatures higher then 20°C. After a week, we can hornest the larves of *Drosophila melanogaster* gaster from the avalls of the container (*Tărtăşeanu, 2005*).

To created a breeding of larves of *Chironomus plumosus*, we meed an aquarium having 60cm lenght, 35-40cm wide, and 20-25cm tall. The aquarium has to have a volume of at loast 30 liters. As base we have used mud, that we have mixed with sond (1/3), an salt without iodine (30g at 5 liters volume of mud), and we have placed on a bottomof the aquarium in a layer having 3-5cm. It can be used also yard mud, mixed with sond and salt in the some proportions, on top of what we add chicken dejection, or horse dejection (*www.acvaristica.com*).

The base is covred with 10-12cm of water without chlorine, or token from the some environment from were we have taken the mud. Being prepared like this, the aquarium has to be in light, outside, for 7-10 days, for the development of the mocroorganisms (not in the case of lake mud, which is rich in microorganisms).

When the biotop is ready, with a lot of microfood for the larves, the aquarium is moved in at the dark, and filtration with a sponge are also needed, and also some tubes or plastic ones, placed on the base, in which the larves can hide from the light. It is covered with gauze. If in the room it isn't dark than we cover the aquarium with a black plastic folium (*www.acvaristica.com*).

After 5-7 days while we change around 25% of the water, the flies appeer. These shouldn't be eaten. They live 3-5 days, time in wich they lay eggs. The larves are taken aut from the pump (it doesn't matter if the water will be come troubled) and the water is colected using a teasieve. The larves fed with *Drosophila melanogaster* had more intense than the control lot, because of the rich content in proteins. The individuals fed with oligochaets worms were better developed in comparison to the ones fed with *Drosophila melanogaster*.

The individuals fed with larves of *Drosophila melanogaster* had more evident colours, in coparison to the control lot. The male individuals had on their body tones of orange, grey or green, while the females were yellow with green. The males had on their bodies orange, black or blue spots, and the females had no spot. At all experimental lots, the survival of the larves beloging to the second generation was better (84,13% - 94,12%) in comparison to the first one (62,5% - 68,75%), which supposes a better adaptation to the diet with only one type of food. The survival values type are uniforms for the larves from the second generation.

In the first mouth, the increasing of the weight was the some for all the lots in between 68,2mg and 70,5mg. In the second mouth, the best weight increase was noticed at the lot fed with larves of *Drosophila melanogaster* (157,2mg), being followed by the control lot (153,4mg). The smallest weight increase was observed at the lot fed with alive *Daphnia pulex* (121,7mg).

The individuals from the control lot and the ones fed with *Drosophila melanogaster* had the bigest lenght increase reaching 2,8cm in the third mouth, they were being followed by the individuals fed with chironomidae larves, which have reached 2,7cm in lenght.

The reproducers from the control lot had the bigest prolificity at the first birth (7 larves/individual) while for the ones fed with alive *Daphnia pulex* the prolificity at the first birth was the smallest (5 larves/individual).

At the second birth, the bigest prolificity was observed at the reproducers that were fed with alive *Daphnia pulex* , and at the ones that had in their diet larves of

Chironomus plumosus (12 larves/individual). The smallest value for the second birth prolificity was noticed at the reproducers belonging to the control lot (9 larves/individual).

As a general concluzion, we can say that the administration of alive food determines directly the performances of *Poecilia retuculata* .