OBSERVATIONS ON THE SEXUAL BEHAVIOR OF DANIO FISH (*DANIO RERIO*)

C. GAȘPAR, Alexandra MOCANU
USAMV IAȘI - Facultatea de Medicină Veterinară, Aleea M. Sadoveanu Nr. 8, Iași
alexandra.moc95@yahoo.com

Abstract
The use of zebra fish in medical research, as well as its popularity in aquariums, makes it very important to study the sexual behavior of this species. The zebra fish were brought to Europe in 1905, originating from the still-flowing or slow-flowing waters of India. It is taxonomically classified in the Cyprinidae family, the Danio genus, being nicknamed "zebra fish". It has a long and thin body, which reaches up to about 5 cm in length and 1 cm in width.

Introduction

Sexual dimorphism is poorly pronounced, especially in youths up to 3 months. Females have a visibly more developed abdomen than males when it is full of eggs, reaching the size of a bean. Males are filiform, showing a more intense color.

In the aquarium, as well as in their natural environment, the zebra fish stay grouped and swim actively at the surface of the water, accustomed to hiding from predators under the leaves of aquatic plants. Thus, to stimulate sexual behavior, it is absolutely necessary to have plants.

The oviparous species, Danio rerio, breeds in aquariums at any time of the year, the sex ratio being a female to two or three males. They reach sexual maturity at about 3 months, and females can breed once every month.

Table 1

Water parameters

Water parameters for stimulating the sexual behaviour of the Danio fish				
Temperature (^{0}C)	**Hardness (dH)**	**pH**	**Light Types**	**Filtration**
23-25	8-10	6,5-8	Fluorescent light 75W/100litri or LED	30 L/h

Materials and working techniques:

- 2 containers, one with mesh and one integral
- Thermometer
- Filter/Airstone
- Lamp
- Clear water
- Plants
- Camera
- Observation and monitoring

In order to stimulate sexual behavior, the following particularities will be taken into account:

- F / M ratio needs to be taken in consideration.
- Simulate natural conditions for their multiplication by separating target individuals from the rest of the group and putting them in fresh and shallow water. In this way, the little fish will feel safe, because any potential predator will not be able to get in shallow water.
- Select a female with visibly enlarged abdomen and active and well-developed male. In this case, individuals are 7 months old.
- A plant nest is provided, giving them the place where they will lay their eggs.

Plants are fixed in a corner of the container. Vallisneria spp., Elodea, Cabomba and Bacopa monieri were used.

From a group of 23 zebras, a female and three males were selected and separated in the prepared breeding container. This was done in the evening so the subjects get used to the new environment.

Tap water is mixed in a 5/1 ratio with rain or snow water to reduce pH and hardness. The temperature was kept at 26 ° C, the light was kept at a moderate brightness so that the subjects would not be scared and stressed by the environment, the water column height was 8.5 cm so that the depth of the water near the banks was reproduced, similar to the place where they breed in the natural environment. The net with which the bottom of the first container is padded will serve to prevent adults from eating the released eggs. Fecundation takes place simultaneously with the release of the eggs so that they are left at the bottom of the dish, where they will hatch for the next three days.

Three minutes after being released into the new environment, the fish start swimming aimlessly in the container and after a while they separate, so the female retired to the plants. The males began to swim agitated, seeming to ignore the new environment in which they had been introduced. They began to bite each other through fast and hardly perceptible movements, describing a chase in circles about 7 cm in diameter.

Once approached, the female comes out of the plants and gets to chase away every male emerges nearby. After that, it withdraws back to the base of the plants, or even under the heater or at the base of the aeration tube.

Taken simultaneously by two or three males, the female emerges from the hiding place. It is noticeable how it is tapped to the abdomen, and even strikes laterally against the walls of the vessel to stimulate the elimination of the eggs.

After 15 minutes, the parallel and synchronous swimming of the male and female, the one keeping the step, sticking its abdomen to her repeatedly for up to 2 seconds. It is noticed that eggs are removed 18-20 at a time at the base of the plants. They are transparent, glassy, have a 1 mm size and fall on the bottom of the bowl or remain adherent to the net accidentally, and being consumed.

After the elimination of the eggs, the female continues to swim, eliminating the eggs at intervals ranging from 3 to 7 minutes.

40 minutes later, a return to the specific exploration swimming was noticed, the female stop eliminating eggs and start avoiding the males. There is also a drastic decrease in the dimensions of her abdomen.

The fish were then removed, approximately 300 eggs, collected in a smaller pot, were rinsed with 1% methylene blue and tripaflavin to limit the multiplication of pathogens, among which Saprolegnia spp ..

They were then transferred to a new aquarium with a temperature of 27 ° C and constant water aeration, suitable for hatching.

Conclusions

1. 70% of genes predisposed to human disease are similar to those in the genome of zebra, and this fact allows the study of numerous functioning mechanisms and treatments for:
    a. Melanoma
    b. More efficient stimulation of STEM cell proliferation and transplants
    c. The tissue regeneration study (zebras are able to regenerate their tissues, including the restoration of their functionality, including cardiac tissue).
2. Respect for specific environmental conditions leads to the stimulation of sexual behavior in this species and promotes spawning.
3. At the time of deposition, the zebra adults should be prevented from eating eggs.
4. The rapid and economical acquisition of these fish allows many research in the medical field, but also their growth as passion in aquariums.

References

1. https://www.nature.com/articles/nature12111
2. Barabaș N., Pasiunea mea, acvaristica. (1983) Ed. Ceres
3. https://www.theguardian.com/science/2013/sep/15/zebrafish-human-genes-project