COMPARATIVE CHARACTERISTICS OF REPRODUCTIVE SYSTEM OF *ABRAMIS BRAMA* FEMALES FROM DIFFERENT POPULATIONS IN ANNUAL CYCLE PERIOD

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Abstract. *There is provided the comparative characterisation of the reproductive system of A. brama female, which populates different types of water reservoirs of the Republic of Moldova. Differences in oocyte development intensity were established in females from different populations during a year cycle period.*

Keywords: *Abramis brama, females, oocyte development, water reservoir.*

Rezumat. Caracterizarea comparativă a sistemului reproductiv al femelelor de *Abramis brama* din diferite populaţii în perioada ciclului anual. *Este dată caracterizarea comparativă a sistemului reproducător al femelelor de A. brama, care populează diverse bazine acvatice ale Republicii Moldova. Au fost stabilite diferenţe în intensitatea dezvoltării oocitelor la femelele din diferite populaţii în perioada ciclului anual.*

Cuvinte cheie: *Abramis brama, femele, dezvoltarea oocitelor, lac de acumulare.*

INTRODUCTION

It is known that under the influence of anthropogenic factors in the reconstructing water basins changes in fish reproduction, various kinds of disturbances in the development and functioning of their reproductive system occur in the first place (KOSHELEV, 1984).

Our researches revealed changes in the development of reproductive system in *Abramis brama* (LINNAEUS) females from Dubasari aquatic reservoir after the construction of Dnestrovsk Hydro-power Station (FULGA, 2004). To emphasize the peculiarities of the reproductive system development in industrially valuable fish species, in Danube *A. brama* in particular, from the aquatic reservoir Costeşti-Stânca, we studied seasonal changes in oocyte development during a year period by comparing with their development in fish from Dubasari water reservoir.

MATERIAL AND METHODS

Sexually adult females were collected from trammel nets between 2003 and 2008. The ovaries of 58 and 35 sexually mature females from the water reservoirs Dubasari and Costeşti-Stânca, respectively, were studied. The gonad pieces were fixed in Buen liquid with subsequent processing according to the appropriate methodology. The gonad maturity stages were established after MEYEN (1939) with the definitions of SAKUN & BUTSKAIA (1963), while the degree of oocyte maturity after the classification of KAZANSKII (1949). The gonadosomatic index (GSI) was calculated through the proportion of gonad weight to carcass weight.

RESULTS AND DISCUSSIONS

In Dubasari water reservoir, after the spawning in the second half of June, the ovaries of Nistru bream pass into the 2^{nd}-3^{rd} maturity stage. Along with the oocytes of protoplasmic growth period the oocyte in the vacuolization phase are present. Altogether with the developments of the new generation oocytes there continues the resorption of free follicular membranes and of unspawned yolk oocytes (Fig. 1).

Figure 1. Oocyte after the spawning at 2^{nd}-3^{rd} maturity stage in females from Dubasari water reservoir.
Figura 1. Oocitul după depunerea icrelor în stadiul II-III de maturitate la femelele din lacul de acumulare Dubasari.

The gonadosomatic index in spawned females decreases up to 2.24±0.05. The missing of the 2^{nd} maturity stage of gonads in sexually adult females of *A. brama* from Dubasari water reservoir was recorded in the first years after the

reservoir creation (ZELENIN, 1960). The following development of the oocytes takes place asynchronously. In August, the gonads on 3rd stage of development contain oocytes, the cytoplasm of which is completely vacuolated (D_3), and oocytes with one or two vacuoles rows ($D_1 – D_2$).

The asynchronization in sexual cells development of Nistru *A. brama* inhabiting Dubasari water reservoir continues even in autumn period. In the process of yolk granules accumulation, along with the oocyte of intense vitellogenesis phase ($D_5 – D_6$), there are also present oocytes in the primary phase of yolk accumulation (D_4). Such a composition of the oocytes characterizes the 4th stage of gonad maturity that takes place at the end of October. GSI in this period corresponds to a value of 15.95±1.20. In April in sexually adult females the main gonad mass is constituted by the oocytes of one generation in the phase of finished vitellogenesis. GSI reaches maximum values in May.

In the past years, in *A. brama* from Dubasari water reservoir the 4th stage of gonad maturity lasted for five months (ZELENIN, 1960), actually – about six months, fact which is connected with the decreasing of the water temperature in the reservoir after the construction of Dubasari Hydro-Power Station.

After spawning, the gonads of Danube *A. brama* from Costeşti-Stânca water reservoir, in contrast to the Nistru one, pass into the 2nd maturity stage that lasts till the second half o June (Fig. 2).

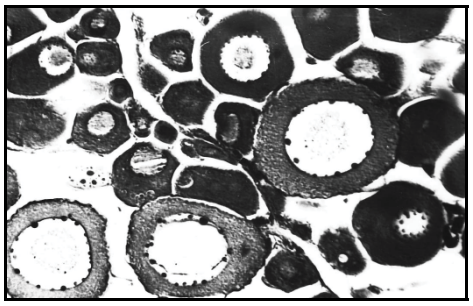

Figure 2. The ovary after the spawning in the 2nd maturity stage at females from Costeşti-Stânca water reservoir.
Figura 2. Ovarul după depunerea icrelor în stadiul II de maturitate la femelele din lacul de acumulare Costeşti-Stânca.

In repeatedly maturating females of Danube *A. brama* the development of sexual cells in the period of primary growth occurs synchronously (Fig. 3), while in Nistru females the oocyte development in this period occurs asynchronously. In contrast to the last ones in females from Costeşti-Stânca water reservoir the beginning of cytoplasm vacuolization in oocyte occurs in the second half of June, i.e. 2-3 weeks earlier.

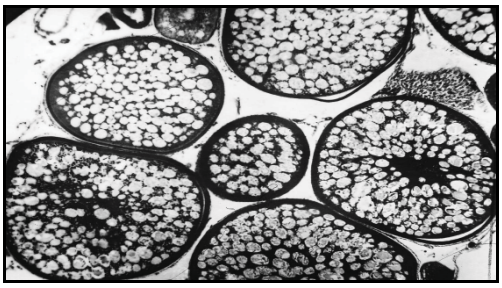

Figure 3. Synchronic development of oocytes on the 3rd stage of gonad maturity in females from Costeşti-Stânca water reservoir.
Figura 3. Dezvoltarea sincronă a oocitelor în stadiul III de maturitate a gonadei la femelele din lacul de acumulare Costeşti-Stânca.

Therefore, in females from Costeşti-Stânca water reservoir at the synchronic development of oocytes in vacuolization phases their transition in the phase of vitellogenesis beginning occurs at the end of August of the current year. As a result, the 4th stage of gonad maturity occurs one month earlier that in females inhabiting Dubasari water reservoir.

CONCLUSIONS

In repeatedly maturating females of *A. brama* from Costeşti-Stânca water reservoir differences in the oocyte development were established during a year period.

In females from Costeşti-Stânca water reservoir, the gonads pass into the 2nd stage of maturity after the spawning and the following oocyte development, of the primary growth period, occurs synchronously.

For the females of *A. brama* from both reservoirs it is the creation of unique oocyte generation ready for spawning in certain spawning seasons.

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