



## Faculty of Agriculture, Trakia University

### REVIEW

**By:** Prof. DSc Vasil Kostadinov Atanasov;

**From:** Faculty of Agriculture, Trakia University, Stara Zagora;

**Registered in:** NATIONAL CENTRE FOR INFORMATION AND DOCUMENTATION - Academic degree "Doctor of Agricultural Sciences", Research area 6.3. "Stock-breeding" and Academic rank "Professor", Research area 4.3. "Biological sciences"

**Regarding:** PhD thesis for acquiring educational and scientific PhD degree in scientific specialty "Breeding of agricultural animals, biology and biotechnology of reproduction", Research area 6.3. "Stock-breeding"

**Autor:** Stanimir Georgiev Bonev

**Title of the PhD thesis:** "Morphometric and reproductive characteristics of fish from the family *Acipenseridae* in the conditions of super-intensive breeding technology"

**Supervisors:**

1. Assoc. Prof. Dr. LUDMILA NIKOLOVA
2. Assoc. Prof. Dr. BOYKO GEORGIEV

**Reason for presenting the review:** participation in the composition of the scientific jury for the defense of the dissertation according to Order No. RD -16-779/05.07.2022r of the Rector of the Agrarian University-Plovdiv

#### **1. Information about PhD student**

The PhD student Stanimir Georgiev Bonev was educated in a doctoral program at the Department of "Animal Science", AGRICULTURAL UNIVERSITY - PLOVDIV, FACULTY OF AGRICULTURE in the scientific specialty: "Breeding of agricultural animals, biology and biotechnology of reproduction" in Professional

direction 6.3. "Livestock". The training was carried out in correspondence form during the period 2017-2022.

## **2. General characteristics of the presented dissertation**

The presented dissertation is written on 208 pages and contains the standard structural components characteristic of this kind of development. It is very well illustrated with 36 tables and 38 figures. The topic is topical, as it affects the morphometric and reproductive characteristics of fish from the *Acipenseridae* family under the conditions of super-intensive breeding technology. The goal closely correlates with the title of the dissertation, and the set tasks logically form 3 work packages, the implementation of which is generally related to morphometric characterization, ultrasound monitoring of sexual development and characterization of sperm production in fish of the *Acipenseridae* family. The object of the research is extremely promising, since sturgeon fish, as economically valuable species, are distinguished by high value of caviar, good organoleptic and dietary-prophylactic qualities of the meat. In this aspect, the development is in line with the main priority of aquaculture - meeting the growing needs of humanity for essential amino- and fatty acids at a peak in the global catch of hydrobionts. The main thesis of the development is supported by the scientific literature used - 211 authors are cited, of which 39 are in Cyrillic. The extensive literature review shows the dissertation's excellent awareness of the problem, its in-depth knowledge and great potential for solving important technological tasks in the cultivation of sturgeon fish in the conditions of super-intensive technology. The methods used are adequate to the research, and the modern equipment and methods are suitable for solving the identified tasks. Variational statistical processing of the data was used to determine a number of important dependencies.

## **3. Evaluation of the obtained scientific and scientific-applied results**

The dissertation presents the obtained scientific and applied results in a very well-illustrated section "Results and Discussion". The logical sequence for solving the set tasks has been observed. A detailed morphometric characterization of seven-year-old female and male Russian sturgeon and a hybrid of Siberian and Russian sturgeon was made. The comparative analysis shows that there are differences between the two sexes in a number of morphometric characteristics. It has been proven that in sturgeon fish cultivated under conditions of super-intensive cage technology, the sex of the fish can not only be successfully determined by the methods of ultrasound examination,

but the age dynamics of the development of the gonads can be followed in both sexes by establishing the separate phases of maturity. In addition, a detailed characterization of the sperm production of the studied sturgeon fish was made. The investigated 4 biochemical indicators /enzyme activities/ of the sperm and 11 specific dynamic characteristics of motility give an extensive metabolic and reproductive characteristic of the spermatozoa. In accordance with what has been achieved, a relatively skillful interpretation has been made, including the research of world authors. In this section, the erudition of the author, the depth of entering into the problem and the level of training achieved in the doctoral program are best seen. In this aspect, the aim and tasks of the dissertation work have been fulfilled, as a result of which 6 conclusions have been formulated and 6 valuable recommendations have been made for fish farming practice. Additionally, emphasis is placed on the need for business and science to cooperate more closely in order to develop sturgeon farming as an efficient industry.

#### **4. Evaluation of scientific and scientific-applied contributions**

The contributions of each scientific work show its usefulness, both in fundamental and in scientific-applied aspect. In this sense, Stanimir Bonev's dissertation is a large-scale study, as a result of which 9 contributions are generally exposed, which could be briefly summarized and arranged as follows:

1. For the first time in our country, a complex study of morphometric and reproductive characteristics of sturgeon fish (Russian sturgeon and F1 hybrid of Siberian and Russian sturgeon) of different sexes and ages, cultivated under conditions of super-intensive cage breeding technology, was carried out. **Scientific and applied contribution original for Bulgaria;**

2. Morphometric differences in a number of plastic and meristic traits have been proven between the Russian sturgeon and the hybrid (F1 Ab x Ag), and between the sexes within the genotype, when reared under conditions of super-intensive cage technology. The possibility of using the morphometric analysis as a tool for species and gender identification, for evaluating the reaction of fish to the conditions of cultivation, as well as for determining the possibility and directions of breeding and improvement activity has been established. **Original scientific and applied contribution;**

3. The parameters of basic indicators characterizing the economic qualities of Russian sturgeon and hybrid (F1 Ab x Ag) (fatness, compactness, thickness and width of the body, etc.) when grown in the conditions of super-intensive cage technology

were established, as it was established the influence of genotype and gender on them.

**Original scientific contribution;**

4. It has been proven that ultrasound diagnostics of ovaries and testes can be used to follow the development and degree of maturity of the gonads in live sturgeon fish, as well as for early sex determination, which is of particular importance for increasing the efficiency of farms for caviar production. **Confirmatory scientific-applied contribution with elements of originality;**

5. For the first time, a study was carried out and age and seasonal dynamics of gonadal development were established in Russian sturgeon and hybrid (F1 Ab x Ag) cultured in the conditions of super intensive cage technology. A comparative analysis of the sexual development of male and female individuals of the Russian sturgeon and the hybrid was made. **Original scientific contribution;**

6. It was established that when reared in the conditions of super-intensive cage technology, female hybrids (F1 Ab x Ag) are more precocious than female Russian sturgeons, and within the same age, they significantly outstrip them in terms of ovarian development. **Original scientific contribution;**

7. It was established that in the conditions of super-intensive cage technology, the sex of the Siberian sturgeon can be determined as early as 3 years of age. **Confirmatory scientific-applied contribution with elements of originality;**

8. For the first time, seasonal dynamics of ovarian and testicular development in Siberian sturgeon cultured under super-intensive cage technology were established. **Original scientific contribution;**

9. For the first time, a study of complex indicators of sperm production of different age groups of Russian sturgeon and hybrid (F1 Ab x Ag) was conducted. It was found that when cultured under the conditions of super-intensive cage technology, the Russian sturgeon and the hybrid have good sperm production and can be successfully used for reproduction. For breeding, it is recommended to use male individuals that have reached 9 years of age. **Original scientific and applied contribution.**

## **5. Evaluation of the dissertation publications**

The logical conclusion of any research is the publications related to it in prestigious scientific journals. According to the present dissertation, they are 5 nos. - 1 piece. in Conference proceedings. VIII International conference "*Water & Fish /unrefereed collection of reports with scientific review/*", 1 issue in *Bulgarian Journal of Agricultural Science* /referred and indexed journal in world-famous databases with

scientific information/, 1 issue in *Agricultural Sciences* and 2 issues. in *Animal Science* /referred and indexed journals in world-famous databases with scientific information/ Stanimir Bonev is the lead author in three of the publications, and in the others he is in second place, which is a good certificate for his participation and contribution in the developments.

#### **6. Evaluation of the Abstract**

The abstract is a compressed version of each dissertation work, and Stanimir Bonev's has the necessary sections in the reference sequence and volume for similar publications. It is presented on 50 pages and reflects the main information in the dissertation. The presented results, contributions, conclusions and recommendations are a valuable aid for the scientific community and those working in the fish farming industry.

#### **7. Critical remarks, recommendations and questions**

With the exception of some technical inaccuracies, I have no significant comments on the dissertation work and the abstract. However, the interpretation of the rich experimental data in a biochemical aspect could be more thorough. For example, the PhD student did not note the reason for some lower enzyme activities in the newt extract compared to the aqueous one.

Given the high value of caviar and the need to improve assisted reproduction, I recommend further research on the effect of some sperm protective media on quality and reproductive performance in sturgeon fish species.

#### **8. Conclusion**

The comments and recommendations made do not at all diminish the merits of the presented dissertation work, which meets the requirements of the ZRASRB. The topic and the biological species have been selected successfully. The scientific experimental activity is organized and conducted with skill and competence. The results are obtained and processed with modern methods and equipment. The discussion is current and in tune with modern scientific achievements in the field. Formulated conclusions, contributions and recommendations are valuable for fish farming practice. The dissertation student, in addition to deep theoretical knowledge, also demonstrates enviable skills in analyzing and discussing the obtained results. In this aspect, Stanimir Bonev's training in the doctoral program has achieved the desired result and the materials presented in the procedure exceed the minimum national

requirements. I highly value the dissertation work, the abstract and the publications related to it, and I strongly recommend to the members of the respected Scientific Jury to vote for the awarding of the PhD degree to Stanimir Georgiev Bonev in the Scientific specialty "Breeding of farm animals, biology and biotechnology of reproduction", professionally direction 6.3 "Livestock".

29.08.2022.  
Stara Zagora

Signature: .....  
/Prof. DSc Vasil Atanasov/