



OPINION

Regarding: dissertation for the award of educational and scientific degree "Doctor" in the field of higher education 6. **Agricultural Sciences and Veterinary Medicine**, Professional field 6.3 **Animal Husbandry**, Scientific specialty **"Breeding of farm animals, biology and biotechnology of reproduction"**.

Author of dissertation: **STANIMIR GEORGIEV BONEV**, PhD-student (part-time) at the Department of Animal Husbandry Sciences at the Agricultural University, Plovdiv

Topic of the dissertation: **MORPHOMETRIC AND REPRODUCTIVE CHARACTERISTICS OF FISH FROM ACIPENSERIDAE FAMILY IN THE CONDITIONS OF SUPERINTENSIVE BREEDING TECHNOLOGY**

Member of the Scientific Jury: **Assoc. Prof. Desislava Vasileva Abadjieva**, PhD, Institute of biology and immunology of reproduction – BAS, in the field of higher education 6. Agricultural sciences and veterinary medicine, professional field 6.3 Animal Husbandry, Scientific specialty "Breeding of farm animals, biology and biotechnology of reproduction", determined according to Order RD -16-778/05.07.2022 of the Rector of Agricultural University – Plovdiv.

1. Relevance of the problem.

The topic of the dissertation is relevant, as addressing a problem related to the development of industrial sturgeon farming, in conditions of extremely insufficient knowledge, regarding the ontogeny of species of the family Acipenseridae in cultivation. Of particular concern is the depleted state of sturgeon populations worldwide.

The sustainable development of European and Bulgarian sturgeon farming can only be achieved by building modern production based on scientific achievements in the field. At the same time, scientific research on sturgeon fish is very scarce, and in conditions of super-intensive technologies, it has not been conducted at all, which emphasizes the importance of the present work. In addition, in the present study, for the first time in our country, morphometric and reproductive characteristics of species and hybrids of the Acipenseridae family, cultivated in conditions of industrial super-intensive cage technology, were studied.

2. Purpose, tasks, hypotheses and research methods.

The purpose of the dissertation is clearly formulated and refers to the morphometric and reproductive characteristics of sturgeon fish (Russian sturgeon and hybrid (F1 Ab x Ag)), when reared in the conditions of industrial super-intensive cage technology. To achieve the stated goal, three main tasks are set, each of them including two sub-tasks, and their solution is presented in a circumstantial experimental part of this work. The following were studied in detail: - the morphological characteristics, through an analysis developed specifically for sturgeon fish and hybrids; - the sexual development of male and female individuals through non-invasive dynamic monitoring, by means of ultrasound examination of live fish; - sperm production was analyzed using the CASA system, as well as the activity of basic enzymes

(LDH, AP, GGT, CK). All data were processed statistically using specialized software (IBM SPSS Statistics 21). Everything presented emphasizes correctly selected and adequately applied approaches by the doctoral student.

3. Visualization and presentation of the obtained results.

The dissertation demonstrates a high style, presented in 208 pages, properly structured in all necessary sections: the literature review of 28 pages reflects the main directions of the thesis. It shows the doctoral student's good awareness of the scientific problem and speaks of his developed skills in synthesizing scientific literature. Followed by aim and tasks of 1 page. Materials and methods are adequately described on 18 pages. Results and discussion of 115 pages, illustrated by 29 tables and 56 figures. There is a conclusion of 7 pages, implications and recommendations of 1 page each. The literature reference of the dissertation cites to 223 sources, most of them in foreign languages.

4. Discussion of the results and used literature.

The results of the scientific research, including their discussion, occupy an essential part of the dissertation work. The comparisons between the data obtained by the doctoral student, with those of other authors, contribute to their being logically and thoroughly presented.

All literary sources are correctly cited. The conducted research is in three directions:

- *morphological characteristic* related to analysis of female and male individuals of Russian sturgeon (*Acipenser gueldenstaedtii*) and hybrid (F1 *Acipenser baerii* x *Acipenser gueldenstaedtii*);
- *sexual development* through the methods of ultrasound research, which allowed the author not only to successfully determine the sex of the fish, but also to follow the age dynamics of the development of the gonads with the establishment of the individual phases of maturity.
- *characterization of sperm production*, as despite the unusual conditions of super-intensive cage breeding technology, good sperm production was established in Russian sturgeons and hybrids from all three age groups studied;

Five conclusions are made that correspond to the experimental results and reflect the contributions of the dissertation.

5. Contributions to the dissertation.

Stanimir Bonev's dissertation presents 9 scientific and applied contributions with specified originality on the part of the author. Among them, it is emphasized that for the first time a complex study of morphometric and reproductive characteristics of sturgeon fish (Russian sturgeon and hybrid (F1 Ab x Ag)) of different sexes and ages, cultured under conditions of super-intensive cage breeding technology (pro . 1), with evidence of morphometric differences in a number of plastic and meristic characters. The doctoral student establishes the possibilities of using morphometric analysis as a tool for species and gender identification, for evaluating the reaction of fish to cultivation conditions, as well as for determining the possibility and directions of breeding and improvement activities (ex. 2). Gonadal ultrasound diagnostics is applied to track the sexual development of live sturgeon fish, as well as for early sex determination, which is of particular importance for increasing the efficiency of caviar production farms (Ex. 4). For the first time, a study was carried out and age and seasonal dynamics of gonad development were established in Russian sturgeon and hybrid (F1 Ab x Ag) cultured in the conditions of super intensive cage technology (ex. 5). Seasonal dynamics of ovarian and testicular development in Siberian sturgeon cultured under

the conditions of the studied technology (ex. 8) were established, which has not been done so far. The study of sperm production in different age groups of Russian sturgeon and hybrid led to the recommendation for the use of male 9-year-old individuals for breeding (ex. 9).

In terms of usefulness and significance for science and practice, the contributions made are fully sufficient for obtaining the educational and scientific degree "doctor".

6. Critical remarks and questions.

The doctoral student uses understandable and precise scientific language, clearly defines concepts and logically structures his work. For the requirements of a doctoral program, this is quite sufficient and in this regard, I have no significant critical remarks.

I have a **question** for the PhD student: At what age does primary oocyte begin implantation in the gonads of female sturgeons and hybrids in the intensive conditions under which the fish subject to the present study are reared? What are the dynamics regarding the shift in the development of the species relative to that in the natural environment?

7. Published articles and citations.

In connection with the dissertation, the doctoral student has published 4 scientific articles, in 2 of which the candidate is the first author.

Some of the obtained results have been presented at scientific conferences.

The presented publication materials cover the necessary 30 points for acquiring the ONS "Doctor" according to ZRASRB.


The presented abstract objectively reflects the structure and content of the dissertation.

CONCLUSION:

Based on the different research methods learned and applied by the doctoral student, correctly performed experiments, summaries and conclusions, I believe that the presented dissertation meets the requirements of ZRASRB and the Rules of the Agrarian University for its application, which gives me reason to evaluate it **POSITIVE**.

I take the liberty of proposing to the Honorable Scientific Jury that it also vote in favor and award **Stanimir Georgiev Bonev** educational and scientific degree "Doctor" in the scientific specialty *"Breeding of farm animals, biology and biotechnology of reproduction"*.

Date: 11-08-2020
Plovdiv

Reviewer: 
(Assoc. Prof. D. Abadjieva)