OPINION

of a dissertation for awarding the educational and scientific degree "**Doctor**"
by: field of higher education *6. Agricultural Sciences and Veterinary Medicine*
professional direction 6.3. *Animal husbandry*
doctoral program *Farm animal breeding, reproduction biology and biotechnology*

Author*:* Georgi Kirilov Georgiev - part-time doctoral student, at the Department of Animal Sciences.
Topic: " Morpho-physiological and biochemical characteristics of fish of the family Acipenseridae"
Reviewer*:* prof. D.Sc. Katya Naneva Velichkova, Trakia University – Stara Zagora, Agricultural faculty, registered in NACID with the scientific degree "Doctor of Sciences", in Professional field 6.3. "Animal Husbandry" and "Professor" in Ecology and Ecosystem Protection - professional direction *4.3. Biological Sciences*,
appointed as a member of the scientific jury by order No. RD-16-613/ 14.05.2025 by the Rector of the Aagricultural University.

1. Actuality of the problem.

The topic of the dissertation is very relevant, since the natural populations of sturgeon species are depleted and cannot meet the growing needs, and the reasons for this are complex. The dissertation is significant due to the studies related to the cultivation of Russian and Siberian sturgeon species and hybrids of Russian and Siberian sturgeon. Comparative analyses were conducted regarding morphology, physiology, slaughter parameters, protein profile of the meat of Siberian sturgeon (*Acipenser baerii*), Russian sturgeon (*Acipenser gueldenstaedtii*) and the hybrid of Siberian and Russian sturgeon (F1 *A. baerii* x *A. gueldenstaedtii*), which contribute to the improvement of cultivation technologies and improvement of productivity in aquaculture. The results of the research provide important information about the genetic profile, adaptive abilities and quality characteristics of the meat, which is key to the creation of economically efficient and sustainable production models. The dissemination and application of the results obtained will contribute to the development of effective and environmentally friendly technologies for growing sturgeon fish, which will be economically profitable and with a high standard of quality of the final product.

2. Purpose, objectives, hypotheses and methods of research.

The set goal is clearly and precisely formulated. The tasks related to the goal, regardless of their large number, are well defined. The stated hypotheses of the study are correctly structured, deduced and lead to a real prerequisite for solving the set tasks. To conduct the experimental part of the dissertation work, modern methods that are applied in the field of fish farming were used. The methods were selected according to the specifics of the planned tasks - morphophysiological, morphometric, chromatographic methods. All data were processed using appropriate statistical methods.

3. Visualization and presentation of the results obtained.

The dissertation is 191 pages long and structured according to generally accepted criteria and contains all the necessary sections - introduction, literature review, goal and

objectives, materials and methods, results, discussion, conclusions, recommendations, cited literature sources. Finally, a list of scientific publications related to the dissertation is included. The research was conducted by applying internationally recognized methods and standards, as a result of which adequate results were obtained and relevant conclusions were formulated, which are 9 in number and 3 recommendations. The doctoral student used various means to visualize and summarize the achieved results with the help of 38 tables and 43 figures.

4. Discussion of results and references.

The literature review shows that the doctoral student is very familiar with the issues and scientific research, having cited 277 sources, of which 77 in Cyrillic and 200 in Latin. The largest section in terms of volume, "Results and Discussion", is richly illustrated with tables and figures, and a comparative analysis follows after each indicator. The detailed and consistent characterization of a number of morphophysiological, slaughter and biochemical indicators of female and male individuals of Russian sturgeon and a hybrid of Siberian and Russian sturgeon from different age and weight groups is impressive. The scientific interpretation of the results obtained by the doctoral student shows his in-depth entry and growth in the field of aquaculture. This has also contributed to the opportunity to formulate specific conclusions and recommendations for improving the biological characteristics of the studied sturgeon species and their hybrids, and subsequently improving cultivation methods.

5. Contributions of the dissertation work.

Based on everything presented in the dissertation, ten contributions have been formulated, which are original scientific contributions and scientific-applied contributions. They reflect the results of the doctoral student's research activities.

The **original scientific contributions** include:

1. It was established that proteins are biologically most complete in the meat of Russian sturgeon and the hybrid of the lower weight group, in which essential amino acids are 67.2% and 55.5% of the total amount, respectively. Next is the higher weight group of Russian sturgeon - with 47.9% essential amino acids, and in the remaining groups their content is from 31.2% to 36.2%.

2. It was established that in the studied conditions, the weight group has an impact on the morphological and slaughter indicators, the chemical and amino acid composition of the fish meat, and for a number of indicators, the impact on individual genotypes is specific.

Confirmatory scientific contribution - It has been confirmed that protein electrophoretic models can be used for genetic differentiation of sturgeon species.

The following are considered **scientific and applied contributions**:

1. A number of morphological and slaughter indicators were studied; the chemical, amino acid composition and protein profile of the meat of Siberian sturgeon, Russian sturgeon and their hybrid (F1 A. baerii x A. gueldenstaedtii), with different consumer weight, cultivated in a super-intensive hatchery farm located in the warm-water Kardzhali reservoir.
2. It was established that sturgeon fish cultivated in a super-intensive industrial farm have good slaughter qualities and meat quality.
3. It was established that in Russian sturgeon, fish from the lower weight group have better slaughter qualities.
4. It was established that in Siberian sturgeon, both weight groups have similar slaughter qualities, slightly higher in heavier fish.

5. It was found that in the hybrid, the fish from the lower weight group had a higher slaughter (89.5% vs. 86.5%, $p<0.05$) and consumer (86.6% vs. 83.8% $p<0.05$) yield.
6. It was found that in the studied conditions, the Russian sturgeon outperformed the Siberian and the hybrid in all three slaughter yields and in the whole fillet in the whole fish in the lighter weight group.
7. It was found that the meat of the fish from the lower weight group had the highest protein content in dry matter: in the hybrid - 84.5%, the Russian - 78.5% and the Siberian -75.0% sturgeons.

6. Critical notes and questions.

Considering the relevance of the issues of the dissertation, I recommend that the doctoral student continue his research.

7. Published articles and citations.

In connection with the defense of the dissertation, 4 scientific publications in English have been presented in refereed journals – Bulgarian Journal of Agricultural Science (Scopus SJR 0.25; Web of Science; Q 3); Agricultural Sciences (Web of Science – CABI). The articles are in a collective, in one of which the doctoral student is the first author, which proves the personal contribution to the results obtained. Georgi Georgiev reported the results of his dissertation work at two scientific forums.

The abstract adequately reflects the results and contributions of the dissertation work.

CONCLUSION:

The presented dissertation work contains scientific and applied scientific results that represent an original contribution to science and meet the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria (ZRASRB), the Regulations for the Implementation of ZRASRB and the Regulations of the Agricultural University for its implementation, which gives me reason to evaluate it **POSITIVELY**.

The dissertation work shows that Georgi Kirilov Georgiev possesses in-depth theoretical knowledge and practical skills in the scientific specialty "Breeding of farm animals, biology and biotechnology of reproduction", demonstrating qualities and skills for independent planning and conducting scientific research. This gives me reason for a positive assessment of the conducted research and I propose to the esteemed scientific jury to award the educational and scientific degree "Doctor" to Georgi Kirilov Georgiev in the field of higher education 6. Agrarian sciences and veterinary medicine, professional field 6.3. Animal husbandry, the scientific specialty "Breeding of farm animals, biology and biotechnology of reproduction".

Data: 20.06.2025
Stara Zagora

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