



REVIEW

Regarding the competition for the "Professor" position in the scientific specialty of Aquaculture, pisciculture, fish farming, and industrial fishing, as announced in State Gazette No. 62 dated 21.07.2023, the candidate is Associated Professor Lyudmila Nikolaevna Nikolova from the Agrarian University, Plovdiv, Bulgaria. The reviewer was appointed as a member of the scientific jury based on Order No. RD 16897/25.09.2023 by the Rector of the Agrarian University - Plovdiv.

Reviewer: Professor Dr. Ivaylo Nikolaev Sirakov, Trakia University, Pisciculture, fish farming, and industrial fishing

(Acad. position, Name, surname and family name, higher school / scientific organization; field of higher education, professional field, scientific specialty).

He has appointed to the scientific jury per Order No. RD-16897/25.09.2023 of the Rector of the Agrarian University.

1. General Information about the Candidate's Career and Thematic Development:

Lyudmila Nikolaevna Nikolova was born on November 5, 1965, in Ukraine. In 1988, she graduated from the Borisenko Zooveterinary Institute/Zooveterinary Academy in Kharkov, Ukraine, majoring in Zooengineering. Between 1993 and 1995, she completed her Master's degree at Sofia University "St. Kliment Ohridski", Faculty of Biology, specializing in "Biology and Chemistry". In 2003, she obtained her Doctoral degree in the field 04.02.12 "Pisciculture, Fish farming, and Industrial fishing".

Lyudmila's professional career began in 1995 at the Agrarian University in Plovdiv, where she took on the role of a Zooengineer in the Department of Animal Husbandry. From 1998 to 2011, she worked as a Research Associate at the Institute of Fisheries and Aquaculture in Plovdiv, Agricultural Academy-AA, advancing through various scientific ranks: Research Associate-I, II, and III. Concurrently, from 2004 to 2005, she served as a Visiting Assistant Professor at the Department of Animal Husbandry, Faculty of Agronomy at AU-Plovdiv. From 2011 to 2014, she held the position of "Associate Professor" at the Institute of Fisheries and Aquaculture in Plovdiv, AA. Between 2012 and 2014, she also was a Visiting Associate Professor at the Department of Animal Husbandry Sciences, Faculty of Agronomy at AU-Plovdiv. From 2014 to the present, she has been a regular Associate Professor at the Department of "Animal Husbandry Sciences" at the Agrarian University in Plovdiv. Between 2013 and 2014, Assoc.Prof.Nikolova served as the Interim Director at the Institute of Fisheries and Aquaculture in Plovdiv, AA. Since 2020, she has been the Head of the Department of "Animal Husbandry Sciences". Associate Professor Nikolova has also held various other roles, including being a member of the Faculty Council, secretary of the teacher certification committee at the Faculty of Agronomy, member of the quality committee at the Faculty of Agronomy, member of the committee overseeing undergraduate internships and the state examination committee for students at the Faculty of Agronomy. Since 2003, Associate Professor Lyudmila Nikolaevna Nikolova has been a member of the Scientific and Technical Union of Bulgaria, and since 2019, she's been a part of NACEE - Network of Aquaculture Centers in Central-Eastern Europe. She has

completed two specializations abroad: in France in 2021 at the "Association Agricole Franco-Bulgare" and in Spain in 2022 at the "Universitat Politecnica De Valencia" in Valencia. In 2019, Associate Professor Nikolova delivered lectures at the Russian State Agrarian University - Moscow Timiryazev Agricultural Academy for students specializing in Zooengineering. Associate Professor Nikolova is fluent in Russian, Ukrainian, Bulgarian, and English.

2. General description of the submitted materials.

For the "professor" competition, Assoc. Prof. Lyudmila Nikolaevna Nikolova is participating with a total production of 39 works, grouped as follows:

- Scientific publications in the nomenclature specialty - 40 in number, of which:
- Publications related to the doctoral dissertation - 1, which is not subject to review;
- Publications with an impact factor/impact rank - 10 (25.64%);
- Publications in reviewed and referred scientific journals - 27 (69.23%);
- Publications in conference proceedings - 2 (5.12%).

Assoc. Prof. Lyudmila Nikolova's personal contribution to the mentioned 39 works is illustrated by the fact that 7 are independent, in 12 she is the first author, in 8 she is the second author, and in the remaining 12, she is the third or subsequent author.

Assoc. Prof. Nikolova has written one textbook and one manual. The scientific works of Assoc. Prof. Lyudmila Nikolova have been cited 36 times in journals referred and indexed in the globally recognized Scopus and Web of Science databases, and 13 times in non-referred journals with scientific reviews.

Regarding the so-called national minimum scientometric requirements for obtaining the academic position of "professor" according to the law for the development of the academic staff in the Republic of Bulgaria, Assoc. Prof. Nikolova meets the criteria, and some of them are multiple times more than required.

For the preparation of the review, 39 scientific publications are subject to analysis.

3. Main directions in the candidate's research work. Demonstrated skills or commitments to leading scientific research (project management, external funding acquisition, etc.).

The subject of Assoc. Prof. Nikolova's scientific research includes: eco-friendly and sustainable technologies in monoculture and polyculture fish farming, studies in the cultivation of sturgeon species, and innovative approaches in determining genetic variability in fish. In relation to the mentioned topics, the candidate has participated in three international and ten national projects. Moreover, she has led four national and one international projects, which showcases the high activity and leadership competencies of Assoc. Prof. Lyudmila Nikolaevna Nikolova in the specialty for which the competition is held.

4. Evaluation of the candidate's pedagogical preparation and activity. His/Her role in the training of young scientific personnel.

Assoc. Prof. Nikolova has a total teaching experience of 13 years, acquired at the Agricultural University in Plovdiv. The candidate conducts lectures and practical exercises with bachelor's and master's degree students in disciplines such as: Aquaculture, Biological Foundations of Aquaculture, Aquaculture Technology, Fisheries and Fishing, Fish Farming, Maritime Affairs and Fisheries, Biological Aquaculture, Recreational Aquaculture and Fishing, Production of Safe and Quality Hydrobiontic Foods-Good Aquaculture Practices, Basics of Aquaculture, Genetic Resources and Selection Specificities in Fish Farming, Fish Reproduction, Integrated Hydrobiontic and Poultry Farming Technologies, Biotechnology of Reproduction in Fish Farming, Breeding Programs in Fish Farming, Genetic Resources Management in Fish Farming, Digitization in Aquaculture, and Integrated Farming of Waterfowl and Fish.

Over recent years, Assoc. Prof. Lyudmila Nikolova has had an average teaching workload of 664 hours. She has been the scientific advisor to 20 graduate students and three doctoral candidates, of which two have successfully defended their doctoral degrees. Supporting her pedagogical activity are the textbook and practical manual has published. Assoc. Prof. Lyudmila Nikolova's strong commitment to the educational process in her specialty is reflected in the vast number of programs for which she is the author (41 in total).

5. Significance of the obtained results, evidenced by citations, publications in prestigious journals, awards, membership in international and national scientific bodies, etc.;

Assoc. Prof. Lyudmila Nikolova's scientific publications have been cited in journals referenced and indexed in the globally renowned databases of scientific information Scopus and Web of Science 36 times, and in non-referenced journals with scientific reviews 13 times. The candidate is a member of the Scientific-Technical Union - Bulgaria and of NACEE - Network of Aquaculture Centers in Central-Eastern Europe.

6. Significance of the contributions to science and practice. A reasoned answer to the question of how well the candidate has a clearly defined profile of research work;

I. ORIGINAL CONTRIBUTIONS

Studies of sturgeon fish cultivated under super-intensive industrial net cages technologies.

As a result of the research, dependencies have been established essential for global cultivation of sturgeon species and hybrids, and original data have been obtained, particularly related to the technological quality of the meat; dynamics of gonad development in male and female individuals; peculiarities of morphometric indicators in male and female individuals; sperm characteristics. It was found that during the growing season, the studied sturgeon hybrids and 7-year-old Russian sturgeons increase all studied measurements of the gonads, while in 5-year-old sturgeons the height and area increase, but the circumference remains unchanged. A tendency for compensatory development of the gonads was also observed in hybrids – in the spring they are less developed than in Russian sturgeons, but in the winter they are better developed. It was established that under the conditions of an industrial net cage farming, male hybrids do not lag behind the Russian sturgeon in their sexual development. It was proven that age does not have a significant effect on the volume of the ejaculate and the sperm

concentration in the hybrid (F1 *Acipenser baerii* x *Acipenser gueldenstaedtii*). In fish from the oldest age group, the indicators related to and characterizing the mobility of spermatozoa, the levels of AR and GGT in the aqueous extract are significantly higher. When comparing seven-, eight-, and nine-year-old Russian sturgeons raised in net cages, it was found that sperm mobility is highest in 9-year-old fish, while the worst indicators, characterizing sperm movement and enzyme levels, are in 8-year-old fish.

Integrated breeding of fish and ducks – an innovative approach to increasing the eco-friendliness and bio-compatibility of carp farming.

For the first time in Bulgaria, at the Institute of Fisheries and Aquaculture-Plovdiv, a comprehensive scientific study was conducted on integrated fish and duck farming in carp ponds. The possibilities of using Peking ducks, moulards, and the "Star 53" hybrid for the needs of integrated breeding were explored. It was found:

- that the influence of ducks on the growth of one-year-old carp is closely related to the area of the fish ponds;
- that integration creates favorable conditions leading to a reduction in competition between grass carp and carp in polyculture, which positively affects the growth of both species;
- the influence of integrated breeding of fish and ducks on the biogenic elements in fish ponds.

Original data were obtained on the relationship between the carrying capacity and the weight of the eggs of Peking ducks from a local population, raised under eco-friendly and bio-compatible integrated with fish technology.

Innovative approaches in determining the genetic variability in local, geographically distant natural fish populations.

A significant scientific contribution is the discovery of new haplotypes in haplotype group A in geographically distant natural fish populations. They differ by single substitutions from the main A and A2 haplotypes: three new haplotypes were discovered in fish from the Caspian Sea and one in the sample from the Syr Darya river. Another previously undescribed haplotype was found in an individual from the Don river and in all examined individuals from the Belomorsky basin (Bulgaria). This haplotype is transitional between haplogroups A and B.

Innovative approaches to processing fish into healthy quality products.

The effect of including a dry distilled extract from rose petals (*Rosa damascene* Mill.) (DDRPE) in an edible alginate coating on paddlefish (*Polyodon spathula*) meat has been clarified. Through studying the changes in pH, acid value, peroxide value, TBARS, color characteristics, and microbial changes in the fish, it was determined that using an alginate coating with a 2% DDRPE solution preserves the freshness of the paddlefish meat for up to 7 days at 0 - 4°C.

II. METHODOLOGICAL CONTRIBUTIONS

Innovative approaches to feeding cultured fish.

The development of this studies relates to the task of reducing the use of fishmeal in aquaculture. The focus is on using locally available plant feeds with a high protein content. Comparative studies have yielded original data on the use of protein feeds prevalent in Bulgaria for feeding carp.

III. APPLIED CONTRIBUTIONS

Exploration of the possibilities for the application of eco-friendly and bio-sustainable technologies in polyculture and monoculture fish farming, opportunities for the introduction of organic production.

Original data of both scientific and applied nature have been obtained regarding the growth of individual species forming the polyculture, the influence of individual factors of the aquatic ecosystem on fish productivity, and clarifying several issues related to the complex interaction of these factors among themselves in warm-water basins in Bulgaria. There's also information related to cultivating and breeding main carp species in warm waters in Kazakhstan. For the first time in Bulgaria, original data have been gathered on the level of overall and individual species' natural fish productivity when raising carp in indigenous polyculture. Original data on the dynamics of the development of bacterioplankton in fish farms using carp polyculture have also been obtained. Through the first-ever application in Bulgaria of the concept of functional groups, seasonal changes in dominant algae in carp basins have been identified. The possibilities to enhance the productivity of freshwater fish farming in lakes and reservoirs in Kazakhstan's interior have been clarified by establishing highly efficient fish farms.

Strategic planning in Bulgarian aquaculture.

An in-depth scientific analysis of the state of aquaculture in Bulgaria has been carried out, including the processing and marketing of products, by a collective of academics and practitioners in our country. A strategy for the development of the sector has been devised, with detailed approaches to address the set tasks.

Diversification of species in Bulgarian aquaculture.

Studies are focused on species that are prospective for aquaculture - zander and paddlefish. Both species are suitable for the application of innovative approaches in forming polyculture. The genetic variability of local, geographically distant natural populations of zander has been identified. For the paddlefish, the potential use of edible coatings has been explored, which are employed to reduce moisture loss and inhibit oxidative processes in muscle tissue, and in combination with antioxidants - to extend the shelf life of the meat.

7. Critical Notes and Recommendations

Regarding the nature of the competition, I have no critical remarks about the candidate. I only have one recommendation - I would like to advise Assoc. Prof. Nikolova that when publishing her future scientific works, they should be addressed to journals that are referenced and indexed in the global Web of Science database, rather than so much in Scopus, as the former is more valued of the two scientific databases, including by accreditation committees.

8. Personal Impressions and Reviewer's Opinion

Assoc. Prof. Dr. Lyudmila Nikolova is a highly erudite teacher and scientist in the field of Fisheries and Aquaculture at the Agricultural University of Plovdiv. She is very responsive and, with her vast experience and knowledge, greatly assists young specialists in the specialty.

CONCLUSION

Based on the analysis of the pedagogical, scientific, and applied scientific activities of the candidate, I believe that Lyudmila Nikolaevna Nikolova meets the requirements of the [Law on the Development of the Academic Staff of the Republic of Bulgaria, Regulations for the Implementation of the Law on the Development of the Academic Staff in the Republic of Bulgaria, and the Regulation of the Agricultural University for its application]. In this competition, Lyudmila Nikolova participates with sufficient volume and experimental depth of scientific papers. Her teaching skills are of exceptionally high caliber.

All of this gives me reason to assess her overall activity POSITIVELY. I take the liberty to suggest to the esteemed Scientific Jury to also vote positively, and the Faculty Council of the Faculty of Agriculture at the Agricultural University - Plovdiv to elect Lyudmila Nikolaevna Nikolova as "Professor" in the scientific specialty of Aquaculture, Pisciculture, Fish Farming, and Industrial Fishing.

13.10.2023

Plovdiv

Reviewer:.....



(Prof. Ivaylo Sirakov, PhD)