R E V I E W

of the materials submitted by **Senior Assistant Professor Penka Lazarova Vasileva, PhD** for the academic position of **"Associate Professor"** at University of Plovdiv "Paisii Hilendarski" in the field of higher education **4.** Natural Sciences, Mathematics and Informatics; professional field **4.3.** Biological Sciences; scientific specialty "Genetics - General and Evolutionary Genetics"

Member of the scientific jury: Prof. Dr. Sci. Diana Lilova Svetleva, retired from the Department of Genetics and Breeding at the Agricultural University - Plovdiv, habilitated in the scientific specialty "Genetics"; appointed by Order RD-22-442/18.02.2025 of the Rector of Plovdiv University "Paisiy Hilendarski" based on a decision of the Faculty of Biology with protocol № 303/21.01.2025.

In the competition for "Associate professor", announced in the State Gazette, issue 98 of 19.11.2024 and on the website of the Plovdiv University "Paisii Hilendarski" for needs of the Department of "Developmental Biology" at the Faculty of Biology, only candidate is **Senior Assistant Professor Penka Lazarova Vasileva, PhD**.

1. General presentation of the received materials.

Subject:

By order No. RD-22-442/18.02.2025 of the Rector of Plovdiv University "Paisii Hilendarski" (PU), I am appointed as a member of the scientific jury of a competition for the academic position of "Associate professor" in the field of higher education 4. Natural Sciences, Mathematics and Informatics, professional field 4.3. Biological Sciences, scientific specialty "Genetics - General and Evolutionary Genetics" announced for the needs of the Department “Developmental Biology” at the Faculty of Biology.

Only one candidate to participate in the announced competition was **Senior Assistant Professor Penka Lazarova Vasileva, PhD** from the Department “Developmental Biology” at the Faculty of Biology in Plovdiv University "Paisii Hilendarski".

Set of materials submitted by the candidate on paper and electronic variants is in accordance with Regulations for Development of Academic Staff in Plovdiv University (PU) and includes following documents:

- Application form to the Rector for admission to participate in competition;
- CV in European format;
- Diploma of higher education Educational and qualification level "Master";
- Diploma of Educational and Scientific Degree "Doctor of Philosophy, PhD";
- List of scientific works and citations;
- Certificate of compliance with the minimum national and additional faculty requirements;
- Annotation of materials under Art. 65 of Regulations on the law for development of academic staff at the University of Plovdiv and self-assessment of contributions;
- Declaration of originality and authenticity of the attached documents;
- Certificate of work experience;
- Documents for academic activity;

- Documents for scientific research work;
- Documents according to the requirements of respective faculty;
- Set of documents from item 1 to item 14 on paper – 2 pieces;
- Set of documents from item 1 to item 14 on electronic media – 2 pieces.

Documents submitted by Senior Assistant Professor Penka Vasileva PhD are in accordance with developed rules for academic growth of lecturers at Plovdiv University "Paisii Hilendarski". They are complete, very clearly arranged and supported by the necessary evidentiary materials.

2. Brief biographical data of the candidate.

Senior Assistant Professor Penka Lazarova Vasileva, PhD was born on 02.01.1972 in Plovdiv.

She completed her secondary education in 1991 at the National Commercial High School, Plovdiv, with a degree in "Agricultural Economics" and completed her higher education with a master's degree in 1996 at the Plovdiv University "Paisiy Hilendarski". She obtained the qualification "Biologist" and has specializations in "Pedagogy" and "Teacher on Biology ".

During the period 1999 – 2003 she was a full-time doctoral student at the Institute of Fisheries and Aquaculture, Plovdiv. She defended her doctoral thesis in 2007 on the topic: "Research on some reproductive and morphological characteristics of the lake crayfish *Astacus leptodactylus* Eschscholz, 1823 as an object of aquaculture" at the Specialized Scientific Council on "Animal Husbandry" at the Higher Attestation Commission and acquired Educational and Scientific Degree "Doctor of Philosophy, PhD" in the scientific specialty 04.02.12. "Fish farming, fish farming and industrial fishing".

For eight years (2002-2010) she worked as a research assistant (III-I degree) at the Institute of Fisheries and Aquaculture, Plovdiv.

From 01.04. to 23.12.2010 she was appointed to the position of "Biologist - Chief Expert" in the Department of “Developmental Biology” in Faculty of Biology at the Plovdiv University "Paisii Hilendarski". After successfully conducted competitions, PhD Vasileva was selected as an "Assistant" (23.12.2010) and "Chief Assistant" (01.06.2011 - until the present) in the same department.

Chief Assistant Vasileva possesses: good communication skills for teamwork, responsibility and ethics towards colleagues and students, as well as correct execution of the assigned tasks. She has very good computer literacy and skills in presenting scientific facts in her research and teaching activities.

Speaks English and Russian at a very good level.

3. General characteristics of the candidate's activities.

3.1. Coverage by the candidate of the national minimum required points by groups of indicators for acquiring the academic position of "associate professor" in the professional field 4.3. Biological Sciences.

Scientific activities presented by Senior Assistant Professor Vasileva fully comply with the minimum national requirements for the professional field 4.3. Biological Sciences. The total number of points collected from the candidate is 519, compared to 400 required. Additionally, 160 points were collected from group E, which is not mandatory for acquiring the academic position of "Associate Professor".

Performance of the groups and indicators is as follows:

In group A, indicator 1 (required minimum 50 points) - the candidate collected 50 points.

After defending a doctoral thesis and receiving a diploma for acquired Educational and Scientific Degree "Doctor of Philosophy, PhD" in the scientific specialty 04.02.12. "Fish Farming, Fishery and Industrial Fishing".

In group B, indicator 3 (required minimum 100 points) - the candidate collected 100 points.

Candidate has presented a monograph - Vasileva, P., 2025. ***Genetics for the benefit of informed nutrition***, Rakursi Publishing House OOD, ISBN 978-619-7599-29-9, p. 135.

For group G, indicators 7 and 8 (requiring a minimum of 200 points) – the candidate collected 235 points.

In group D, indicator 11 (minimum 50 points required) – the candidate collected 134 points.

Includes 67 citations in scientific publications, some of them referenced and indexed in world-renowned databases of scientific information (Web of Science and Scopus).

In group E, the 160 points collected by indicators are as follows:

- **Indicator 14** (Participation in a national scientific or educational project) – **the candidate collected 130 points.**

- **Indicator 16** (Management of a national scientific or educational project) – **the candidate collected 20 points.**

- **Indicator 19** (***1*** published university manual) – **the candidate collected 8 points.**

- **Indicator 20** (***1*** published university textbook) – **the candidate collected 2 points**.

3.2. Fulfillment of the additional criteria represent from the Faculty of Biology in Plovdiv University "Paisii Hilendarski".

1. Candidate must be the author or co-author of at least two textbooks in the relevant field and specialty of the announced competition:

Senior Asst. Prof. Penka Vasileva is a co-author of one manual, one book (used as a textbook) and 2 electronic courses, which fully cover this indicator:

2. Candidate to have supervised at least 5 (five) successfully defended graduates in the relevant field of the competition.

Candidate in the competition presented a list of nine successfully defended graduates.

3. Candidate must present a document for at least 5 years of teaching experience.

A certificate with issue № RD-38-36/31.01.2025 has been submitted, which states that the Senior Assistant Vasileva has a total work experience of 22 years 05 months and 23 days by the specified date, of which 14 years 00 months and 21 days is pedagogical. She has held the academic position of "Senior Assistant" for 13 years. She has also acquired Educational and Scientific Degree "Doctor of Philosophy, PhD" before 13 years.

4. Candidate must have participated in at least 2 (two) scientific projects.

Senior Asst. Penka Vasileva has submitted a list of her participation in 14 projects. For 10 of them she has submitted Official Notes. One is with outgoing № 036 dated 04.02.2025, which lists a list of 6 projects, one of which she is the leader, and in the others she is a participant. The other Official Note, with outgoing № 15 dated 04.02.2025, certifies the candidate's participation in 4 more projects.

5. Candidate should have administrative experience (for the last 5 years) in at least one of the activities listed below:

- Participation in preparation and accreditation procedures;

- Participation in activities to ensure the quality of education;

- Participation in the preparation of a candidate student campaign;

- Participation in administrative activities, such as an attestation committee, an ethics committee, etc.;

- *Other activities.*

Senior Assistant Professor Vasileva is a member of the organizing committee for the BalkanBio 2025 conference and the technical board of Journal “BioScience and Biotechnology”.

She is a member of Commission for Accreditation of professional field 4.3 Biological Sciences and Quality Commission for ensuring better quality in the training of students in the Faculty of Biology at the Plovdiv University “Paisiy Hilendarski”. In 2024, she was determined as a coordinator of the specialty “Biology” for students studying for Bachelor's degree. She participated in candidate student campaigns as a curator and as an examiner of the written exam on “Biology” for the candidate students.

For five years (2018, 2019, 2023, 2024 and 2025) she was a member of the Commission for preparation of a Biology competition ("Journey into Biology") for scholars in 10 to12 classes.

She is the materially responsible person of Department “Developmental Biology”.

3.3. Evaluation of educational and pedagogical activity and preparation of candidate (study materials, lecture courses, work with students and graduates).

Teaching activity of Senior Assistant Professor Penka Vasileva includes a rich palette of 10 lecture courses for different specialties. They are as follows:

For Bachelor's programs:

- Bases of Genetics - for specialty of “Special Pedagogy”;
- General Genetics - for specialty of “Biology” - part-time study;
- Genetics - for the specialty “Pharmaceutical Biotechnology”;
- Theory of Evolution - for specialties: “Biology” (full-time and part-time), “Ecology and Environmental Protection” (full-time and part-time), “Biology and Chemistry”, “Biology and English”, “Biology with Ecotourism” (for Smolyan Branch), “Biology and English” (for Smolyan Branch).
- Cell Biology (for Smolyan Branch) and Genetics exercises at the "Lyuben Karavelov" branch in Kardzhali.

For Master's programs:

- Modern aspects of genetics in breeding investigations;
- Fundaments of classical genetics - basic seminars;
- Practicum on methods for reporting cytotoxicity and mutagenicity.

For the specialized course "Motivated Teachers"

- Genetics;
- Biological Evolution.

Over the past five years (2020-2025), total pedagogical workload of Senior Assistant Professor Penka Vasileva is 2842 hours. This includes 240 hours for assigning and controlling independent student work, as well as 40 hours for supervising graduates. Average annual workload of candidate is 568 hours (varies from 383 to 601 hours). Workload for 2025 is as planned, because the academic year has not ended.

One textbook has been published in co-authorship (Staykova T., Ivanova E., Popova T., Stoyanov I. **Vasileva P.** 2021. Textbook of Population Genetics. University Publishing House "Paisiy Hilendarski", 190 p. ISBN 978-619-202-687-5).

Candidate in the competition has developed the section "Genetic variability in populations by morphological and physiological traits" (from 130 to 141 pages). It examines issues concerning genetic variability in populations by morphological and physiological traits; methods for accounting of mutations

affecting viability of organisms; accumulation of mutations in populations that affect expression of certain physiological traits; induction of synthetic lethals and expression of cumulative (additive) and epistatic interactions. Concept of compensatory gene complexes is also considered. Section is illustrated with 3 figures. It is written in a clear scientific style.

Senior Assistant Professor Penka Vasileva is also a co-author of published book, which is used as a teaching aid in the training of students (Ivanova E.N., Staykova T., Andreenko E., **Vasileva P.**, Mitkovska V., Stoyanov I., Dzhoglov S., Doncheva V., Panayotova G., Tsvetkova I. 2011. Genetic foundations of behavior. University Publishing House "Paisii Hilendarski", 239 p. ISBN 978-954-423-718-9). She developed subsection "III.3. Reactions, stimuli, types of behavior" (from 73 to 82 page), which includes one figure. Section is described very fully and in a way that is understandable for students.

Textbook and teaching aid are intended for students of various biological specialties of the Plovdiv University “Paisii Hilendarski”. They are tailored to the students’ curriculum and the number of teaching hours, but can also be used by students of various biological fields and related specialties from other higher education institutions.

Candidate in the competition has also developed two electronic courses in the disciplines - "Modern aspects of genetics in breeding investigations" for master's program "Genetics" (https://e-learning.uni-plovdiv.bg/enrol/index.php?id=135) and "Fundaments of Genetics" for bachelor's program "Special Pedagogy" (https://e-learning.uni-plovdiv.bg/enrol/index.php?id=110)

Electronic course on the subject - "Modern aspects of genetics in breeding investigations" has been developed for 20 hours of lectures. It examines main issues related to breeding in plants (14 topics have been developed as text files) and animals (includes 4 topics as text files). Files are 2 to 5 pages long. Electronic course includes a total of 18 topics (text files) and a very detailed presentation of 83 slides, which are illustrated with 2 tables, 9 diagrams, 11 photos and 1 wonderful collage of photos of tomatoes. It is a good impression that issue of applying *in vitro* technologies to plants as an auxiliary method in their breeding is included. In the future, it would be good to include the applied *in vitro* methods in animals, as well as the molecular research methods used.

Electronic course on the subject "Fundaments of Genetics" for the bachelor's program "Special Pedagogy" is designed for 30 hours of lectures. It includes 18 very good presentations, which are very well illustrated with appropriate tables, diagrams and photos.

3.4. Evaluation of the candidate's scientific, scientific-applied activity and citations.

Senior Assistant Professor Penka Vasileva has a very active and diverse activity both in scientific research and in education of students.

She has attached a list of a total 49 scientific papers. Of these, 9 are in connection with acquisition of the Educational and Scientific Degree "Doctor of Philosophy, PhD", and 14 are in connection with the competition for the academic position "Senior Assistant".

In connection with this competition, number of submitted scientific papers is 20, which are printed and subject to review.

Of the 17 submitted articles, one is in the Q1 category, six - in Q3 and ten - in Q4, twelve of which have a total impact factor (IF) of 7.686, and 10 of these articles have a total Scientific Journal Ranking (SJR) of 2.651. Three articles have only SJR (total 0.434). Two articles have 0.1 Journal Scimago Index (JSI). Total Impact Rank SJR of all articles is 3.085.

Seventeen of the candidate's scientific works are published in English, and remaining 3 - in Bulgarian.

By the number of co-authors, distribution of scientific works is as follows: independent - 1 monograph (5.00%); with four co-authors - 3 (15.00%); with five co-authors - 4 (20.00%); with six or more co-authors - 12 (60.00%).

Scopus database includes 18 publications, with h-index of the candidate in competition being 5.

Senior Assistant Professor Vasileva has participated in 53 scientific forums, with 16 reports, 17 posters and 20 attendances.

Twenty-one of Assoc. Prof. Vasileva's articles have been cited 67 times. Nineteen citations by Bulgarian authors have been noted, and remaining 48 are marked by foreign authors. All citations have been found in foreign issues most of which are prestigious and publications are written in English.

Publication: Stefanova, E., Uzunova, E., Hubenova, T., **Vasileva, P.**, Terziyski, D., Iliev, I. 2008. Age and growth of the chub, *Leuciscus cephalus* l. from the Maritza river (South Bulgaria). Bulgarian Journal of Agricultural Science, 14 (2), pp. 214-220. Q3; IF – 0.058 is the most cited (7 times). It is included in the list of publications for participation in competition for the academic position of "Chief Assistant".

There are no documents submitted on the economic effect obtained from scientific products of the candidate in competition.

Scientific monograph submitted for review ("***Genetics for the benefit of informed nutrition***") is written on 135 pages. It includes 46 color photographs of very good quality, 14 tables and an appendix with 5 certificates for analyses performed by the laboratory of company "Trimart Industries Ltd." with address: Western District, 1 "Filip Totyu" Str., 5000 Veliko Tarnovo.

Cited literature includes 210 titles and four Internet sources. Only 4 of the titles are by Bulgarian authors and 2 are in Cyrillic. This shows that the monograph examines issues and problems that are not very familiar to the Bulgarian scientific community.

Monograph examines an important problem related to the effect of food additives on dividing cells of model genetic object onion (*Allium cepa* L.), which is used as a plant test system *in vivo*. Effect of different concentrations of selected dyes (tartrazine, sunset yellow and carmoisine), preservative sodium benzoate and sweetener aspartame was studied. This study was conducted in Bulgaria for the first time. Experimental results and comparative analysis leads to the conclusion that studied additives used in the production of food products have a toxic effect on cells of onion (*Allium cepa* L.) root meristem. It is expressed as suppression of growth of root system and a negative impact on cell proliferation, as well as manifestation of a specific genotoxic effect.

Results of research activity presented in the monograph are part of a student project *SP 19 BF-011: "Transfer of knowledge along the "science - practice" axis through the development and promotion of model cases in genetics*", headed by Senior Assistant Professor Penka Vasileva, funded by the Scientific Research Fund of Plovdiv University "Paisiy Hilendarski", in which three students actively participate.

Senior Assistant Vasileva has participated in the development of three technologies for application in aquaculture.

3.5. Contributions (scientific, scienific applied and applied).

Senior Assistant Professor Penka Vasileva conducts her research activities on various biological objects - plants [pepper (*Capsicum annuum* L.), onion (*Allium cepa* L.)], animals - common honey bee (*Apis mellifera*), carp (*Cyprinus carpio* Linnaeus, 1785), lake crayfish (*Astacus leptodactylus* Eschscholtz, 1823 (*Crustacea:* Decapoda); mulberry silkworm (*Bombyx mori*), termites [*Reticulitermes lucifugus* (Rossi, 1792) (Isoptera: *Rhinotermitidae*)]; ants of species *Messor barbarus* (Linnaeus, 1767) and *Messor structor,* (*Hymenoptera, Formicidae*), as well as in humans.

Studies were conducted in the following areas:

- ❖ Mutagenicity and cytotoxicity of xenobiotics in model test systems;
- ❖ Intrapopulation variability during ontogenesis;
- ❖ Interpopulation variability;
- ❖ Human reproductive health – genetic and environmental components;

Contributions resulting from conducted research can be attributed to the following categories:

ORIGINAL CONTRIBUTIONS

For the first time in Bulgaria, *in situ* sperm analysis was applied, which is a reliable method for assessing genotoxicity of environmental factors and pesticides used in *Apis mellifera* (**Publications G1 and G2**).

Using seven isoenzyme systems in a total of 49 populations of ants from species *Messor barbarus* L. and *Messor structor* Latreille, their genetic heterogeneity was studied. Studies provide new information on polymorphism and phylogeny of ants from genus *Messor* in Bulgaria (**Publications G11, G13, G15 and G17**).

SCIENTIFIC CONTRIBUTIONS

Potential mutagenic and cytotoxic effect of beekeeping acaricide Coumaphos has been proven, which, at concentration recommended for practice, blocks germination of onion seeds (*Allium cepa* L.). Acaricide has a pronounced mutagenic effect, expressed in occurrence of chromosomal aberrations (**Publication G3**).

Oxalic acid has been shown to have a weak cytotoxic effect and no genotoxicity on *Allium cepa* plant test system. This allows its use as an alternative method against varroa in conventional and organic beekeeping (**Publication G3**).

Cytogenetic effect of pesticides - Nuprid SL and Calypso 480 SC on root meristem of onion (*Allium cepa* L.) was studied. Inhibition of cell division was found, which proves cytotoxic effect of their active substances imidacloprid and thiacloprid (**Publication G4**).

Mutagenic effect of pesticides Nuprid, Calypso, Chlorpyrifos, Aktara, Actellic, Rival, Verita and Roundup on root meristem cells of onion (*Allium cepa* L.) and pepper (*Capsicum annuum* L.) was studied. A significantly high frequency of chromosomal aberrations was demonstrated and a positive correlation was established between concentrations of studied pesticides and frequency of chromosomal disorders (**Publications G5 and G8**).

In vivo cytotoxic and genotoxic effects of lead and cadmium have been established in root meristem of onion (*Allium cepa* L.). It has been shown that lead has a greater cytotoxic effect than cadmium, expressed in a stronger inhibition of cell division, while cadmium has a stronger genotoxic effect, causing chromosomal aberrations with a higher frequency (**Publication G14**).

It has been proven that anthropogenic pollution of water used for irrigation of agricultural areas has a mitoinhibitory and clastogenic effect (**Publication G9**).

The cytogenetic effect of the pesticides - Nuprid SL and Calypso 480 SC on the root meristem of onion (*Allium cepa* L.) was studied. Inhibition of cell division was found, which proves the cytotoxic effect of their active substances imidacloprid and thiacloprid (**Publication G4**).

When using plant and animal test systems *in vitro*, mutagenic and cytotoxic effect has been proven of: food additives tartrazine, sunset yellow, carmoisine, monosodium glutamate and aspartame; bee acaricide Coumaphos; pesticides Nuprid, Calypso, Chlorpyrifos, Aktara, Actellic, Rival, Verita and Roundup; heavy metals lead and cadmium and some organic pollutants (**Publications G5 and G8**).

- During ontogenesis of *Astacus leptodactylus* and *Reticulitermes lucifugus*, have been identified intrapopulation differences in the exterior, demonstrating sexual dimorphism and gene expression of soluble protein and isoenzyme loci (**Publication G16**).
- Using isoenzyme markers in mulberry silkworm (*Bombyx mori* L.), genetic variations within the studied breeds and between breeds with different geographical origins have been identified (**Publications G11 and G13**).
- It has been proven that genomic and chromosomal mutations in combination with harmful environmental and lifestyle factors in men are the cause of infertility-related diagnoses (**Publication G10**).

METHODOLOGICAL CONTRIBUTIONS

- Using isoenzyme markers non-specific esterases (EST), malate dehydrogenase (MDH) and acid phosphatase (ACP) from hemolymph, phosphoglucomutase (PGM) and hexokinase (HK) from silk glands and alkaline phosphatase (ALP) from midgut of mulberry silkworm (*Bombyx mori* L.) have been found to exhibit genetic variation within the studied breeds and between breeds of different geographical origins (**Publications G11 and G13**).
- Acridine orange fluorescence test can be used to establish a link between medical diagnoses of male infertility and conventional sperm analysis. This test allows for assessment of sperm quality, infertility diagnoses, and the number of sperm with DNA damage in their nuclei (**Publication G7**).

SCIENTIFIC AND APPLIED CONTRIBUTIONS

- Results obtained from the analysis of various environmental factors that negatively affect structure and function of sperm can be used to develop a system of activities for prevention of male reproductive health and determine the potential risks of its deterioration (**Publications G6, G7 and G10**).

4. Critical remarks and recommendations.

I have no critical remarks about the candidate's works. My only recommendation is that in the future she should focus on reducing the number of objects in her research. In this way she will be able to obtain more complete information about them.

5. Personal impressions

I do not personally know Senior Assistant Professor Penka Vasileva, but from the scientific production and presented documentation, I believe that she is a very responsible and executive colleague.

CONCLUSION

Documents and materials presented by *Senior Assistant Professor Penka Vasileva PhD* meet all requirements of the Act on Development of Academic Staff in Republic of Bulgaria (ADASRB), Regulations for Implementation of the ADSRB and Regulations of Plovdiv University “Paisii Hilendarski”.

Candidate in the competition has presented **20** scientific papers, published after materials used in the defense of Educational and Scientific Degree "Doctor of Philosophy, PhD" and holding academic position of "Chief assistant". Her works contain original, scientific, methodological and applied contributions, which have received international recognition through the total of **67** citations found, 48 of which are from foreign authors. Some of scientific works have been published in journals and scientific collections published by international academic publishers with a total Impact Factor according to Thomson Reuters - 7.686, and others have a total Impact Rank SJR = 3.085.

Scientific and teaching qualifications of *Senior Assoc. Prof. Penka Lazarova Vasileva, PhD* **are undoubted**.

Results achieved by her in educational and scientific research activities **fully comply** with the minimum national and additional requirements of the Faculty of Biology, accepted in connection with Regulations of the Plovdiv University for implementation of the Law on Development of Academic Staff in Republic of Bulgaria.

After familiarization with materials and scientific works presented in the competition, analysis of their significance and original, scientific and applied contributions contained in them, I find it reasonable to give my **POSITIVE** assessment and to recommend to the Chairman and members of the Scientific Jury to prepare a report-proposal to Faculty Council of the Faculty of Biology for election of **Senior Assistant Professor Penka Lazarova Vasileva, PhD** to the academic position of "**ASSOCIATE PROFESSOR**" at Plovdiv University "Paisiy Hilendarski" in the field of higher education **4.** Natural Sciences, Mathematics and Informatics; professional field **4.3.** Biological Sciences; scientific specialty "**Genetics - General and Evolutionary Genetics**".

Date: 13.03.2025 **PREPARED THE REVIEW**: …….

City of Plovdiv (Prof. Dr. Sci. D. Svetleva)