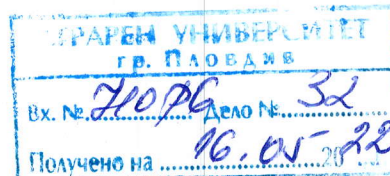


## REVIEW



for the competition procedure for occupation of the academic position "PROFESSOR" in the scientific specialty "Selection and Seed Production of Cultivated Plants (Plant Biotechnology)", announced in State Gazette, issue 7 of January 25, 2022, with candidate Assoc. Prof. Svetla Dimitrova Yancheva, PhD

by Prof. Venelin Roychev Roychev, DSc., appointed with Order № RD–16-368/28.03.2022 of the Rector of the Agricultural University – Plovdiv as a member of the scientific jury

**Reviewer:** Prof. Venelin Roychev Roychev, DSc., Agricultural University – Plovdiv, 6. Agricultural Sciences and Veterinary Medicine; 6.1 Horticulture; Viticulture, appointed as a member of the scientific jury with Order № RD–16-368/28.03.2022 of the Rector of the Agricultural University – Plovdiv.

There is one candidate participating in the competition procedure for occupation of the academic position "Professor" at the Department of Viticulture and Fruit Growing at the Agricultural University – Plovdiv. The documents for the competition have been prepared in accordance with the requirements of the Act on Development of the Academic Staff in the Republic of Bulgaria and the Regulations on its implementation at the Agricultural University – Plovdiv.

### 1. General information on the candidate's career and thematic development.

Assoc. Prof. Svetla Yancheva, PhD was born on June 15, 1962 in Sofia. She studied and graduated from the Higher Agricultural Institute "V. Kolarov", Plovdiv during the period 1984–1989, specialty Agronomy – Field Farming, engineer-agronomist, Specialization Plant Biotechnology, Master's degree; from 1991 to 1994 she was a full-time doctoral student at the Institute of Genetic Engineering, Kostinbrod; from 1995 to 1998 – an agronomist at the Plant Biotechnology Laboratory at the Department of Genetics and Selection at the Agricultural University – Plovdiv and head of the same department from 2006 to 2016; she occupied the scientific and teaching positions of Junior Research Associate I and II degree, Chief Assistant Professor and Associate Professor at the Department of Genetics and Selection at the Agricultural University – Plovdiv from 2000 to 2006, and 2008, and 2020 respectively; Associate Professor at the Department of Viticulture and Fruit-Growing after 2020. She defended a dissertation on the topic "In vitro regeneration and genetic transformation in the selection of plums (*Prunus domestica* L.)" in 1997 and was awarded the educational and scientific PhD degree. Her administrative duties are very responsible: from 2012 to 2016 she was the Chairperson of the General Assembly of the Agricultural University – Plovdiv; since 2016 onwards she has been the Vice-Rector of the Agricultural University – Plovdiv for International Affairs and Public and Business Relations. Her public commitments include participation in local government, as in 2007–2011–2015 she served two terms as a municipal councillor at the Maritza Municipality, and in 2017 she was Deputy Minister at the Ministry of Agriculture and Food.

### 2. General description of the presented materials.

Assoc. Prof. Svetla Yancheva, PhD has presented proven, correct and objective information on the scientometric indicators according to the minimum national requirements provided for in the Regulations on the Implementation of the Act on Development of the Academic Staff in the Republic of Bulgaria – number of points for occupation of the academic position "Professor", summarized below:

– **Indicator A** – minimum requirements – 50 points – presented materials for 50 points;

- **Indicator C** – minimum requirements – 100 points – presented materials for 116,74 points;
- **Indicator D** – minimum requirements – 200 points – presented materials for 220,76 points;
- **Indicator E** – minimum requirements – 100 points – presented materials for 360 points;
- **Indicator F** – minimum requirements – 100 points – presented materials for 686,67 points.

**TOTAL: 1 434,17 points**

This data shows that the scientific works of Assoc. Prof. Svetla Yancheva, PhD fully cover the national minimum scientometric requirements for occupation of the academic position “Professor”.

Assoc. Prof. Svetla Yancheva, PhD participates in the competition for “Professor” with a total of 81 scientific works in the nomenclature specialty, grouped as follows:

- Publications related to the PhD dissertation (30 points according to the scientometric indicators) and the academic position “Associate Professor” (458 points according to the scientometric indicators) – 42, which are not subject to review;
- Scientific publications with which the candidate participates in the announced competition – **39**. These publications are subject to analysis in the current review;
  - Scientific articles – 33;
  - Scientific publications in journals referenced and indexed in globally acknowledged databases with scientific information Scopus or Web of Science – 25 (64%);
  - Publications with impact factor (IF) – 10, with total **IF** – 5,421 and **Q / SJR** – 2,158. The publications are in the journals: Propagation of Ornamental Plants – 1, Bulgarian Journal of Agricultural Science – 6, Emirates Journal of Food and Agriculture – 1, Comptes Rendus de L'Academie Bulgare des Sciences – 1, Acta Physica Polonica A – 1. The articles with impact rank are published in Journal of Central European Agriculture – 3, with **Q / SJR** – 0,617;
  - Publications in journals with impact rank (SJR) – 13;
  - Publications in peer-reviewed and referenced scientific journals – 9;
  - Publications in conference proceedings – 7;
  - Studia article – 1;
  - Chapters of collective monographs – 2;
  - Book based on a defended dissertation for the awarding of the educational and scientific PhD degree – 1;
  - Students' textbooks – 2;
  - Books outside the nomenclature specialty – 3.

The individual participation of Assoc. Prof. Svetla Yancheva, PhD in the above-mentioned 39 works is illustrated by the fact that in 13 of them (33.3%) she is the first author, in 8 (20.5%) – the second, in 8 (20.5%) – the third, and in 10 (25.7%) – the fourth and next author. From the 36 publications and scientific works directly related to the competition, 32 are published in English and 4 – in Bulgarian.

The presented Extended Habilitation Reference contains all the elements described in the Regulations on the Implementation of the Act on Development of the Academic Staff in the Republic of Bulgaria. The main purpose of the presented summarized content of 32 scientific articles is related to the development and optimization of various biotechnological methods (micropropagation, regeneration systems through somatic embryogenesis and organogenesis, callus and cellular cultures), application of molecular marker-assisted selection in various plant species – raspberries, wild Bulgarian berry species, Tayberry – a blackberry-raspberry hybrid (RUBUS FRUTICOSUS X IDAEUS), high-stemmed blueberries, vine varieties and rootstocks, Paulownia, Fabiana (Fabiana imbricata Ruiz et Pav.); *in vitro* test for determination of the selectivity of soil herbicides in five new maize and pepper hybrids; absorption of chromium by micro algae; salt resistance experiments in millet; application of physical and chemical mutagens in pepper selection programs; determination of the main carotenoids (lycopene and  $\beta$ -

carotene) in local samples and mutant forms of tomatoes, etc. I definitely believe that Assoc. Prof. Svetla Yancheva, PhD has been one of the best experts for many years in the field of utilization of biotechnological methods in vine selection. All obtained results have been analysed objectively also in terms of their practical significance. The great diversity of plant species and experimental methodologies encompassed by Assoc. Prof. Svetla Yancheva, PhD, present her as a widely informed and erudite researcher in the field of application of biotechnology in horticulture.

### **3. Main directions in the research work of the candidate. Demonstrated competences or talents for scientific research management (project management, obtained external funding, etc.).**

During her studies at the Higher Agricultural Institute, the candidate focused her efforts on researching the methods of contemporary biotechnological science. Therefore, later in time, the main directions in her scientific work are: application of biotechnological approaches in plant selection – tissue and cellular cultivation *in vitro*; development and optimization of regeneration systems (embryo, callus, cellular and protoplast cultures); genetic transformation; GMOs and biosafety; use of molecular markers in selection; plant genetic resources. The successful mastery and application of all these methods require a lot of time, intellectual effort, precision, patience, knowledge of foreign languages (English and Russian – at an excellent level), computer literacy, skills and sense to experiment, improvise, analyse, knowledge of the biological characteristics of different plant species, varieties, clones, biotypes, and talent, which Assoc. Prof. Svetla Yancheva, PhD, proven by the results of her scientific research, possesses. She has conducted over 45 specializations in a number of countries in Europe and Asia.

Her organizational skills are manifested in the coordination, management and administration of people, projects and budgets in the professional field and in public bodies, and in strategic decision making. She is the faculty and institutional coordinator of the Erasmus and Erasmus+ Programs, and the leader or institutional coordinator of 9 international scientific and educational joint projects, with partners from China, Northern Macedonia, Turkey, Serbia, Russia, Moldova, Albania, Jordan, Egypt, Ukraine, Kosovo, the Republic of South Africa, Slovakia, Slovenia, Bosnia and Herzegovina, Montenegro, Romania. She is also a member of 12 other international scientific and educational projects, thematically focused on technical cooperation among countries in Europe and Asia.

### **4. Assessment of the pedagogical preparation and activity of the candidate. Their role in training young scientists.**

Assoc. Prof. Svetla Yancheva, PhD has a teaching experience at the Agricultural University – Plovdiv of twenty-three years and nine months. For the period from 2016 to 2021, she conducted 2 119,5 academic hours of lectures and seminars with students, equated to seminars, in Bachelor's and Master's degree programs, as well as 91,5 hours in the Erasmus program. In the Erasmus+ program, she lectured in English for a total of 300 hours and conducted seminars of 315 hours on the disciplines Plant biotechnology, Genetic transformation and analysis of transgenic plants, Plant genetic resources, Tissue culture and *in vitro* systems for regeneration, Plant cell and tissue cultures, with students from universities in Poland, Russia, Moldova, Jordan, Italy, Spain. During the period 2010 – 2021 she conducted Erasmus+ mobility for learning and teaching at universities in Spain, Greece, the Czech Republic, Croatia, Poland, Slovenia. Within the project "Introduction of Electronic Forms of Education at the Agricultural University – Plovdiv", she developed and published in the distance learning system a textbook in an electronic form on the Plant biotechnology discipline.

For the purposes of training full-time and part-time students in **Bachelor's degree programs** in the Agronomy specialty (Viticulture and Horticulture and Organic Production, Plant Biotechnology, Field Farming, Agribusiness, Selection and Seed Production, Decorative Gardening and Landscaping, Tropical and Subtropical Agriculture, Plant Protection), Assoc. Prof. Svetla Yancheva, PhD has developed and implemented 20 curricula, some of which are in

English, in the disciplines: Plant biotechnology, Plant cell and tissue cultures, Biotechnological methods in plant selection, Plant genetic resources, Phylogenetic resources, methods for genetic diversity development and population management, Application of biotechnological methods for seed and planting material production. Genetically modified plants. Normative basis, Biotechnological methods in fruit crops, included as an elective discipline in the curriculum of the "Fruit Growing" specialty, Biotechnological methods in vine selection. Under her supervision, 6 students successfully defended their theses. In **Master's degree programs**, she delivers lectures and seminars for full-time and part-time students in the Master's courses "Plant Biotechnology", "Viticulture with Wine Production Fundamentals", "Selection and Seed Production", "Agribusiness", "Plant Protection" and "Plant Medicine". 11 Master's degree students have defended their theses successfully. The candidate supervises five doctoral students – one from Greece, three from Kazakhstan, and one from Bulgaria, three of whom have defended their dissertations. She trains three experts from the Institute of Mountain Animal Breeding and Agriculture – Troyan, and one from the Institute of Plant Genetic Resources – Sadovo, in the field of applied biotechnological methods in plant selection. She is a co-author of two textbooks for students at the Agricultural University – Plovdiv – "Guide to Selection and Seed Production and Plant Biotechnology", and at Plovdiv University "Paisii Hilendarski" – "Contemporary Methods in Genetics and Agricultural Biotechnology".

The analysis of the pedagogical activity of Assoc. Prof. Svetla Yancheva, PhD shows that she has contributed significantly to the education of students from different faculties of the Agricultural University – Plovdiv in the mentioned biotechnological disciplines. On the basis of my personal observations, I have repeatedly stated that her classes are filled with modern scientific content, presented in a highly professional manner with a pedagogically accurate style, which not only develops respect in students, but also stimulates their diligence in mastering biotechnological knowledge and techniques.

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

In the period from 2018 to 2022, Assoc. Prof. Svetla Yancheva, PhD has presented a list of a total of 167 citations of 29 of her articles (Author *h*-index: 7) in Scopus and Web of Science, one of which has been cited 24 times. The large number of citations in scientific journals referenced and indexed in globally acknowledged databases, indicates an interest in the importance of the candidate's experimental results not only by the Bulgarian but also by the foreign scientific community.

Assoc. Prof. Svetla Yancheva, PhD has been an active member of important committees for the development of education in the country, she has received letters of appreciation and certificates: Thematic working group "Higher Education" at the Executive Agency, Operational Program "Science and Education for Smart Growth"; Joint working group for development of the cross-border cooperation program under the instrument for pre-accession assistance between the Republic of Bulgaria and the Republic of Turkey for the programming period 2021 – 2027; Letter of appreciation for active participation in the preparation and conducting of the Day of the Assembly of the Peoples of Eurasia in Bulgaria by the Director General of the Assembly; ERAACON certificate; Award for 2021 – ERASMUS +.

As a member of scientific juries, she has prepared 6 statements in competitions for awarding the academic title "Associate Professor", and the educational and scientific PhD degree, as well as 2 reviews of dissertations for awarding the educational and scientific PhD degree, and 1 – for "Professor".

#### **6. Significance of the contributions to science and practice. Motivated answer to the question to what extent the candidate has a clearly defined profile of the research work.**

I acknowledge all contributions to science and practice in the order indicated by the candidate. Due to the requirements for a certain volume of the review, I present them with some

abbreviations.

## ORIGINAL SCIENTIFIC AND THEORETICAL CONTRIBUTIONS

The possibility of growing the medicinal plant *Fabiana imbricata* Ruiz et Pav. in *in vitro* cultures with various degrees of differentiation has been proven. (Article 3)

The possibility to use molecular markers as an alternative, highly effective approach in different directions of modern plant selection has been shown. (Articles 7, 8, 9, 10)

The effectiveness of the ISSR (Inter-Simple Sequence Repeats) technique has been proven, in distinguishing the profiles of different species, including mutant and hybrid genotypes, their application to confirm successful hybridization in the early stages of plant development, for varietal identification in case of mechanical contamination due to mixing of seeds. (Articles 9, 10)

It has been established that, as a result of induced mutation, the normal course of  $\beta$ -carotene hydroxylation is disrupted and in all mutant *bc* pepper genotypes there is no enzymatic activity of *CrtZch03*, leading to an increase in  $\beta$ -carotene in the pericarp of the fruits up to 2 times compared to the wild type. The content of  $\alpha$ -carotene also increases, and the concentrations of lutein,  $\beta$ -cryptoxanthin and zeaxanthin decrease. (Article 7)

By means of the modern method ISAP (Inter-SINE-Amplified Polymorphism) a protocol has been adapted, which is used in a Bulgarian pepper collection with single-family and multiplex primer combinations generating clear and reproducible fragments and polymorphic profiles. (Article 8)

The ability of individual and mixed cell cultures of nine different strains of microalgae to absorb chromium has been proven. In the processes of intracellular chromium absorption, mixed cultures with positive allelopathy are leading. (Article 24)

## ORIGINAL METHODOLOGICAL CONTRIBUTIONS

Optimized protocols for micropropagation of Bulgarian and introduced raspberry varieties have been developed, based on specific genotypic features, modified nutrient media and cultivation conditions, ensuring the obtaining of quality plant material with a high survival rate in outdoor conditions. (Articles 1, 2, 4, 34)

An optimized protocol with proven effectiveness in the propagation of high-stemmed blueberry using a combination of cytokinins (reduced zeatin concentration and complementary action of 2iP) has been developed. (Article 20)

A protocol for genetic transformation of red raspberry (*Rubus idaeus*) has been adapted by means of the *Agrobacterium tumefaciens* vector system. The integration of the *npt* and *Hygromycin* marker genes has been confirmed by PCR analysis using primers whose nucleotide sequence is complementary to these genes. (Article 5)

The use of molecular markers (marker selection – MAS) increases the efficiency of selection in combining high quality of fruit with other valuable indicators in hybrid pepper genotypes. (Article 7)

Highly efficient liquid chromatography (HPLC) methods for assessment of the biological value of fruit pericarp have been adapted. The evaluated pepper and tomato samples have been included in selection programs for the creating of varieties. (Article 8)

The genotypes with the highest concentrations of carotenoids in varieties and F1 hybrids of tomatoes with red, orange and yellow colour of the fruit pericarp have been identified and selected by chromatographic methods (Article 19).

For the first time, digital holographic microscopy (DHM) has been applied to observe and determine the size of cell clusters in suspension cultures of *Fabiana imbricata* Ruiz. et Pav. A digital holographic microscope (DIHM), developed at the Agricultural University – Plovdiv, has been used. (Article 27)

An efficient system for micropropagation of *Fabiana imbricata* Ruiz. et Pav. has been developed, using an optimized nutrient medium composition designed for the species. (Article 31). It has been found that LED sources with different spectra are not more suitable than the

conventionally used fluorescent lamps. (Article 32)

Various types of bioreactors applicable to plant micropropagation have been evaluated, identifying RITA® Temporary Immersion Systems (TIS) as one of the most effective due to their simplified design, low cost and significant advantages in use. (Article 29)

Screening tests have been developed to determine the selectivity of soil herbicides in different crops, which can be used as a model for abiotic stress and research into the adaptive abilities of plants in their subsequent development. (Articles 6, 11, 16, 17, 18)

Linear correlations have been established between the antioxidant properties shown by FRAP method or DPPH analysis, and total phenols (TPC), respectively:  $r = 0,98$  and  $0,73$ . Higher values of antioxidant activity and TPC have been found in bilberry and strawberry (Article 15).

## ORIGINAL SCIENTIFIC AND APPLIED CONTRIBUTIONS

Effective protocols for micropropagation of the Bulgarian raspberry varieties Shopska Alena, Samodiva, Lyulin, Bulgarian Ruby, Iskra have been developed on the basis of nutrient media with optimized mineral composition and growth regulators. (Article 34)

A reliable *in vitro* protocol has been developed for adventitious organogenesis in four wild Bulgarian species – strawberry (*Fragaria vesca* L., *Rosaceae*), raspberry (*Rubus idaeus* L., *Rosaceae*), bilberry (*Vaccinium myrtillus* L., *Ericaceae*), and cranberry (*Vaccinium vitis-idaea* L. *Ericaceae*), and pathogen-free plant material from wild berry species has been obtained for scientific research as well as for recultivation of natural habitats. (Article 15)

An effective system for micropropagation of the blackberry-raspberry hybrid Tayberry has been developed, which ensures a high proliferation coefficient and evenness of plants, as a prerequisite for successful rooting, adaptation and quality of the obtained plant material. (Article 14). A pilot study has identified the phenological, vegetative, reproductive manifestations in the cultivation of the blackberry-raspberry hybrid variety Medana in the Troyan region. (Article 33)

An experimental protocol has been developed for *in vitro* propagation of three different Paulownia genotypes (*P. elongata*; hybrid *P. tomentosa* x *P. fortunei* and complex hybrid (*P. elongata* x *P. tomentosa*) x *P. elongata*). (Article 14)

An optimized and simplified system for micropropagation of 12 vine varieties and 11 rootstocks has been created in order to obtain pre-basic planting material. The developed experimental protocol has been introduced as a standard for micropropagation of vines at the Plant Biotechnology Laboratory at the Agricultural University – Plovdiv. (Article 23)

A PCR-based marker for early selection of pepper plants with high potential for  $\beta$ -carotene synthesis has been developed. The polymorphism in the *CrtZch03* gene (C/C primer pair) between mutant and baseline genotypes has been used. (Article 7)

Mutant genotypes of peppers with orange fruits have been found to be more sensitive to moderately high temperature stress than those with red-coloured fruits. (Articles 7, 8)

Lines with improved fruit morphology and productivity of mutant plants with high content of  $\beta$ -carotene have been obtained, and lines for accelerated creation of varieties and F1 hybrids of pepper with orange and red fruits have been identified within the selection programs (Articles 7, 8).

The mutant lines 1647 (Gold Medal *ms8*) with nuclear male sterility (*ms8ms8*) and K587 with nuclear-cytoplasmic male sterility (*Srfrf*) have been cytologically characterized. (Article 7)

Various lines, varieties and F1 hybrids of tomatoes have been characterized, including local and foreign ones, with a mutant gene introduced into them by hybridization: *Aft* (Anthocyanin fruits), *ah* (Hoffmann's anthocyaninless), *aw* (anthocyanin without), *bls* (baby lea syndrome), *ae* (entirely anthocyaninless), *aa* (anthocyanin absent) *hp* (high pigment), *og c* (old gold crimson), as well as with two combined mutant genes – *og c* and *ah*, *og c* and *hp*, *og c* and *bls*). (Article 8)

The developed screening tests aimed at determining the selectivity of soil herbicides in winter peas, maize and pepper are applicable as a model for abiotic stress. (Articles 6, 11, 16, 17, 18, 36)

29 local Kazakh and foreign specimens of millet (*Panicum miliaceum* L.) have been studied in laboratory experiments for salt resistance. (Article 18)

By combining classical selection methods such as induced mutagenesis, and the application of marker-assisted selection, a new variety of pepper "Desislava" has been created, with orange colour of the fruits and twice increased content of  $\beta$ -carotene.

The professional and creative path of Assoc. Prof. Svetla Yancheva, PhD clearly outlines the parameters of her scientific research profile – she is an extremely erudite researcher in the field of plant biotechnology.

#### **7. Critical notes and recommendations.**

I have no critical remarks for the candidate as regards the essence of the competition.

#### **8. Personal impressions and opinion of the reviewer.**

Assoc. Prof. Svetla Yancheva, PhD is an outstandingly highly erudite lecturer and researcher in the field of plant biotechnology at the Agricultural University – Plovdiv.

### **CONCLUSION**

On the basis of the presented analysis of the pedagogical, scientific and scientific-applied activity of the candidate, I believe that Assoc. Prof. Svetla Dimitrova Yancheva, PhD meets the requirements provided for in the Act on Development of the Academic Staff in the Republic of Bulgaria, the Regulations on the Implementation of the Act on Development of the Academic Staff in the Republic of Bulgaria, and the Regulations on its implementation at the Agricultural University – Plovdiv. Assoc. Prof. Svetla Yancheva, PhD participates in this competition with scientific works sufficient in terms of volume and experimental depth. Her teaching skills and experience are at an exceptional professional level.

All these facts give me a reason to evaluate **POSITIVELY** her overall pedagogical and scientific activity.

I would like to propose to the esteemed Scientific Jury to vote positively, and the Faculty Council of the Faculty of Viticulture and Horticulture at the Agricultural University – Plovdiv to elect Assoc. Prof. Svetla Dimitrova Yancheva, PhD for "**Professor**" in the scientific specialty "Selection and Seed Production of Cultivated Plants (Plant Biotechnology)".

Date: 12.05.2022  
Plovdiv

REVIEWER:   
(Prof. Venelin Roychev, DSc.)