



## EVALUATION REPORT

By Prof. Dr. Zarya Vasileva Rankova

from Fruit-Growing Institute – Plovdiv, a member of the Scientific Board, appointed by Order No. RD-16-368/28.03.2022 of the Rector of Agricultural University – Plovdiv, Regarding the competition for the academic position of a Full Professor in Higher Education Area 6. Agricultural Sciences and Veterinary Medicine, Professional Field 6.1. Crop Science, Scientific Major ‘Plant Breeding and Seed Production of Cultivated Plants’ (Plant Biotechnologies), Announced in SG No. 7 of 25.01.2022

Applicant: Assoc. Prof. Dr. Svetla Dimitrova Yancheva from the Agricultural University – Plovdiv

### Brief presentation of the applicant

Associate Professor Dr. Svetla Yancheva was born in 1962 in the city of Sofia. She graduated from the Higher Institute of Agriculture in 1989, majoring in General Agronomy and a Master’s degree in Plant Biotechnologies. In 1997 she acquired the Educational-and-Scientific degree ‘Doctor’ (PhD) as a full-time doctoral student at the Institute of Genetic Engineering, Kostinbrod. During the period 1995 – 2008 she worked in the Laboratory of Plant Biotechnologies at the Department of Plant Genetics and Breeding at the Agricultural University – Plovdiv. She took the academic position of an ‘Associate Professor’ at the Department of Plant Genetics and Breeding from 2008 until 2020 and since 2021 she has been working as an ‘Associate Professor’ at the Department of Viticulture and Fruit-Growing. In 2017 she was appointed a Deputy Minister at the Ministry of Agriculture and Foods and since 2016 she is a Vice-Rector of the Agricultural University – Plovdiv.

### General Description of the Scientific Production

Assoc. Prof. Dr. Svetla Yancheva participates in the competition for the academic position of a Full Professor with a total of 39 scientific papers, grouped as follows:

- Scientific publications – 33, including scientific publications in journals, peer-reviewed and indexed in world-famous databases with scientific information Scopus or Web of Science – 25 publications (64%), of which 10 papers in journals with an impact factor (IF) and 13 in journals with an impact rank (SJR).
- Research essay – 1;
- Chapters in a collective monograph – 2;
- Book based on a defended PhD Thesis for the award of the educational-and-scientific degree ‘Doctor’ – 1;
- Student Manuals – 2.

The presented certificate of compliance with the Minimum National Requirements shows that the candidate covers and in some groups of indicators exceeds the minimum number of points required to take the academic position of a Full Professor, according to Art. 2b, para. 2, 3 and 5 of the Act on Development of the Academic Staff in the Republic of Bulgaria and Annex to Art. 1a of the Regulations for the Application of the Act.

The presented scientific papers for the competition for the academic position of a Full Professor confirm that the candidate is the first author of 13 publications (33.3%), the second author in 8 publications (20.5%), the third author in 8 (20.5%), the fourth and next author in 10 (25.7%).

The research studies of Assoc. Prof. Dr. Svetla Yancheva are in the area of plant biotechnologies (micropropagation, regeneration systems through somatic embryogenesis and organogenesis, callus and cell cultures), as well as the application of molecular marker-assisted breeding (MAB) in various agricultural crops, **focussed mainly on:**

**Micropropagation systems:** a number of studies have been carried out to develop and optimize micropropagation systems in different plant species:

A system for *in vitro* propagation and rooting of the Bulgarian raspberry cultivars 'Bulgarian Ruby', 'Shopska Alena', 'Samodiva' and 'Ruby' was developed by optimizing the mineral composition of the nutrient media. By reducing the salt content of the main nutrient medium to 1/2, an increase in the percentage of the rooted plants of the studied cultivars was achieved, 100% rooting being reported for 'Shopska Alena'.

Four wild Bulgarian species – strawberry, raspberry, blueberry and cranberry, were evaluated for their regenerative capacity for *in vitro* propagation by adventitious organogenesis. The results obtained showed a reliable *in vitro* protocol for the production of high quality planting material from the studied wild berries for research activities and for the reclamation of natural habitats.

An efficient system for micropropagation of two blackberry-raspberry genotypes (Hybrid 1 and 'Medana' cultivar) was established. The nutrient medium used for propagation ensured a high coefficient of proliferation and uniformity of the plants as a precondition for successful rooting, adaptation and quality of the obtained planting material.

An optimized protocol for propagation of 'Toro' cultivar (high-bush blueberry) was developed using WPM (Lloyd and McCown, 1980) as the basic medium, pH = 4.2, and an application of a combination of cytokinins, which reduced production costs.

An optimized and simplified system for micropropagation of 12 vine cultivars and 11 rootstocks was established in order to obtain pre-basic planting material. The main advantage of the procedure is that the stages of multiplication and rooting take place simultaneously, on the same nutrient medium.

An experimental protocol for *in vitro* propagation of three different Paulownia genotypes was developed in the Laboratory of Plant Biotechnologies at the Agricultural University – Plovdiv.

An efficient system for micropropagation of *Fabiana imbricata* was developed using an optimized composition of the nutrient medium. The application of 0.3% activated carbon (AC) had a positive effect on plant growth and development and increased about twice the proliferation.

### **Regeneration and genetic transformation systems**

Genetic transformation of red raspberry (*Rubus idaeus*) was achieved using the vector system *Agrobacterium tumefaciens*. The high efficiency of the established regeneration system and the transgenic plants obtained were a prerequisite for its optimization in order to further

improve genetically the culture through the introduction of genes encoding valuable economic characteristics, such as resistance to disease, pests and stress factors.

### **Screening tests for herbicide selectivity and stress factors**

The susceptibility of two cultivars of winter forage peas to the soil herbicide Gesagard 500 SC was studied by an *in vitro* test. In similar *in vitro* experiments with the same cultivars of winter forage peas, the selectivity of the herbicide PELICAN 50 SC was investigated. Reliable data were obtained about the susceptibility of both genotypes, demonstrating delayed seed germination and adverse effects of the development such as inhibited growth, lack of branching, shortened internodes and shorter mean length of the central root, as well as blocked chlorophyll synthesis. A laboratory and *in vitro* test was also performed to determine the selectivity of the soil herbicide isoxaflutole (Merlin Flex® 480 SC) in five new maize hybrids, which reliably showed the response of the genotypes at the early stages of development under stress. An *in vitro* protocol was developed as a model for herbicidal phytotoxicity in pepper. It provided reliable data on how the herbicide affected germination and early stages of growth, as well as during cultivation, in dynamics. The susceptibility of five newly bred pepper genotypes of different origin and fruit colour to the soil herbicide napromamide (Devrinol 4 F) was studied.

The developed experimental protocols represent theoretical and practical contribution and they can be used for evaluation of various toxic compounds.

### **Application of biochemical methods and molecular markers in plant breeding**

Biochemical studies related to determining the biological value and content of secondary metabolites in four wild species – strawberry, raspberry, blueberry and cranberry (*Vaccinium vitis-idaea* L. *Ericaceae*) were carried out. Spectrophotometric analyses were used to assess the total phenolic content and antioxidant properties of methanolic fruit extracts obtained from *ex vitro* and *in vivo* species.

A protocol for molecular identification of species and hybrids of Paulownia genus was developed and adapted using the ISSR-PCR marker system, which is able to differentiate closely related genotypes by detecting the differences between them at the level of hereditary material. The data obtained set the basis for further research related to identifying loci associated with valuable economic characteristics in species and hybrids of Paulownia genus.

A study of nine mutant lines of tomatoes obtained by hybridization was performed. Anthocyanin content was assessed in breeding lines containing *Aft* gene derived from wild-type germplasm. Molecular characterization of seven tomato breeding lines was accomplished (six mutant lines and one parental). Mutant lines were obtained by induced mutagenesis. A protocol for quantitative evaluation of major carotenoids (lycopene and  $\beta$ -carotene) in local samples and mutant forms of tomatoes with different colours was developed and adapted by high performance liquid chromatography (RP-HPLC method with Vis detection at 450 nm). It was proved that the method can be used in plant species of other families (melon, cucumber) to determine the two carotenes.

A new pepper cultivar 'Desislava' with orange colour of the fruit and twice increased content of  $\beta$ -carotene was developed by combining classical breeding methods such as induced mutagenesis and the application of marker-assisted breeding.

As a result of the overall research activity of the candidate, **original and scientific-and-applied contributions** were confirmed. I accept that the contributions are personal findings of the candidate and I should note that they bring new and important information in the development of existing scientific problems – application of biotechnological methods in crop breeding, based on in-depth research studies.

### **Citations of the Scientific Publications**

The scientific papers of Assoc. Prof. Dr. Svetla Yancheva were cited in 167 research publications.

### **Participation in research projects and programmes**

Assoc. Prof. Dr. Svetla Yancheva has participated in the implementation of 21 research and educational projects, including international, and she was a coordinator in nine of them.

### **Participation in international and national scientific forums and specializations**

Assoc. Prof. Dr. Svetla Yancheva has participated in a large number of international and national scientific forums and she realized 11 mobilities under Erasmus+ programme.

### **Evaluation of the teaching activities of the candidate**

Along with her research studies, Assoc. Prof. Dr. Svetla Yancheva has significant experience in teaching. The certificate issued by the Agricultural University shows that the candidate taught 2119 academic hours to Bachelor and Master degree students for the period 2016 – 2021.

### **Personal impressions and recommendations**

I do not find any significant gaps in the research studies of the candidate, which could eventually affect the results and conclusions.

### **Conclusion**

At the announced competition for the academic position of a Full Professor in **Professional Field: 6.1. Crop Science; Scientific Major: Plant Breeding and Seed Production of Cultivated Plants (Plant Biotechnologies)**, the only candidate Assoc. Prof. Dr. Svetla Dimitrova Yancheva has presented scientific papers in sufficient quantity and quality. The contributions in them are original and scientific-and-applied and they represent a novelty for science and enrich the existing knowledge. The research production presented by

Assoc. Prof. Dr. Svetla Yancheva for participation in the present competition, confirm that she is an established researcher in the area of plant biotechnologies. Her participation in a large number of research and educational projects defines her as a well-versed specialist, capable of working in a team, which is especially important for modern research.

According to the criteria for scientific and metric indicators, the candidate fully meets the requirements of the Act on Development of the Academic Staff in the Republic of Bulgaria and the Regulations of the Agricultural University for taking the academic position of a Full Professor.

**All that gives me the reason to evaluate POSITIVELY the candidate and to propose to the esteemed Scientific Board to vote POSITIVELY for electing Assoc. Prof. Dr. Svetla Dimitrova Yancheva a Full Professor in Professional Field: 6.1. Crop Science; Scientific Major: Plant Breeding and Seed Production of Cultivated Plants (Plant Biotechnologies).**

27.04.2022

  
**Prof. Dr. Zarya Rankova**