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REVIEW

on the materials submitted for participation in a competition for the Academic position "Associate Professor" in professional field 6.1. Plant growing, scientific specialty "Soil Science" announced by the Forest Research Institute – BAS in SG 35/27/04/2021

Candidate for the competition: Assistant Prof. Vanya Georgieva Kachova MD - Forest Research Institute, BAS.

Reviewer: Prof. Dr. Ekaterina Georgieva Filcheva-Konisheva, Professional field 6.1. Plant growing, scientific specialty "Soil Science", Institute of Soil Science, Agrotechnology and Plant Protection "N. Poushkarov", Sofia, retired, appointed by order No RD 15-277/30.06.2021 of the Director of the Forest Institute-BAS.

1. Short biographical data.

Vanya Georgieva Kachova was born on April 20, 1964, in Dospat, Smolyan region. Her secondary education was acquired in the period 1978-1982 at Dimitar Blagoev Polytechnic High School in Vidin. He studied at Sofia University in the years 1982-1988, specialty "Analytical and Organic Chemistry" and graduated as a Master in 1988. From 15.06. 1989 to 01.07. 1992 she worked at the Institute of Plant Physiology – BAS as a specialist biologist. From 27. 11. 1995 to 01. 07. 1996 she is a teacher, technical manager of a training workshop on rubber and plastics, Technical school "Asen Zlatarov", Vidin, Bulgaria. From 21. 10. 1996 to 18.01.1999. she works as a chemist in the Laboratory "Forestry Soil Science" at the Forest Research Institute, Bulgarian Academy of Sciences. Performs laboratory tests according to certain methodologies with different equipment, participates in scientific and applied projects. From 18.01.1999 she started working as a researcher at the same institute, then she was also assigned a PhD and defended her dissertation in 2006. Assist. Prof. Vanya Kachova prepared her dissertation work in the period 18.10.1999 - 29.12. 2006 on the topic "Heavy metals in soils of urbanized oak ecosystems in Sofia region", Forest Research, BAS, specialty "Soil Science".

Since 2007 she has held the position of Assistant Prof. passing through the grades III, II scientist and Assistant Prof., Laboratory "Forest Soil Science", Department "Forest Ecology". She conducts scientific- fundamental and applied research on various topics and projects. Explores in theoretical, methodological and practical terms the state and trends in the field of forestry soil science in the development of forest sp. She publishes works, participates in symposiums and other forums with reports and posters. From 07. 05. 2013 she is an Assis. Prof. in the Department "Forest Genetics, Physiology and sp., Forest Research Institute, BAS.

2. Compliance of the submitted documents and materials of the applicant with the minimum requirements, according to the Regulations for acquiring scientific degrees and holding academic positions at the Forest Institute - BAS.

The presented materials comply with the requirements of Law on Development of academic staff in the Republic of Bulgaria and the rules for its application at BAS and for the Forest institute, BAS. The 'minimum required points by group of indicators' achieved by the applicant exceed the values set out in Table 1 of Annex 1, Area 6. "Agricultural Sciences and Veterinary Medicine" from "Rules of Procedure for acquiring scientific degrees and for holding

academic positions at Forest Institute, BAS. The total number of points reached by the applicant is 1063.5 points, compare to a minimum number of 500 points.

2a. Organizational skills and competencies: Studies on the condition and quality of forest soils under deciduous and coniferous crops; Studies on soil pollution; Studies on ways and methods for improving the quality characteristics of forest soils.

2b. Computer skills: Competencies in the development and implementation of research projects; Participates in the working group of 4 national and 4 international scientific projects; Computer Skills and Competencies - Good mastery of Microsoft Office™ (Word™, Excel™ and PowerPoint™).

3. General description of the materials submitted (by type; by place of publication; language in which they are published; number of co-authors, etc.)

A total of 27 published articles are presented, of which 1 (under print) – Γ 7.9, as follows by groups of indicators: Category A - 50 p.; Category B – none (without monograph); Category B4 - 10 pcs., 240 p. (50 min.) - in referenced and indexed editions selected by the applicant as the equivalent of a monograph; Category Γ 7 - 9 pcs. publications in referenced and indexed editions, 207.5 p.; Category Γ 8 – 8 pcs. publications in non-reported publications or total Γ 7 + Γ 8 239.5 p. (min. 200 p). The articles are published in referenced (Scopus and WebScience-13) and indexed editions (10 pcs.) in the following scientific journals - Forest Science (2 pcs.) and Silva Balcánica (2 pcs.), Ecologia Balcanica (3 pcs.), BJSS (3 pcs.); Balkan Ecology (2 pcs.) and one publication in the Journal of Geochemical Exploration – (IF – 2.312), Agricultural Science and Technology, BJAS (IF - 0.189), Procedia Environmental Sciences (IF - 0.210), Šumarski list (IF 0.409). Publications in unrefereed articles are a total of 8 in number and include conference Proceedings and unreferenced journals.

The publications, in the order of the list of relevant Database, category Q, SJR/ IF (year), the numbering in the annexed list in the documents is respected:

Group 4. Scientific publications (not less than 10) in publications that are referenced and indexed in world-renowned databases of scientific information.

- 1- CABI
- 2- Scopus, WoS IF (2013) = 0.210. SJR (2013) = 0.198
- 3- Scopus, WoS Q1 IF (2014) = 2.312. SJR (2014) = 1.031
- 4- Scopus
- 5- CABI
- 6- CABI
- 7- Q4 SJR (2018) = 0.103
- 8- WoS Q4JR (2018) = 0.103
- 9- Scopus, WoS Q3 IF (2019) = 0.409
- 10- CABI

Group 7. Articles and reports published in scientific publications, referenced and indexed in world-renowned scientific information databases

1. CABI
2. WoS, CABI
3. WoS, CABI
4. Scopus, WoS Q3 IF (2013) = 0.189
5. WoS, CABI
6. CABI

7. WoS, CABI

8. WoS Q4 SJR (2018) = 0.103

9. WoS, CABI

27 publications are presented for participation in the competition (one is under print), 16 are in English and 11 in Bulgarian.

To category D min. number of points 100, the applicant has 280 points.

Category E, min. requirements; 50 points, the candidate has 205 points. **Additional indicators** - 49 points.

Total points for the applicant – 1063.5, which significantly exceeds the requirements for the academic position "Associate Professor: 500 t.

Assistant Prof. Dr. Vanya Katsova participated in 8 national and 8 International forums, mainly reports were presented in the forums.

4. Main strands in the applicant's research work and the most important scientific contributions.

A. According to the extended habilitation report, the main strands discussed are presented as follows:

A.1. Main characteristics of forest soils

A2. Characteristics of soils influenced by anthropogenic activity

A3. Pathways for improving the quality of forest soils and of technogenic substrates.

As a result of the studies carried out, the following scientific and methodological contributions are formulated with certain corrections of the reviewer:

Direction A1. Main characteristics of forest soils

- Data are obtained from the physico-chemical surveys of soils under deciduous, coniferous and grass vegetation in the region of the Middle Balkan Mountains – Beklemeto. A higher potential for acidification of the soil under the beech planting has been identified compared to those under spruce plantations and pastures. (B 4.1).

A microbiological characteristic of Smolnitsa (Vertisols) was made after application of fertilization with organic fertilizer "Siepton" independently and in combination with application with the mineral fertilizer "Crystallon" and organic fertilizer "Biohumus". A positive influence of fertilization on heterotrophic microorganisms, actinomycetes and bacteria has been found. Microscopic fungi are poorly influenced (B 4.1).

Direction A.2. Characteristics of soils influenced by anthropogenic activity

- Soils under oak plantations in Sofia region have been studied in order to establish bioavailable forms of heavy metals in them using NH_4OAc . Mobile forms of heavy metals Cu, Zn, Pb and Cd at pH = 7 are extracted in larger quantities compared to natural soils. It is recommended to use NH_4OAc to determine "biologically active" or "bioavailable" forms of PTEs of anthropogenic origin (B. 4.3).

- The role of forest vegetation as a barrier for reducing the spread and contamination of soil with heavy metals emitted by road transport has been confirmed. The vegetation locates heavy metals in the soil at a lower distance from the road than meadow vegetation (B. 4.4).

- An analysis of the behavior of heavy metals (Cu, Zn, Pb, Cd) in the urbanized soils under oak ecosystems in Sofia has been carried out. It is established that they are mainly located in a non-extractable fraction, are not accessible to plants and parks can be used for recreational purposes.

Mobile forms of Cu, Zn and Pb were found to have higher values in the upper 0-5 cm, while for Cd - migrated in depth 0-20 cm (B. 4.6).

Direction A.3. Pathways for improving the quality of forest soils and of technogenic substrates used for cabbage activities

- Positive effect on the growth and accumulation of biomass of two wood species *Quercus rubra* L. and *Pinus Nigra* Arn has been demonstrated after simultaneous introduction of waste from the paper industry and fertilization (N-P-K in relation to 2-1-2) of technogenic substrates from metallurgic company "Kremikovtzi". The introduction of accelerators and fertilization improves growth conditions. Both tree species *Quercus rubra* L. and *Pinus Nigra* Arn. have good potential for use in phytoremediation of contaminated terrains (B. 4.2).

- A study has been done on the sustainability of forest crops: *Pinus nigra* Arn., *Quercus rubra* L., *Quercus sessiliflora* Salisb with regard to heavy metal pollution of natural soils from the vicinity of Kremikovtzi. Afforestation of these terrains with red oak crops (*Quercus rubra* L) is recommended, which is relatively stable, with very good growth indicators and with a good entomological situation (B.4.7).

- The positive role of agro-forestry practices applied to *Robinia pseudoacacia* L. in the region of Seslav - Kubrat forestry has been confirmed. The role of agro-forestry in improving the soil environment, which has better acidity, carbon and nitrogen content and the composition of an organic matter is highlighted (B. 4.8).

- The positive role of agro-forestry practices in the development of poplar sp. crop along the Danube near Kozloduy and Oryahovo on alluvial Fluvisols has been confirmed. Carbon stocks and nitrogen are higher in agro-forestry than controls. In the composition of humus, humic acids predominate over fulvic acids in forestry. It is confirmed that agro-forestry is a good method for increasing the productivity of the poplar csp. applied in their young age (B. 4.9), and soil properties in terms of carbon, nitrogen and humus composition are also improved (B. 4.10).

In the attached documents, the applicant has given a reference to more substantial scientific and applied contributions in works that are clearly divided into those of a scientific and scientifically applied nature. I allow myself to propose shorter and somewhat corrected scientific and scientific-applied contributions. Particular attention should be paid to the contributions made by publications 7.9, 8.2 and 8.6.

SCIENTIFIC CONTRIBUTIONS

A1. Main characteristics of forest soils

- A general physical and chemical characteristic of anthropogenic and natural soils from the region of Sandanski is made. The soils studied by the urban park show the characteristic features of urbanized soils: higher pH in the surface layer compared to the lower layer. High spatial variability is recorded with regard to the accumulation of organic carbon in surface soil layers in anthropogenic soils. It was found that the organic matter in soils from the urban park is humified to a lower degree than the controls (Γ 8.2)!

- A common feature of cinnamon forest soils from Lozen Mountain, formed under (*Quercus cerris* L). and under meadow vegetation, has been made. The land use type affects the accumulation and transformation of an organic substance. A higher stock of org. C has been established C ($2.53 \pm 1.18 \text{ kg/m}^2$) in soils under meadow vegetation compared to those under *Quercus cerris* L ($2.12 \pm 1.20 \text{ kg/m}^2$). The C/N ratio in the ecosystems studied reflects a weak accumulation of organic matter, medium acid reaction of soils (pH max= 5.45) under meadow vegetation, and below *Quercus cerris* L - neutral (pH max= 6.80) (Γ 8.4).

Studies on the sorption properties of soils under woody vegetation.

- Studies have been carried out on the sorption properties of forest soils under beech plantations from the Central Balkan and Osogovo. The total exchange capacity ($T_{8,2}$) for central Balkan soils is from 10.6 mol.kg^{-1} to $20.9 \text{ cmol.kg}^{-1}$, and for those from Osogovo from $18.4 \text{ cmol.kg}^{-1}$ to $34.4 \text{ cmol.kg}^{-1}$. The saturation with bases (BS) in surface horizons is 33.0 % and 75.0 % of the total sorption capacity (Γ 7.4).
- Studies have been carried out on the sorption characteristics of the soils of Sofia region, influenced by anthropogenic activity: urbanized, semi-urbanized, natural and technogenic. Soils from urbanized parts of the area have a higher degree of saturation with bases in surface horizons and a lower amount of $H_{8,2}$ compared to the semi-urbanized and mountainous parts of the area. The degree of saturation with bases in technogenic soils is highest, the pH values are also highest. In urbanized soils there is alkalization of surface horizons, while in mountainous and semi-urbanized soils there is a process of acidification in the surface part of the profile. For urbanized and forested parts of the area, this is a diagnostic feature (Γ 8.3).
- Soils from the forest of the town of Sandanski – "St. Vrach" have been studied., which are characterized by moderate colloiddally in the surface layers ($T_{8,2} = 20 - 30 \text{ meq/100 g}$ of soil), while those from the controls outside the urbanization center under natural forest plantations have higher values of total cation exchange capacity and refer to medium colloidal soils. Acid processes in the soils studied occur at an average intensity more pronounced in natural forest soils, where the exchange Al is of higher values (Γ 8.2).

Microbiological characteristics of forest soils

- The soils under oak ecosystems of Sofia region with the highest biogenicity are those with the highest density of plant cover, respectively the largest coating with grass vegetation (90% in Beledie han). The density of plant cover has the greatest impact on soil microflora, the highest level for heterotrophic microorganisms of the total amount of microorganisms is established. The metabolic coefficient presented as a ratio between basal and substrate-induced respiration of soil microorganisms is from 0.20 to 0.44 (Γ 7.2).
- The soils from the urbanized parks of Sandanski are characterized by higher biogenic and biological activity compared to the soils from the urbanized parks of Sofia. The metabolic rate is from 0.18 to 0.45. Climatic conditions and wood density are the main factors with the highest influence on the size of soil microbiological communities (Γ 7.3).

Characteristics of soils influenced by anthropogenic activity – urbanized and technogenic by industrial and mining regions

- An amendment of the physical and chemical characteristics of soils from urbanized areas under oak plantations in Sofia region has been found. The data show changes in acid-base equilibrium. Higher pH values are found in the surface compared to the following lying layers i.e. a process of alkalization of soils influenced by anthropogenic activity - urbanized soils. There is a lower participation of organic colloids in the formation of total sorption capacity in urbanized soils compared to those under natural conditions (Γ 8.5).
- Basic conclusions have been drawn about the specific characteristics of urbanized soils based on information from literary sources and obtained experimental data: heavy metal pollution; changes in acid-base equilibrium with a tendency to alkalization; enrichment with organic substance, changes in the composition of humus; carbon associated with aromatic structures predominates; changes in sorption capacity in most cases - a higher degree of saturation with exchange bases; changes in physico-chemical properties; lower water capacity and higher compaction at lower clay

differentiation; presence of dust and materials of urban construction, and corresponding modification of the parent elements; changes in microbiological properties (Γ 8.6)!

- A study has been carried out on the distribution and sources of heavy metals in soils under the influence of different types of anthropogenic activity – urbanized soils, soils from the metallurgical activity area and soils under WWTP sludge. By applying chemical (study of general and mobile forms), soil genetic (by soil profile depth) and statistical approach is shown that different heavy metals may have different origins in surface horizons and deeper soil horizons, which confirms or excludes the influence of the anthropogenic factor and highlights the influence of the pedogenic or lithogenic factor. It has been established that in anthropogenically influenced Cu and Zn may be of anthropogenic and pedogenous origin, Pb and Cd are mainly of anthropogenic, and Fe, Cr, Ni and Co of lyto(pedo)gene origin. The element Mn is of - bio pedogenic and anthropogenic origin (Γ 8.7).

- An assessment of the condition of soils (black pine *Pinus nigra* Arn.) was carried out 30 years after conducting the biological reclamation of heaps from "Kremikovtzi" Metallurgic company near the village of Lokorsko. Research has shown that a start-up process has begun as a result of afforestation. The formed soil has a slightly acidic reaction on the surface. It is saturated and relatively well stocked up with organic matter (Γ 7.1).

- Heaps from Baikusheva neighborhood in Pernik, near the M. Tolbuchin mine, under three tree species: black pine /*Pinus nigra* Arn./, birch /*Betulla alba*/ and ash /*Fraxinus 5 pennsylvanica*/, after 45 years of reclamation. Studies have shown that processes of humus formation and humus accumulation occur differently under different tree species. The largest amount of org. C accumulates under *Fraxinus pennsylvanica*. Although, under this planting is the lowest degree of humification, enough amounts of more stable humic acids accumulate in the substrate below it, which significantly predominate the more mobile fulvic acids. Under the coniferous planting of *Pinus nigra* Arn, the degree of humification is highest, with the formation of the largest amounts of humic acids, the humus formation process is in its initial stages (Γ 7.9) !

- The physical and chemical properties of soils and substrates from the Pernik coal region, natural and recultivated, have been studied and found to differ in the origin of the constituent materials as well as in chemical and physico-chemical characteristics, which predetermines different buffer ability at external sources of influence. The content of the organic substance in the recultivated heaps indicates the manifestation of elementary soil formation processes associated with humus formation and humus accumulation mainly in the surface layers. The high degree of base saturation and the predominance of exchanged calcium determine the favorable physico-chemical status of the recultivated heaps (G 8.8).

Characteristics of soils from riparian forests.

- A characteristic of soils (Alluvial Fluvisols) from the islands of the Danube – Eidemir and Vetren is made. It is established that two groups of soils can be distinguished. Newly formed soils on the periphery of the islands, those closest to the waters of the river, which are distinguished by a lighter mechanical composition, as well as a lower content of organic carbon, with a fulvic type of humus, and the greatest prevail of fulvic acids over humic acids. The second type are soils from the interior of the islands, those in which the soil process is more advanced, which have a heavier mechanical composition, are distinguished by a higher amount of humus and have a humic-fulvic type. It is established instability and greater lability of organic matter in soils from the islands (Γ 7.8).

5. Most significant scientific and applied achievements and implementation activities.

Use of fertilizers and improvers to make better soil characteristics and plant growth

Pot experiment with a mixture of the heap (Kremikovsi Metallurgic company) and sludge (1:6) from the vacuum filter of the cellulose processing plant Kostenets has been carried out with seeds of *Quercus rubra* L. The lack of ecotoxicity and phytotoxicity, as well as the low content of heavy metals, makes the vacuum filter sludge of the treatment plant in cellulose processing production suitable for introduction into the soil. Woody plants increased by more than 30 % in height and 17 % in thickness compared to control, with total biomass increasing by more than 50 % as a result of improved environmental characteristics (Γ 8.1).

- Pot experiment with fertilization with Seapton, organic fertilizer, Crystallon, mineral fertilizer in different ratios or independently has been carried out. The use of "Seapton" and in its combination with "Cristalon" has the best effect in terms of accumulation of biomass ryegrass, and also in terms of soil properties. Fertilization leads to the accumulation of more dry matter in the leaves; more C and N in the leaves, improving soil acidity; higher stocks of C; more favorable composition of the organic substance in the soil, with a higher amount of humic acids (Γ 7.5).

- The use of organic fertilizers - "Seapton" and "Biohumus" is beneficial for the growth of saplings by *Acer platanoides* L. The composition of humus improves in the use of organic fertilizers, the Ch/Cf ratio increases This gives us reason to recommend fertilization with these fertilizers in the cultivation of saplings by *Acer platanoides* L. for the needs of forestry and urban public works (Γ 7.6).

Wood vegetation as an opportunity to reduce soil contamination with heavy metals

- An assessment of the condition of the forest vegetation (black pine *Pinus nigra* Arn.) was carried out 30 years after conducting the biological reclamation of heap from the "Kremikovtzi" Metallurgic company near the village of Lokorsko. Black pine has been found to develop well and sustainably. The planting indicates a slight deviation from normal health. Based on the results obtained, we propose the creation of black pine crops (*Pinus nigra* L.) in the afforestation of this type of technogenically contaminated terrain (Γ 7.1).

6. Reflection of the applicant's scientific publications in literature (cytability).

The candidate has indicated a total of 21 citations of the publications, of which 14 in scientific publications, referenced and indexed in world-famous databases, 6 in monographs and collective volumes with scientific review and in unreferenced journals with scientific review, 1 - dissertation thesis.

7. Participation in scientific and applied projects.

The candidate has indicated a total of 8 project with its participation, leading 4, three of which have an internal subsidy to BAS and one with bilateral cooperation BAS with RAS – EBR. Participates in a project funded by the Research Fund of the Ministry of Education and Science. As a participant in 3 international projects, 2 of which are under COST and one bilateral of BAS with RAS. According to this indicator, they correspond to 205 points, which are over the requirements for this indicator.

8. Educational and teaching activities (Head/Consultant of PhD students, training of students, etc.)

The applicant has given Erasmus lectures at Santiago de Compostela University - Lugo, Spain under the ERASMUS program (2015):

- A. Agroforestry in Bulgaria, past and perspectives
- B. Soil Resources in Bulgaria and Sustainable Management

There is no information on the training of students and PhD students.

9. Assessment of the applicant's personal contribution.

Of all the publications submitted for the competition (27) the candidate has six independent publications. The first author is in many of them (19), second author in 2 pieces and third and subsequent author in 3. These indicators demonstrate that the candidate's personal contribution to the audience activity should be determined as sufficient for the competition.

10. Critical notes and recommendations.

The following critical remarks do not diminish the applicant's achievements and may be accepted as a recommendation for her future work.

I can ask the following questions; a. why are different literary sources cited in different publications to determine one the same indicator?

b. In article 31 (Г 8.4) "Organic carbon content in cinnamon forest soils in various forms of land use" there is some contradiction in the conclusions: the highest C content is determined under meadow vegetation and mineralization is found to be highest also under meadow vegetation?

A. As a clarification to the contribution, I will note that summary information on humic and fulvic acids in soil differences was published as early as 2004, and later with additions, respectively, 2007, 2015.

B. The articles presenting data on the content and composition of the organic substance are to some extent incomplete. The relative dimensions of the components, as well as the determination of total C for greater accuracy and for the convenience of users of materials, should also be presented. It is not clear that the types of humic acids (HA) are presented as part of the total amount of HA and the remaining data are in % of total carbon. None of the articles with humus composition data defined the optical characteristics (E_4/E_6), which provide information about the humification process, the nature and properties of the formed HA, etc.

C. The contribution is presented in great details. In a future summary of her materials, the applicant must work very thoroughly to clearly highlight everything achieved.

D. It is correct to use an organic matter, not – in plural, including organic substances, composition of humus, not humus composition, humic-fulvic type humus, and not humus-fulvic type humus.

E. Many spelling mistakes have been made.

F. The summary information provides 35 publications, and 27 are indicated for participation in the competition, which can lead to confusion.

G. When arranging the competition materials between different groups of publications, it would be good to have a separate page corresponding to the group of articles in the list of publications, as well as to number each article in the relevant group. Some articles miss cover pages, content, or editorial board.

H. High HA content in substrates with the presence of coal impurities has been reported in the years (Gencheva, 1993, Gencheva and Filcheva, 1995, Filcheva et al 2000, Filcheva et al, 2021; Banov, 1989 and later) – high content of total carbon, HA, humus formed under the influence of coal impurities. And this should clearly be emphasized in the developments (7.9.) in the future. There are comparisons with the 1995 developments for Pernik, but there are also summaries about Pernik in later developments that can be used.

I. I recommend that the applicant prepare and publish monographs with a summary of her research and achievements for forest soils, as well as for the other directions on which she works.

11. Personal impressions.

I know the candidate in the contest personally. I have been interested in monitoring developments, journals publications and participation in scientific forums. Personal and computer skills, English proficiency, use of different equipment make it possible to accumulate and summarize data and process it and shape scientific developments.

I don't have any common publications with the candidate.

12. Conclusion.

On the basis of the analysis of the scientific and scientific and applied activities of the applicant, I believe that the Assistant Prof. Dr. Vanya Georgieva Kachova cover the requirements of the Law on Development of academic staff in the Republic of Bulgaria, the Rules of its application and the Regulations of BAS and the Forest Institute, BAS for its application.

The presented developments are up-to-date, with scientific input, with citations in reputable journals, and on the basis of the overall scientific activity I believe that the candidate fully cover the requirements of the and the rules for its application, the collected points are 1063.5 which exceed the minimum requirements of 500 points.

All this gives me reason to **positively** appreciate the overall activity of the candidate in the competition for "associate professor" at the Forest Institute, BAS – Vanya Kachova.

I allow myself to propose to the honorable Scientific Jury also to vote positively, and to choose Assistant Prof. Dr. Vanya Georgieva Kachova for "Associate Professor" in Professional Field 6.1 Plant Growth, the scientific specialty "Field Studies".

10.08.2021

Reviewer:

(prof. Dr. E. Filcheva)