



REVIEW

from prof. Anelya Zhivkova Pencheva PhD, University of Forestry, Sofia
of the materials for participation in the competition for the academic position "Professor",
professional field 6.5. "Forestry", scientific specialty „ Forest Melioration, Forest Protection and
Special Forest Uses “: procedure code ELA-P-1123-113.

The competition for the academic position was announced in the State Gazette, no. 102 /0.8.12.2023 and on the website of the University of Forestry (UF), for the needs of the "Plant Pathology and Chemistry" department at the "Ecology and Landscape Architecture" faculty. The only candidate in the competition is Assoc. prof. Danail Dimitrov Doichev PhD.

1. Short biography of the candidate

Associate Professor D. Doichev was born on January 21, 1972, in the town of Radomir, Pernik region. He completed his secondary education in 1991 at the Technical School of Electrical Engineering and Automation, Sofia. Until 2000, he worked as an electrician specialist at the City Transport Company, Sofia. At the same time, he was a part-time student at UF, Sofia. In 1999 he graduated from the Forestry University and acquired professional qualification of a forestry engineer – master’s degree.

Since 2000, after a successful competition, Dr. Doichev became assisten professor in UF, department of Pathology and Plant protection. In February 2014 he successfully defended her PhD thesis "Bark beetles (Coleoptera, Curculionidae, Scolytinae) in Scots pine (*Pinus sylvestris* L.) plantations in Southwest Bulgaria - species composition, distribution, and damage". Dr. Doichev earned the title of Associate Professor of "Forest Melioration, Forest protection and Special Forest Uses" in 2015.

Since Februarw 2024 he has been Head of Department of Plant Pathology and Chemistry.

Assoc. prof. Doichev is bilingual in Russian and English. He has participated in a few scientific and educational projects and has excellent computer practical skills. He is a member of the Bulgarian Union of Scientists and a member of the National Forestry Commission of the Executive Forest Agency.

2. Compliance of the submitted documents and materials of the applicant with the required ones ments in accordance with the Rules for the development of academic staff in the UF

The candidate, Dr. Doichev presents very thoroughly selected and arranged documents for the competition. The main emphasis is: a summarized list of his scientific works, which includes a total of 40 scientific publications (in the period after habilitation); participations in science forums (18 reports and posters); an information about management and participation in 8 national scientific and applied research projects and a description of citations of his scientific publications. He also has provided some other comprehensive information about his activities: various types of expertises, the evidence for his participation in different courses and commission.

The reference attached below is a scientometric expression of the materials submitted by the candidate, prepared in accordance with The Regulations on the implementation of the

Development of Academic Staff in the Republic of Bulgaria Act (DASRBA) and the Rules of the FU.

Number of points by indicators

| Group of indicators /accordingly DASRBA / | Minimum national requirements | Indicator | Number of points |
|---|-------------------------------|--|------------------|
| category A | 50 | PhD thesis work for awarding educational and scientific degree "Doctor" | 50 |
| category B | 100 | B4 – 10 publ. (referenced and indexed in e Scopus – and in Web of Science) | 144,57 |
| category G | 200 | G7 – 19 publ. (referenced and indexed in Scopus and in Web of Science.); G8 – 6 publ. (reports in edited collective volumes) G11 – 6 publ. monograph chapters | 236,57 |
| category D | 200 | D13 – 20 citations in science editions, referenced and indexed in world renowned databases | 300 |
| category E | 100 | E18 – total 7 participations in a national science projects E20 – 1 project (management of a national scientific project) | 135 |
| | | Total | 866,14 |

The number and quality of the presented materials set forward by the applicant fully complies with the requirements as presented in the Rules of the UF for the academic position of Professor.

Characteristics of published scientific results

The presented list of scientific publications concerning this application includes 40 scientific papers, distributed as follows:

- Publications in scientific journals indexed in world-famous databases - 29.
- Publications in edited volumes - 6 issues.
- Published chapters of collective monographs - 5 items.

The number of scientific publications is a respectable result for the period in which they were published – between 2015 and 2022. Seven of the total number of publications are in journals with IF (impact factor), and 13 - registered in Scopus with SJR. The authority of these journals speaks for itself about the importance and originality of the published materials. Among them more important are;

- *Acta zoologica bulgarica* – 5 articles;
- *ZooNotes* – 4 articles;
- *Silva Balcanica* – 7 articles.
- *Ecologia Balkanica* – 3 articles.
- *Biologia* – 1 article;
- *Spixiana* – 1 article;
- *Journal of Forest Science* – 1 article ;

- *Baltic Journal of Coleopterology* – 1 article;
- *Journal of the Entomological Research Society*, – 1 article;
- *Historia naturalis bulgarica* – 1 article each, etc..

One of the publications is independent, 12 with one contributing author and 24 are with two or more contributing authors. Assoc. Prof Doichev is the first author in 5 of the publications,

The articles in refereed and indexed journals authored by Assoc. Prof Doichev are indicative of his academic contributions to the field of forest protection. This is further attested by the applicant's active participation in conferences and scientific committees, lectures before professional societies etc. all of which all speak to the outstanding professional qualities of the candidate.

3. A reflection on the candidate's scientific publications in the literature (citations).

The candidate submits the citations of his papers in a summary reference for entire scientific production, which includes a total of 20 citations. The represented citations are carefully accompanied by supporting evidence. All of them are in journals with a significant for our scientific area factor / IF /, referenced and indexed in world-famous databases of scientific information (Web of Science or Scopus).

I am more than sure that Dr Doichev has many times more citations, bearing in mind that I alone have cited him more than 5 times, which is not noted in the presented materials.

4. Characteristics and evaluation of the candidate's activity

4.1. An educational and pedagogical activity

The educational and pedagogical contribution to the field of forestry of the applicant is extremely diverse. Between 2015 – 2023, Dr. Doichev has held lectures in the following disciplines:

- Forest Entomology (Bachelor degree Forestry).
- Forest Protection (Master degree Forestry).
- Integrated Methods of Plant Protection (Master degree Ecology and Environmental Protection).
- Introduction to Plant Protection (Bachelor degree Ecology and Environmental Protection).
- Ornamental Plant Protection (master's degree Landscape architecture)

Associate Professor D. Doichev was a scientific consultant to a PhD student who had already successfully defended his thesis, and from January 2024 he is the scientific supervisor (together with Prof. S. Bencheva) of a full-time PhD student. Dr. Doichev is dedicated to teaching and mentoring both graduate and undergraduate students, having successfully mentored 25 students who have completed their academic work under his direction as of 2023. These include the following:

- Bachelor degree Forestry – 4 students, Master degree Forestry – 21.

In his education approach, the candidate uses modern training technologies and has overseen the construction and equipment of an Entomology laboratory. In his daily work he expresses a keen desire to improve and update the educational materials with innovations in forest protection practice and entomology.

4.2. Scientific, applied scientific and innovative activity

The scientific output of Dr Doichev has a wider subject scope but is mainly focused on forest entomology. The publications presented are mainly devoted to the group of bark beetles and wood-destroying insects. The selected topic is current and important for forest protection practice, given their role in forest decline. The studies continue the themes of previous studies and are the result of significant factual material. A very good impression is created by the in-depth and purposeful studies of the bio-ecological features, which reflect on the success of the measures for their control. The publications also include studies related to the role and importance of the entomophagy's complex of the investigated pests.

The research activity of Dr. Doichev is supported by work on various projects, the number of which amounts to 8. Among the most notable projects of the candidate is his annual participation in the team implementing the program "Assessment and monitoring of forest ecosystems - within the framework of project "Future development and construction of a unified forest monitoring system". The database created as a result makes it possible to comprehensively characterize the processes related to the dynamics of the phytosanitary status of forest ecosystems. The work of the team has laid the foundations for national and international management decisions regarding the protection of forest ecosystems.

The candidate's priority scientific activity includes the project "Reserves and role of dead biomass in forest ecosystems of common beech in Western Stara Planina" - 2016-2017.

The candidate's participation in the research projects has undoubtedly enriched and deepened his knowledge in the subject area, which is essential for his imposition as a scientist and teacher.

4.4. Candidate's contributions (scientific, scientific applied, applied)

Given his all-encompassing work in the last 8 years, contributions of Dr. Doichev are very broad and affect in multiple areas including forest phytopathology, entomology, and plant protection. I will review and organize them in the following categories:

Original faunal contributions to the country

- -The following insects are reported as a novel to the entomofauna of Bulgaria: the invasive pest of *Ulmus minor* - the sawfly *Aproceros leucopoda*, (B4, G11), 2 parasitoids of *Ips typographus* (*Medetera pinicola* and *Lonchaea fugax*) (B1), the larval parasitoid of longhorn beetle *Rhimphoctona xoridiformis* and the saproxylic species *Pediacus dermestoides* (G20)
- Studies of representatives of the family Cerambycidae. Based on data from a species survey in Belasitsa mountain (Bulgarian and North Macedonian part), a zoogeographical characterization of the established 110 taxa was made. In this region, the European complex is dominant (38.18%), followed by the Mediterranean (19.09%) and the Eurosiberian (13.64%). According to the analysis, the endemic longhorn beetles have the largest share (8.18%), compared to the endemics from other Bulgarian mountains. The analysis included 104 trophic relationships between 54 tree and shrub species and 93 taxa of longhorn beetles (G12, G13, G15 and (G27).
- Data from field surveys on the distribution of 17 taxa of the family Buprestidae and 33 of the family Cerambycidae in the Abruzzo, Lazio and Molise National Park, Italy, of which 19 (16 goldfinches and 3 goldfinches) are new to this territory. (G17).

- The data on the distribution in Bulgaria of representatives of the Buprestidae family, belonging to different subfamilies – Agrilinae (31 taxa), Buprestinae (47), Chrysochroinae (19) and Polycestinae (13 taxa) are summarized (G21, G23, G25 and G28).

Scientific and applied scientific contributions related to the ecology of insect pests

These studies are original for our country, they concern the complex of pathogens, parasites and parasitoids involved in regulating the number of populations of forest pests. They are the result of extensive field and laboratory research. Data from studies at different sites are compared with similar ones in Europe and commented on in their context as a promising alternative to traditional pest control measures.

- Studies on *Ips typographus* - one of the most significant pest of spruce in our country. Four entomopathogens (virus, protozoa and the entomopathogenic fungus *Beauveria bassiana*) and five nematode species were isolated from biological material collected over a long period (2003 – 2018) from nine localities (in the Vitosha, Lyulin and Rhodopes mountains). The unicellular microorganism *Gregarina typographi* is the dominant species. The group of nematodes includes 4 types of parasites and 1 associate. In the different localities, the contamination with them is between 38.8% and 96.2%. The pathogenicity and infection mechanisms of individual types of entomopathogens are discussed. (G33) Entomopathogenic fungi of the genus *Beauveria* were studied in populations of *Ips typographus* from Vitosha. Two species - *B. bassiana* and *B. caledonica* - were identified and 33 strains were obtained in vitro. A comparative analysis of the most pathogenic 5 strains with the commercial myco-insecticide Boverol® and highly virulent strain *B. bassiana* ARSEF 12957, (isolated from *I. typographus* in Slovakia) was made. Results from laboratory studies demonstrate the potential of these strains for *I. typographus* control (B6)
- The presence of various parasitic nematodes was found in 13 species of bark beetles. The strongest infestation was reported for *Ips sexdentatus*, *Hylurgus ligniperda* and *Orthotomicus erosus* – 90%, 81.6% and 80%, respectively. (B1)
- In various other localities of bark beetle attacks in the country, protozoa of the genus *Gregarina* were isolated from *Ips sexdentatus* (with an infection rate of 11.1%) and *B. bassiana* on the bark beetles *Dryocoetes autographus* and *Hylurgops palliatus* (B3). Microsporidia of the genus *Nosema* were found for the first time from the fat body of the bark beetle *Pityogenes chalcographus*. (B5)
- In bark beetle collections from the country, protozoa of the genus *Gregarina* were isolated from *Ips sexdentatus* (with an infection rate of 11.1%) and *B. bassiana* on the bark beetles *Dryocoetes autographus* and *Hylurgops palliatus* (B3).
- Also new for our country is the isolation of *B. bassiana* spores from adults of *Attelabus nitens*. The established infection rate reaches 62%. (B5).
- A total of 18 species of entomopathogenic fungi and numerous isolates belonging to the orders Hypocreales, Eurotiales and Entomophthorales were identified during six years of research from 12 bark beetle's species and 10 species of butterflies. The results of laboratory and field trials conducted with some of these fungal isolates against various bark beetles and *Lymantria dispar* (G35) are attached.
- In the period 2005-2017, nine new for Bulgaria cyprinid and dipterous larval parasitoids of sechkovci were found. (B4)
- Two new entomophages of *Thaumetopoea pityocampa* were found - the parasitoid *Bothria frontosa* (Diptera, Tachinidae) (B9) and *Oecanthus pellucens* (Orthoptera, Gryllidae) - a

- predator of larvae from the continental form of *T. pityocampa* (B7).
- The list of predatory insects known in the entomological literature related to different stages of the development of *T. pityocampa* has been supplemented - a total of 21 species from the div. Orthoptera, Mantodea, Dermaptera, Coleoptera, Hymenoptera and Diptera. (B7)

Other scientific and practical contributions

In general, they concern the following several aspects:

- Possibilities for bark beetle control: The efficacy of the entomopathogenic fungus *Metarhizium pempigi* was also tested against adults of *I. typographus* in laboratory conditions. The results prove that the tested strain is promising. Further trials related to its use for bark beetle control are recommended (B8). The insecticidal activity of three plant extracts - essential oils from *Origanum vulgare hirtum* and *Monarda fistulosa*, as well as a hexane fraction from *Tanacetum cinerariifolium* - was investigated. in relation to their in laboratory conditions against adults of *Ips typographus*.
- Factors influencing the health status of forests.
The candidate's research includes studies and analyzes of the health status of natural oak plantations, oak and beech forests, and white and black pine cultures located in different regions of Bulgaria (Stara Planina, Sredna Gora, Vitosha, Rila, Plana, Strandzha and Rodopi). They are the result of his participation in the international cooperative program "Assessment and monitoring of the influence of polluted air on forest ecosystems". (D32, D36, D37, D38, D39 and D40). The published analysis is based on many years of data and can provide practical guidelines for the management of different types of forests in our country.
- An innovative methodology for complex assessment and distance monitoring on forest plantations in hard-to-reach areas has been tested, through in-situ observation and remote sensing technology to determine the damaging factors. The method made possible to trace the expansion of bark beetles from *Ips typographus* and on this basis the decline of Norway spruce plantations (*Picea abies*) was predicted (G14, G24).
- The first study in Bulgaria was carried out on the spread of the dangerous pathogen *Biscogniauxia mediterranea* in cork oak plantations. New for Bulgaria are the associations of the cork oak with ten species of insect xylobionts. Eight of them are also potential vectors of *B. mediterranea* (G27).
- In beech plantations from the Western Stara Planina, 24 species of insects from 14 families were found, decomposing dead beech wood. Five of the beetles found are part of the European Red List of saproxylic beetles of the International Union for Conservation of Nature (IUCN) – *Cerambyx scopolii*, *Denticollis rubens*, *Isoriphis melasoides*, *Isoriphis nigriceps* and *Sinodendron cylindricum*. (G31).

5. Assessment of the applicant's personal contribution

I am convinced of the personal contribution of Dr. Doichev in the materials presented to me. I am a witness to the fact that the major part of the publications is based on the biological materials collected in extensive field work and analyzed at the entomology laboratory at the Forestry University.

6. Critical notes and recommendations

The materials reviewed exceed the requirements for the rank of professor as defined by the Forestry University based both on their quality and quantity. I have no major critical remarks. Rather, I would make a recommendation for Dr Doichev to focus on the previous results and experience gained, and generalize them in a wider context. The candidate has the knowledge accumulated over the years and the necessary practical experience to provide a teaching aid in this area. Given the lack of contemporary textbooks on Forest Entomology and Forest Protection from the last 4 decades in our country, such material will be very valuable for practice.

7. Personal impressions.

I know the candidate since his appointment at the Forestry University. I consider Dr Doichev a well-respected and meticulous lecturer who demonstrates an exemplary level of professionalism in her duties. He is a very attentive and careful colleague.

Doctor Doichev approaches his scientific work very responsibly, strives for precision, and is very methodical in his choice of topics and a team. He has a personal interest in photography and these skills allow him to use original photo materials for publications.

8. Conclusion:

It is evident that the candidate is a well-rounded scientist and lecturer with comprehensive specialized skills and knowledge in forest plant protection. My review of his scientific contribution leads me to the conclusion that the volume and content of his work meet all the requirements for the academic title of Professor, as defined by the Forestry University policy.

Therefore, I take the liberty of recommending to the Honorable Jury to award Associate Professor Dr. Danail Dimitrov Doichev the academic position of "**Professor**" in professional field 6.5. "Forestry", scientific specialty „Forest Melioration, Forest Protection and Special Forest Uses.

Date: 01.04.2024

Reviewer:

