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OPINION

on the materials submitted for participation in a competition for the academic position of "Professor" in the Scientific field 4. Natural Sciences, Mathematics and Informatics, Professional field 4.3. Biological Sciences, Scientific specialty "Ecology and Ecosystem Protection", announced by the Forest Research Institute - BAS in the State Gazette No. 18 of 17.02.2026 for the needs of the Section "Forestry and Forest Resources Management"

Candidate for participation in the competition: Assoc. Prof. Dr. Ina Yosifova Aneva

Prepared the opinion: Corresponding Member, DSc Georgi Tsvetkov Georgiev, Professional field 6.5. Forestry, Scientific specialty Forest reclamation, forest protection and special uses in forests, appointed as a member of the scientific jury by order No. RD-15-209/15.04.2026 of the Director of the Forest Research Institute – BAS.

1. Brief biographical data

Ina Yosifova Aneva was born on 04.06.1985. In 2004, she graduated with honors from the "Acad. Sergey P. Korolyov" High School of Natural Sciences and Mathematics in Blagoevgrad. From 2004 to 2010, she studied at Sofia University "St. Kliment Ohridski" as a bachelor in molecular biology and master in botany (higher plants) and graduated with a gold badge for excellent results. During her studies, she worked as a laboratory assistant in the "Neurogenetics" Section at the Institute of Molecular Biology "Acad. Rumen Tsanev". In 2011, she started working as a biologist at the Institute of Biodiversity and Ecosystem Studies at the Bulgarian Academy of Sciences (IBES). In the period 2012–2016, she developed a dissertation on the topic "Biological and phytochemical in situ and ex situ study of Sideritis species with conservation status in Bulgaria" and received the educational and scientific degree "Doctor". In 2016, she was appointed to the Institute of Biodiversity and Ecology as an assistant, where in 2017 she was elected as a Chief Assistant, and in 2019 - as an Associate Professor, where she currently works. In 2021, she was elected as the Scientific Secretary of the Department of "Biodiversity, Bioresources and Ecology" of the Bulgarian Academy of Sciences, and in 2025 she was re-elected for a second term. Her research activity has been honored with 9 national scientific awards, including Grand Prize for Young Scientist "Pythagoras" (2020) and Honorary Badge "For Merit to the Bulgarian Academy of Sciences" (2024), as well as three international awards, including UNESCO's Man and the Biosphere (MAB) Young Scientists Award.

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

Assoc. Prof. Dr. Ina Aneva provides all necessary documents and materials required by the Regulations for the Acquisition of Scientific Degrees and Holding Academic Positions at the Forest Research Institute - BAS. The overall assessment of her scientometric indicators (3881 points) exceeds nearly 6 times the required minimum (660 points) for holding the academic position of "professor" at the Forest Research Institute - BAS.

3. General description of the materials presented

Assoc. Prof. Dr. Ina Aneva has presented 148 scientific publications, of which 102 are refereed and indexed in Web of Science and Scopus (with a total impact factor of 223), book chapters in international journals (Springer and Taylor & Francis) and conference proceedings. She participated in the competition for a professorship with 56 scientific publications – 16 in Indicator Group B and 40 in Indicator Group D.

All publications in the competition for a professorship are written in English. Of the remaining 92 publications, 89 are written in English and only three – in Bulgarian.

Assoc. Prof. Dr. Ina Aneva is the sole author in two publications, in 27 collective publications she is the lead author (11 in the competition), in 24 she is the second author (four in the competition), and in 95 – the third and subsequent author.

The candidate participated with 174 reports and posters at international and national scientific forums.

Assoc. Prof. Dr. Ina Aneva is the author (producer, screenwriter, director, cinematographer and editor) of the feature-documentary film "155 years of the Bulgarian Academy of Sciences: The Living Spirit of the Creators", presented on 11.10.2024 in the "Prof. Marin Drinov" hall at the Bulgarian Academy of Sciences. The film was broadcast four times on BNT 2 and BNT 4 and was presented in Paris (Ethnografilm Festival – Paris).

4. Main areas of the candidate's research work and the most important scientific and applied scientific contributions

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The research activity of Assoc. Prof. Dr. Ina Aneva is focused on the field of biodiversity, genetic resources and sustainable use of medicinal plants. Her scientific and applied scientific contributions are related to the taxonomy and systematics of taxonomically complex groups of plants, species diversity, distribution, genetic resources, conservation and sustainable use of medicinal plants and their secondary metabolites. An extended habilitation report considers medicinal plants not as an isolated object of botanical or pharmacognostic research, but as a multi-layered system in which the conservation and sustainable use of medicinal resources requires an integrated scientific approach based on floristic, taxonomic, molecular, phytochemical, population biological and ethnobotanical methods. As a result of the candidate's research, significant scientific and applied scientific contributions have been made, as follows:

TAXONOMIC, FLORISTIC AND SYSTEMATIC CONTRIBUTIONS. A new species from Bulgaria – *Sideritis elica* – has been described based on a complex approach, including morphometric

characters and molecular data for differentiation from the closely related *S. scardica* [Publication No. 3]. *Malus florentina* has been reported for the first time in the country [No. 15]. A new locality of *Inula spiraeifolia* has been identified in the Struma River valley [No. 13]. It has been proven that the use of public genetic databases and DNA barcoding based on four widely used markers (matK, rbcL, trnH-psbA, ITS) is insufficiently reliable for the characterization and identification of the taxonomically complex genus *Thymus*, therefore an integrated approach combining molecular, morphological and population genetic data is proposed for this purpose [No. 2].

CONTRIBUTIONS TO THE STUDY OF THE BIOCHEMICAL, GENETIC AND PHYTOCHEMICAL DIVERSITY OF MEDICINAL PLANTS. An integrated approach was applied to characterize the genetic and structural variability of *Hyssopus officinalis*, combining analysis of genetic diversity using SRAP markers and study of the composition of volatile compounds in flowers using GC-MS analysis [No. 10]. In the genus *Thymus*, new data on the chemical composition of essential oils and extracts from Bulgarian and Balkan taxa were presented [No. 7, 9]. A reliable analytical platform was developed for assessing the quality and quantity of characteristic molecules in three species of the genus *Rhodiola* [No. 19]. Significant interspecific differences in the metabolic profile and biological activity of *Asphodelus albus* and *A. aestivus* were found [No. 20]. A relationship was proven between the evolutionary differentiation of species of the genus *Hypericum* and their ability to produce hypericin [No. 28] and spatial variability in metabolic profiles and alkanine content in populations of *Alkanna tinctoria* [No. 29]. In species of the genus *Inula*, chlorogenic acid and isomeric dicaffeoylquinic acids were identified and quantified [No. 36], the composition of volatile compounds was analyzed [No. 40], a new ent-kauranic diterpene was structurally characterized [No. 42], 33 terpenoids were identified [No. 44], and the variability in the content of phenolic compounds and antioxidant activity was studied [No. 52]. Fifty-two primary and secondary metabolites were identified in *Nectaroscordum siculum*, [No. 41]. The phytochemical composition of three species of the genus *Carlina* was studied [No. 41]. The phytochemical profile of natural populations of *Arctostaphylos uva-ursi* from different mountainous regions in Bulgaria was studied [No. 56].

CONTRIBUTIONS TO THE ASSESSMENT OF THE FUNCTIONAL AND ECOLOGICAL POTENTIAL OF MEDICINAL PLANTS AND THEIR SECONDARY METABOLITES. The main groups of medicinal plants and phytochemical compounds affecting pulmonary hypertension have been identified [No. 18]. The effect of *Cynara scolymus* on body weight and body mass index has been assessed [No. 21]. Data on the effects of *Tribulus terrestris* on the female reproductive system have been systematized [No. 23]. It has been shown that the joint application of *Cynara scolymus* leaf extract with conventional therapy leads to improvement of liver function and reduction of fatty infiltration [No. 24]. It has been proven that the intake of *Punica granatum* regulates oxidative stress by increasing antioxidant enzymes and reducing lipid peroxidation [No. 27]. The biological potential of essential oils and exudates of *Artemisia santonicum* and *A. lerchiana* as biopesticides has been assessed [No. 31]. Data on the therapeutic potential of phytochemical compounds in allergic asthma have been systematized [No. 33]. The mechanisms of action of phytochemical compounds in allergic rhinitis are summarized [No. 34]. Ethnopharmacological and phytochemical data on species of the genus *Gentiana* are systematized [No. 38]. The therapeutic potential of resveratrol in respiratory diseases is evaluated [No. 43]. Significant differences in the metabolic profile of the

plant organs of the endemic Balkan species *Angelica pancicii* are established [No. 48]. The therapeutic potential of a hydromethanolic extract of *Fraxinus excelsior* for the treatment of rheumatoid arthritis is studied [No. 50]. Thirteen isoquinoline alkaloids are identified in species of the genus *Corydalis* [No. 51]. The role of the signaling target of rapamycin (mTOR) in viral infections, including COVID-19, is systematized [No. 54].

CONTRIBUTIONS TO THE STUDY OF THE TOXICOLOGICAL AND ECOLOGICAL EFFECTS OF NATURAL AND SYNTHETIC COMPOUNDS ON BIOLOGICAL SYSTEMS. Data on the mechanism of action of natural compounds and RNA interference in coronavirus infections have been systematized [No. 22]. A complex toxic effect of avermectins on the physiological systems of animals and ecosystems has been proven through bioaccumulation, ecotoxicity and the risk of resistance development [No. 26]. The phytotoxic activity and inhibitory effect of extracts, exudates and essential oils from plant species on weeds have been assessed [No. 35]. The herbicidal potential of essential oils from representatives of the Lamiaceae and Asteraceae families has been assessed [No. 37]. Data on the toxicity of medicinal plants and related cases of poisoning in humans have been systematized [No. 37]. The risks of combined use of natural products and drugs in COVID-19 have been analyzed [No. 45]. A strongly pronounced phytotoxic and insecticidal effect of essential oil from *Origanum vulgare* subsp. *hirtum* on plants and pests [No. 53] and insecticidal activity of plant extracts and essential oils of species from the families Lamiaceae, Asteraceae and Amaryllidaceae as an alternative to synthetic insecticides [No. 55].

CONTRIBUTIONS IN THE FIELD OF CONSERVATION AND SUSTAINABLE USE OF MEDICINAL PLANT SPECIES. A comparative analysis of representatives of the genus *Thymus* with a clearly established phytochemical profile was carried out, including traditionally cultivated and newly introduced local species, some of which are distinguished by a significantly higher yield of essential oil and a clearly expressed and stable chemotypic differentiation [No. 7]. It was established that *Rhodiola rosea* populations in the Rila Mountains are small and fragmented, with limited regeneration and strong dependence on specific ecological conditions, and it was concluded that anthropogenic pressure and the increasing demand for the species for pharmacological purposes pose a significant risk to the studied localities [No. 12]. An assessment was made for the sustainable use of the potential of representatives of the genus *Tilia* based on information from forest management plans [No. 11], *Adonis vernalis* through analysis of representative natural localities in Western Bulgaria [No. 16], *Primula veris* through embryological, population and genetic analyses [No. 25], species of the genus *Gentiana* [No. 30]. It has been established that pollinators, and in particular bees, are a key factor in the reproduction of plant resources and the maintenance of the biodiversity of medicinal plants [No. 14].

CONTRIBUTIONS TO CLARIFYING THE ROLE OF ECOLOGICAL AND ANTHROPOGENIC FACTORS IN SHAPING SPECIES RICHNESS IN DIFFERENT TYPES OF ECOSYSTEMS. It has been shown that the assessment of biodiversity in agroecosystems cannot be based solely on the type of land use, but requires an integrated approach taking into account the complex interaction between climatic, ecological and anthropogenic factors [No. 1]. The role of grassland ecosystems as habitats with high conservation value and key elements of biodiversity, including rare, endemic and conservation-important species and requiring targeted measures to preserve floristic diversity and maintain the favorable condition of grassland habitats [No. 8]. It has been established that in agricultural ecosystems, semi-natural habitats (especially grassland communities and fallow lands)

have a key role in maintaining specialized species, while landscape heterogeneity and connectivity support overall biodiversity [No. 17]. Based on field and remote sensing data (satellite imagery), habitat loss and reduction in plant diversity have been identified in the Kurram Valley in northwestern Pakistan, resulting from increasing use of natural resources [No. 47].

CONTRIBUTIONS IN THE FIELD OF ETHNOBOTANY AND TRADITIONAL KNOWLEDGE. Ethnobotanical and pharmacological studies have been conducted to quantitatively assess the scale and specific applications of medicinal plants in the Rhodope Mountains, relevant for collecting ethnobotanical data necessary for strategies for the conservation and sustainable use of existing and new medicinal resources [No. 4, 5]. A high degree of similarity in the traditional uses of the genus *Thymus* in different parts of the Balkan Peninsula has been highlighted, highlighting the sustainable nature and empirical basis of ethnopharmacological knowledge [No. 6].

5. Reflection of the candidate's scientific publications in the literature

Assoc. Prof. Dr. Ina Aneva presents a list of 803 citations to 82 of her publications. The citations are made in reputable scientific publications, referenced and indexed in world-renowned databases of scientific information.

6. Participation in scientific projects

Assoc. Prof. Dr. Ina Aneva is the head of a Bulgarian team in three international scientific projects under Horizon Europe and 5 national scientific projects – three under the Scientific Program “Young Scientists and Postdoctoral Fellows”, one with the Scientific Research Fund (SRF) and one with the Ministry of Education and Science (MES). The funds attracted by the projects led by the candidate are 989,731 BGN. Apart from this, Assoc. Prof. Dr. I. Aneva is a participant in the implementation of 5 international and 15 national scientific projects: two under European Union programs, 9 with the SRF, three with the MES, one with the Ministry of Environment and Waters, one with the Enterprise for Management of Environmental Protection Activities, one with the Environmental Protection Agency and three with other national institutions.

7. Teaching and learning activities (supervisor/advisor of doctoral students, student training, etc.)

Assoc. Prof. Dr. Ina Aneva leads classes at the University of Forestry - Sofia, Department of Agronomy, in the discipline "Enemies of Cultivated Plants", full-time and part-time education of the 3rd and 4th courses for obtaining the educational and qualification degree "Bachelor" and "Master", with a total annual workload of 121 hours and 5 hours outside of classroom work.

8. Assessment of the candidate's personal contribution

Assoc. Prof. Dr. I. Aneva is the author of both individual and collective publications, in which her individual style stands out.

9. Critical notes and recommendations

I have no critical comments about the candidate's scientific works.

10. Personal impressions

Assoc. Prof. Dr. Ina Aneva uniquely combines exceptional potential for scientific research, administrative capacity and attitude and skills for formulating and implementing common causes. Professionally, she is ambitious, purposeful and maximally responsible, and personally, she is extremely correct in her relationships with colleagues.

11. Conclusion

Assoc. Prof. Dr. Ina Yosifova Aneva has a clearly outlined profile of scientific research in the field of biodiversity and biological activity of medicinal plants. She participated in the competition with a rich and exceptionally high-quality scientific output. Her scientometric indicators many times exceed the requirements of the Law on the Development of the Academic Staff of the Republic of Bulgaria, the Regulations for its implementation and the criteria adopted at the Forest Research Institute of at the Bulgarian Academy of Sciences. Her contributions enrich and expand botanical science with new facts about the functional, biochemical and genetic diversity of medicinal plants, the biological activity of plant compounds and the influence of anthropogenic factors on various types of ecosystems. An indicator of the quality of her scientific research work is the large number of publications and citations in the most prestigious scientific journals and the implemented socially significant projects in the field of studying and protecting biological diversity.

In connection with the above, I confidently propose Assoc. Prof. Dr. Ina Yosifova Aneva to be elected "Professor" in Scientific Area 4. Natural Sciences, Mathematics and Informatics, Professional Field 4.3. Biological Sciences, Scientific Specialty "Ecology and Ecosystem Conservation".

07.06.2026

Written by:

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