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REVIEW

of the PhD Thesis presented for the awarding of the scientific and educational degree DOCTOR in the field of higher education 6. Agricultural Sciences and veterinary medicine, professional direction 6.5. Forestry (scientific specialty Forest melioration, forest protection and special forest usage)

Author: MSc Pavel Yordanov Topalov, Forest Research Institute, Bulgarian Academy of Sciences

Theme: "SPECIES COMPOSITION, DISTRIBUTION AND BIOECOLOGICAL FEATURES OF THE LONGHORN BEETLES (COLEOPTERA, CERAMBYCIDAE) ON VITOSHA MOUNTAIN"

Reviewer: Prof. Dr. Zdravko Hubenov – National Museum of Natural History, Bulgarian Academy of Sciences

By order № RD 15-138 from 23.04.2025 of the Director of the Forest Research Institute, Bulgarian Academy of Sciences I was appointed a member of the scientific jury in a competition for the academic position of "Doctor" in the field of the higher education 6. Agricultural Sciences and veterinary medicine, professional direction 6.5. Forestry (scientific specialty **Forest melioration, forest protection and special forest usage**), announced for the needs of the Department of Forest entomology, phytopathology and hunting fauna at the Forest Research Institute, Bulgarian Academy of Sciences.

MSc **Pavel Yordanov Topalov** from the Department of Forest entomology, phytopathology and hunting fauna participates in the announced competition as a candidate.

Pavel Topalov entered the Faculty of Biology of the Plovdiv University Paisii Hilendarski as a biology student in 1994. The following year, he continued his education at the Faculty of Biology of the Sofia University St. Kliment Ohridski, where he received a bachelor's degree in biology in 1999. In 2001, he graduated with a master's degree in biology – Zoology of Vertebrate Animals (Herpetology) at the Faculty of Biology of the Sofia University St. Kliment Ohridski. From 2001 to 2015, he worked as a biology teacher and head of extracurricular activities. From 2017 to 2018, he was an expert in educational projects at the Give a Book Foundation. From 2022 to 2025, he was a PhD student at the Forest Research Institute, Bulgarian Academy of Sciences. His interests are focused in the fields of entomology and herpetology. Related to the theme of the dissertation, he has presented 5 publications (2 with IF) in specialized academic journals, in 2 of which he is the first author. He has participated in 6 scientific forums related to the dissertation.

The data presented show the qualifications, research experience and scientific activity, required for participation in the competition for the scientific and educational degree of Doctor.

The PhD Thesis is written on 200 pages, of which 1 – Table of Contents, 2 – Introduction, 1 – Aim and Tasks, 35 – Literature Review, 10 – Material and Methods, 131 – Results and Discussion (divided into 2 sections), 1 – Conclusions and Recommendations, 1 – Contributions and 18 – References of 318 titles (87 in Cyrillic and 231 in Latin). The dissertation contains 11 tables and 140 figures.

The introduction of the dissertation discusses the importance of the Cerambycidae family for the forest communities, their total number, research in Bulgaria and the good opportunities for comparative faunistic studies that the Vitosha Mountain offers. The role of the Cerambycidae in the decomposition of the dead wood and role of the separate species as forest pests are mentioned. Attention is paid to the conservation importance of the family and the interest of collectors in it. The research presented in the dissertation are current and necessary.

The precise and detailed literature review provides an idea of the knowledge of MSc Topalov, his penetration into the problems and his ability to critically evaluate and use the existing information. This is also seen in the following chapters of the dissertation, where the literature is used in the interpretation of his own data and conclusions. The literature analysis includes a characterization of Cerambycidae, a review of studies on the family in Bulgaria and the conservation significance of the established species. Detailed, useful, comprehensive and up-to-date information is presented, which can be used by various specialists.

The aim and tasks of the dissertation include a study of the species composition of Cerambycidae in the different parts of Vitosha, horizontal and vertical taxa distribution, trophic relationships, areographical analysis of the representatives of the family, parasitism and parasites on the forest pests and conservation significance of the established taxa. The data presented in the dissertation correspond to the set aim and listed tasks.

The physiographical characteristic of the Vitosha Mt. concern the features of the relief, climate, waters, soils and vegetation. It allows an opinion to be formed about the studied territory and the degree of its knowledge by the author. The attached map of the studied region complete this impression. The characteristics of Vitosha can also be used by other specialists. In collecting and processing the material, classical and modern methods were used, adapted to the specifics of the study: comparative material from museum collections, collection from vegetation, use of traps, pheromone traps and isolation of tree parts. The studied territory is well covered by skillfully selected transects. The duration of the study, general work with the best specialists, improvement of the research methods, collection of material and using of modern methods allowed MSc Topalov to accumulate material suitable for comparative studies, that demonstrate well and convincingly present the results of the study.

For the first time, all information on the studies of the Cerambycidae family in Bulgaria has been summarized in detail and critically. A total of 131 species (51.4% of the species known for the country) from 7 subfamilies has been established in the Vitosha Mt. Fifteen species are new to the fauna of the mountain. The distribution of 60 species, of which 7 are rare forms, has been appended. The established Cerambycidae have been scrutinized by zones and vegetation belts, and the localization of the greatest diversity has been determined. The trophic relationships (with 24 new food plants) and the parasitoid complex (parasites from the orders Hymenoptera and Diptera) have been presented. The Cerambycidae fauna is distributed among 17 areographical (chorotypic) categories, combined in 8 complexes and compared with other Bulgarian mountains. The dominant areographical complexes have been determined. The conservation significance of the Cerambycidae family has been scrutinized in details. It is clarified that 85 species (64.9%) are included in the national, European and international acts and conventions related to the protection of the endangered taxa. The most vulnerable species are commented.

The dissertation includes contributions of a faunistic, zoogeographical, parasitological, biological, methodological and conservation character, which are new for science, enrich the existing knowledge, correct known ideas or append knowledge about the distribution, parasite-host relationships, collection and research methods. These contributions have both a fundamental scientific and scientific-applied character. The attached figures and tables sustain and illustrate the presented material. An achievement is the use of a new methodological approach for collecting and controlling the number of species in the forest communities using a mixture of synthetic pheromones, which allows an early detection and monitoring of the pests and invasive forms.

The abstract and the reference for the scientific contributions correctly and accurately reflect the achievements and contributions of the dissertation work.

The presented dissertation is according to the requirements proposed for the design of such works. However, some recommendations can be made.

1. When considering a mountain system, it is better to present the areographical structure of the fauna (Table 10) according to the vegetation or hypsometric belts (as in Table 7). This allows an easy comparison of the areographical complexes at different altitudes to be made.

2. When using the areographical scheme of Vigna Taglianti et al. (1999), it should be kept in mind that the border between the Western and Eastern Palaearctic runs along the Ural Mountains (the eastern border of Europe, not along the Yenisei River), which the zoogeographers most often consider as an error.

3. For some species, a general distribution and areographical category are given, while for others, only the areographical category (chorotype) is given. It is

recommended the same representation of the distribution for the separated taxa to be given.

4. The chapter Conclusions and Recommendations is better as Results and Conclusions to be formulated, as it includes separate results but only one recommendation for future investigations.

From literature at the end of the dissertation and the abstract it is seen the participation of MSc Topalov in 5 publications (2 with IF) in specialized scientific journals, in 2 of which he is the first author. The works are precisely presented, one in Bulgarian and 4 in English. They reflect the research of MSc Topalov on the distribution, faunistic composition, areography, parasitoid fauna, conservation significance and the role of Cerambycidae in the forest communities of Vitosha.

The publications and original research outline the personal contribution of MSc Topalov as an established specialist in the presented field. The assessment according to the credit system in the Bulgarian Academy of Sciences regarding the educational program (a mandatory minimum of 250 credits) has been exceeded more than 2 times and the PhD student has achieved a total of 582 credits. His participation in 6 scientific forums, close to the topic of the dissertation, is evident.

CONCLUSION. MSc **Pavel Topalov** is a well-established specialist in the field of the ecology and protection of the forest ecosystems. He is familiar with the problems of the fauna, distribution, conservation and significance of an important group of rare forest insects. He has applied the necessary methods, carried out a series of experiments and made convincing summaries and conclusions, which are supported by the necessary factological material and publications in specialized scientific journals. The presented work is in accordance with the Act for the Development of the Academic Staff, the Rules of its Application and the corresponding Rules of the Bulgarian Academy of Sciences for the scientific and educational PhD degree. I give a **positive** assessment and **recommend the Scientific Jury to vote positively** and award the scientific and educational degree **Doctor** to MSc Pavel Yordanov Topalov in the scientific specialty Forest melioration, forest protection and special forest usage.

Sofia
6.06.2025

Reviewer:

/Prof. Dr.Zdravko Hubenov/