

## О P I N I O N



on a thesis for the degree of Doctor of Science in Field of higher education 6. Agricultural sciences and Veterinary medicine, Professional Direction 6.5 Forestry, Scientific Specialty "Forest plantations, breeding and seed production"

**Author of the dissertation:** Assoc. Prof. Krasimira Nikolova Petkova-Tzokova, PhD, Department of Forestry at the University of Forestry, Sofia

**Dissertation topic:** "Potential for Adaptation of Douglas-fir and Common beech Provenances to Climate Change"

**Member of the Scientific Jury:** Prof. Nikolina Penkova Tzvetkova, PhD – University of Forestry, Field of higher education 6. Agricultural sciences and Veterinary medicine, Professional Direction 6.5 Forestry, Scientific Specialty "Forestry (incl. Dendrology)", appointed as a member of the scientific jury with order No. ZPS-636 / Nov 28, 2019 of the Rector of the University of Forestry.

### **1. Brief introduction of the applicant**

Krasimira Petkova is an Assoc. Professor at the Department of Forestry at the Faculty of Forestry. In 1990, she acquired PhD science degree with a dissertation thesis on forest crops. Later she has further developed and expanded this subject to the level of her current doctoral work. Assoc. Prof. Petkova has written a syllabus on Forest Plantations and she has authored and co-authored nine textbooks and teaching aids. She is continuously raising her professional level by participating in courses in modern academic teaching methods, which contribute to her growth as a highly qualified student teacher. A large number of bachelor's and master's theses have been developed under her supervision, as well as a doctoral dissertation. Assoc. Prof. Petkova is an in-depth researcher in the field of forest cultures, with an active international participation in scientific forums, international programs and specializations. She has taken part as an expert in more than 20 national and international research projects.

### **2. Relevance of the problem.**

The real size of climate change provokes the need to study the adaptive capacity of tree species in regards to a future successful management. This need determines the relevance of the present thesis and its significance as one of the pioneering scientific researches in Bulgaria in this field.

### **3. Knowledge of the problem's state and creative interpretation of the literature review.**

The extensive and well-structured literature review shows an in-depth knowledge of both the current state of the problem and the modern methods of solving it. The dissertation handles a considerable amount of scientific information, which Assoc. Prof.

Petkova deliberately interprets and summarizes in the context of the topic.

#### **4. Goal, tasks, hypotheses and research methods. Relevance of the research methodology with the goal and the tasks of the dissertation.**

The purpose and objectives are formulated clearly and in accordance with the possibility of proving the researcher's hypotheses. The methodology combines classic and modern approaches to determine the parameters and characteristics of the studied tree plants that could be reasonably applied as objective markers for their adaptive capacity. Innovative statistical methods have been applied to estimate the identified dependencies, which are an objective basis for a realistic discussion on the results and for reaching sound conclusions and recommendations for the practice.

#### **5. Visualization and presentation of the obtained results.**

The tables and graphs extensively illustrate the acquired data with clear content and adequate annotations in the text.

#### **6. Discussion of results and references.**

The obtained results are analyzed in-depth and are compared to those published by a wide range of authors, which makes it possible to assess the place and importance of the current work in the scientific field.

#### **7. Contributions of the thesis.**

The contributions, formulated in the dissertation, accurately reflect the main achievements of the work in the scientific-theoretical and applied aspects. Not only does this study summarize data from long-term observations of the growth, survival and phenological development of the species studied, but it also provides a comparative quantitative assessment of the effects of individual environmental factors. This allows to predict the behavior of the plants under specific environmental conditions.

##### **7.1. Scientific contributions**

The role of the provenance trials in establishing the ability of tree plants to adapt to future climatic conditions has been experimentally demonstrated. The boundaries of varying important indicators of the vitality and growth potential of one native and one introduced tree species at specific environmental parameters in certain regions of the country are outlined. The application of statistical approaches in this study is groundbreaking and allows an accurate processing of biometric and phenological data. An attempt has been made to model the growth response to leading climate parameters - a prerequisite for greater objectivity in predicting the future status of stands of these species in the context of climate change.

##### **7.2. Scientific and applied contributions**

A system of criteria for the selection of suitable provenances for afforestation of habitats with specific climatic conditions has been established, on the basis of which specific promising provenances are indicated.

#### **8. Assessment of the degree of the author's personal participation in the contributions.**

The presented doctoral dissertation is the result of many years of persistent and consistent experimental work of the author.



### **9. Critical notes and questions.**

It would be interesting to see the author's view on the methodological value and application in practice of the provenance trials.

### **10. Published articles and citations.**

Assoc. Prof. Petkova presents a list of 13 scientific publications related to the topic of the dissertation. The significance of the published results is confirmed by the interest of the scientific community in them, proved by 38 citations. These indicators are in line with the National Doctorate Degree Requirements.

### **11. Assessment of dissertation publications: number, rating of journals in which they are printed. Reflections in science - used and cited by other authors.**

The publication of dissertation data in peer-reviewed scientific journals proves the level of this research and the value of its contributions. Five of the featured publications are in Impact Factor and Impact Rank journals, about one-third are self-contained, and in more than half, Assoc. Prof. Petkova is first in the author team. Among the references in the literature, a significant share have those in refereed and indexed journals, with seven citations from sources with a high Impact Factor. It is noteworthy that an article published in the Journal of Forest Science has 16 references, with about half of them - in refereed and indexed journals.


The abstract objectively reflects the structure and content of the dissertation.

### **CONCLUSION:**

Based on the applied various scientific methods of research, the correctly performed experiments, the summaries made and the conclusions drawn, I believe that the presented dissertation work meets the requirements of Law on the growth of academic staff in the Republic of Bulgaria and the Rules of the University of Forestry for its application. That gives me a reason to evaluate this work with **POSITIVE**.

I allow myself to propose to the respected scientific jury also to vote positively and to award to Assoc. Prof. Dr. Krassimira Nikolova Petkova-Tsokova the degree of "**Doctor of Science**" in Field of higher education 6. Agricultural sciences and Veterinary medicine, Professional Direction 6.5 Forestry, Scientific Specialty "Forest plantations, breeding and seed production"

**Date:** Feb 10, 2020  
Sofia

**Signature:**   
(Prof. N. Tzvetkova)