



AKDENİZ UNIVERSITY
Faculty of Agriculture, Department of Plant Protection

REVIEW

by scientific consultant, Professor Dr. Hüseyin Basım, on the PhD dissertation entitled "Phytopathological assessment of introduced walnut varieties and development of protective measures against major diseases for the southern fruit-growing zone of Kazakhstan", submitted by Elmira Ismagulova for the degree of Doctor of Philosophy (PhD) under the educational program 8D08104 – Plant Protection and Quarantine

Introduction

The PhD dissertation by Ms. Elmira Ismagulova entitled "Phytopathological assessment of introduced walnut varieties and development of protective measures against major diseases for the southern fruit growing zone of Kazakhstan" represents a comprehensive and original scientific work devoted to an important and underexplored issue of modern horticulture. The study focuses on phytopathological monitoring, pathogen identification, and the development of protection strategies for *Juglans regia* L. (walnut) under the agroecological conditions of southern Kazakhstan.

Scientific Importance and Relevance

The research is highly relevant considering the growing importance of walnut cultivation in Kazakhstan and the increasing incidence of fungal and bacterial diseases affecting productivity and orchard sustainability. The dissertation addresses the lack of systematic phytopathological studies and the absence of registered plant protection products for walnut in the Republic of Kazakhstan. The author's work contributes valuable data on national and regional strategies for sustainable walnut production and plant health management.

Research Objectives and Methodology

The objectives of the dissertation are clearly formulated and logically interconnected. The author employed a multidisciplinary approach combining field surveys, microbiological assays, molecular-genetic identification (ITS and 16S RNA sequencing), SNP genotyping, and evaluation of fungicides and antibacterial preparations. The experimental design is methodologically sound, statistically validated, and demonstrates a strong command of modern phytopathological and molecular techniques. The use of both field and laboratory experiments adds credibility and reproducibility of the obtained results.

Scientific Novelty

The dissertation provides, for the first time in Kazakhstan, an in-depth characterization of the phytopathogenic complex of walnut using microbiological and molecular-genetic approaches. The study identifies key fungal and bacterial pathogens, including *Xanthomonas arboricola* pv. *juglandis*, *Pantoea agglomerans*, *Alternaria alternata*, *Fusarium solani*, and others. The author developed diagnostic profiles for these pathogens and established the genetic diversity and population structure of *J. regia* cultivars and genotypes based on SNP genotyping. This represents a significant scientific contribution of both applied and theoretical phytopathology.

Results and Discussion

The results are presented clearly and analyzed thoroughly. The author successfully demonstrated differences in disease incidence and severity across cultivars and regions, identified resistant genotypes, and evaluated the biological efficacy of modern fungicides and antibacterial agents. The findings have direct practical relevance for orchard management and breeding programs. The discussion reflects a deep understanding of plant-pathogen interactions and integrates the results into broader international scientific context.

Practical Value and Implementation

The research findings have been implemented in walnut farms in the Almaty and Turkestan regions, confirming their practical utility. The developed recommendations contribute to improving walnut yield, reducing chemical use, and enhancing environmental sustainability. The outcomes of this study have significant importance for Kazakhstan's walnut industry and may be applicable to other Central Asian countries with similar climatic conditions.

Final Evaluation and Recommendation

The research conducted by Elmira Ismagulova demonstrates her deep mastery of modern scientific methods, analytical thinking, and ability to carry out independent research work. The author has successfully performed a comprehensive set of experimental studies, showing a high level of knowledge in the field of phytopathology and plant protection.

The results of the dissertation are reflected in scientific publications, including articles published in journals indexed in Scopus and Web of Science, which confirms the quality and international significance of the research conducted. The publication of the results in reputable journals ensures recognition of this work by the international scientific community.

Considering the relevance of the topic, the scope and the high scientific level of the research work, as well as the practical importance of the obtained results for agricultural production, I believe that the presented dissertation fully meets the requirements of the Committee for Quality Assurance in the Field of Education and Science of the Ministry of Science and Higher Education of the Republic of Kazakhstan. In view of the above, I recommend Elmira Ismagulova for the award of the degree of Doctor of Philosophy (PhD) in the educational program 8D08104 - Plant Protection and Quarantine.

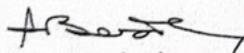
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