

OPINION

by

Associate professor Dr. Aleksandra Ravnachka, Section "Economic and Social Geography", National Institute of Geophysics, Geodesy and Geography at Bulgarian Academy of Sciences
Member of the scientific jury for awarding the educational and scientific degree "Doctor" by Professional field 4.4. "Earth Sciences", PhD Program Economic and Social Geography - Regional Development of Industrialization

PhD student: Katrin Evgenieva Gotsova

Dissertation topic: "Regional analysis of the spread of infectious diseases among farm animals in the southern border areas of Bulgaria"

Scientific leader: Associate professor Dr. Kosyo Stoychev

Candidate details

Katrin Gotsova was born in 1993. In 2018, she graduated in veterinary medicine at the Forestry University, Sofia, professional qualification "Veterinary doctor" (Master's degree in veterinary medicine). During the period 2019-2022, he is a doctoral student at Sofia University "St. Kliment Ohridski", Department of Regional and Political Geography.

From 2018 until now, he has been working as a veterinarian at the "101 Lovers" Veterinary Clinic, Sofia..

He speaks English.

Dissertation data

The presented work has a volume of 235 pages and contains an introduction, three chapters, a conclusion, bibliography and four appendices. The text material is illustrated with 43 figures and 12 tables. The bibliographic reference includes 110 titles in Bulgarian and English, and 16 sources from the Internet.

The text of the dissertation is written concisely, in a logical sequence and with a purposeful exposition. The content of the individual chapters is well balanced. The style is at the required scientific level.

The introduction presents the topicality, object, subject, goals and tasks of the research. The topic of the dissertation work is relevant from the point of view of its applicability. The object of research is presented - the territorial diffusion of selected infectious diseases among farm animals in the southern border territories of the country, as well as their economic and social consequences are assessed in detail. The author points out that from an economic point of view, farm animal diseases must be monitored, controlled and prevented because they cause significant losses or lost profits. The goal is clearly formulated, as well as the five tasks for its implementation. The geographical scope of the conducted research was analyzed, and the doctoral student justified his choice with the high risk of the penetration and spread of infectious diseases from and to the country's southern neighboring countries.

In the first chapter "*Theoretical foundations of the regional study of the diffusion of diseases*" an overview is made and the used conceptual and terminological apparatus is analyzed. The essence, significance and development of medical geography, as well as its place in the study of episodic waves, are revealed. The PhD student pays special attention to the nature of veterinary geography. A rationale for the relationship between medical geography and epizootology is made,

with the author pointing out that they overlap to some extent, but there are also significant differences. A set of terminological concepts (disease, infectious disease, parasite, infectious cells, health, enzootic and others) with which medical geography deals is examined. The methodology of the research with its adjacent quantitative and qualitative methods is clarified. The PhD student uses the interdisciplinary approach and diverse methods of information analysis. The region-system in the study of medical geography is presented. The author establishes the connections between the peculiarities of the region and the course of diseases, pointing out the need to distinguish regions, which would imply the successful implementation of specific measures for the entire territory within the borders of the region.

The second chapter "*Factors and conditions for the spread of diseases in farm animals*" presents the diffusion of infectious diseases in space. "*Diffusion is a process in which information, matter, or other phenomenon moves in the space between two points in a given time interval*" (p. 63). The PhD student examines two types of diffuse processes, which he analyzes in detail. According to the author, the study of the diffusion characteristics will enable the establishment of different types of barriers to modify the process. The three elements of the epidemic process (the host, the pathogen and the environment), their interrelationships and the conditions under which it develops are characterized. According to the author, these three elements are mutually connected and bound in the disease process at the individual level, and in the epidemic process at the population level. In this chapter of the dissertation, the main factors that have a direct and indirect influence on the spread of animal diseases are fully and thoroughly analyzed. The author attempts to measure population dynamics using various indicators such as birth rate, death rate, fertility rate, viability, replacement and survival indices, emigration and immigration. Causality in the disease process has been revealed by analyzing the four main models of causality. A detailed analysis of the essence of the epizootic process was made. According to the PhD student, it is divided into epizootic, enzootic and panzootic depending on the territorial extent, the number of infected hosts and the typicality of its occurrence.

In the third chapter, "*Analysis and Trends in the Geographical Distribution of Selected Infectious Livestock Diseases*", the author provides a detailed regional analysis of the distribution of three livestock diseases (African swine fever, Contagious nodular dermatitis of cattle, Bluetongue in ruminants), which are relatively new for the territory of the country. The social and economic consequences of their spread have been evaluated. The trends in the territorial diffusion of these three diseases on a global, national and regional scale (the southern border regions) have been established and the routes for their entry into the territory of the country have been indicated. The author analyzes the importance of the southern border territories for the spread of diseases, their role in the course of diffuse waves in them. According to the PhD student, the characteristics of individual diseases, both the way they progress, and the natural conditions of the region should be taken into account when developing and implementing measures to limit them.

In the *Conclusion*, the main results of the conducted research are presented, which are interpreted with the necessary accuracy.

Scientific contributions to the thesis

The formulated three contributions reflect the achieved scientific results. They have a scientific and scientific-applied character.

Evaluation of the auto-reference

The abstract summarizes the contents of the dissertation work. It is 38 pages long and contains a main text, a reference to contributions and a list of publications on the topic of the dissertation research.

Publications on the subject of the dissertation

Two independent publications have been presented on the subject of the dissertation, one of which is in the proceedings of the "Geography and Regional Development" conference, 2021. The second publication is in print in a peer-reviewed journal (Geopolitika, 2023). The presented articles are completely sufficient and meet the criteria defined in the Law on the Development of the Academic Staff in the Republic of Bulgaria.

Recommendations and notes

I appreciate the effort of the candidate to try to find an intersection between two scientific fields - geography and veterinary medicine.

I have no serious critical remarks about the presented work. The literature review could be expanded with additional sources. Graphical and cartographic materials could be better developed.

Conclusion

The proposed dissertation work is current and dissertable. The analysis made and the results obtained in the dissertation prove that the doctoral student Katrin Gotsova has the necessary preparation and skills for independent use of scientific research methods. The dissertation contains the necessary scientific and scientific-applied results. **On this basis, I give my positive assessment and propose to the respected members of the Scientific Jury to award the candidate Katrin Gotsova the educational and scientific degree "Doctor" in Professional field 4.4. "Earth Sciences"**

19. April 2023

Sofia

Opinion is prepared by:

Assoc. Prof. Dr. Aleksandra Ravnachka