



REVIEW

of a dissertation on a topic „**RESEARCH ON THE PREVALENCE, AETIOLOGY AND NATURAL DEFENCE MECHANISMS OF THE MAMMARY GLAND IN SHEEP WITH SUBCLINICAL MASTITIS**” for the awarding the educational and scientific degree "Doctor", in the scientific specialty "Obstetrics and gynecology of animals and diseases of newborn animals", professional field 6.4 “Veterinary medicine”, field of higher education 6.0 “Agricultural sciences and veterinary medicine”.

Author: Aleksandar Aleksandrov Stoimenov, PhD student at the department of "Surgery, radiology, obstetrics and gynecology”, faculty of "Veterinary medicine", University of Forestry, Sofia.

The review was prepared by Prof. Stanimir Angelov Yotov, PhD, Department of "Obstetrics, reproduction and reproductive disorders", faculty of Veterinary medicine, Trakia University, Stara Zagora, Bulgaria, appointed as a member of the scientific jury according to order № 3ПЦ-640/01.12.2022 r. of the Rector of UoF, Sofia.

1. Biographical data for the PhD candidate

Aleksandar Aleksandrov Stoimenov was born on 16.02.1993 in the city of Sofia, Republic of Bulgaria. In the period 2012-2018, he studied at the Faculty of Veterinary Medicine, University of Forestry and graduated from higher education with a “Master's” degree in Veterinary Medicine. After that, he worked as a veterinarian in the "Sveti Antim" veterinary center, Sofia.

He started his teaching career on 27.02.2019 as an assistant in the department of "Surgery, radiology, obstetrics and gynecology", faculty of "Veterinary Medicine", University of Forestry, Sofia. By order of the Rector of University of Forestry № 3СД-154/28.06.2021 r. was enrolled in a doctoral course of self-study in the scientific specialty "Obstetrics and gynecology of animals and diseases of newborn animals". On 03.11.2022, by order of the Rector of UoF No. 3СД-499, he is with the right of defense.

The PhD student has published three scientific publications in a scientific journal, referenced and indexed in NACID, participated in two international scientific forums and a workshop in the field of veterinary medicine.

He speaks English at level B2 and has skills in working with various computer programs and specialized medical equipment.

2. Evaluation of the dissertation and the dissertation abstract

Relevance and dissertationability of the topic:

Mastitis is a current problem in sheep farming, leading to significant economic losses, as a result of reduced milk production in problem animals, low purchase price of milk with reduced quality and costs of treating sheep with inflammation of the mammary gland. The introduction of new technologies in sheep farms with year-round production of sheep's milk implies intensive exploitation of the mammary gland. The above is a prerequisite for changes in the protective mechanisms of the gland and the occurrence of a number of disorders in its function, leading to subclinical inflammatory processes.

Regardless of the research on the issue to date, many issues remain understudied or controversial. In recent years, research on the causes of the spread of subclinical mastitis in dairy sheep, etiological factors, adaptation of existing and implementation of new methods for the diagnosis of hidden inflammatory processes, based on changes in the gland and/or the milk secretion. For the therapeutic control and prevention of the disease, it is important to elucidate in detail the changes in the protective mechanisms of the mammary gland and the influence of modern animal husbandry and milking technologies. Insufficient and divergent information, especially for sheep farms located in our country, requires additional studies, which are the subject of this dissertation work. All this gives reason to define the topic of the dissertation as current and dissertationable.

Structure of the dissertation:

The dissertation is written in 175 pages and structured as follows: Title page - 1 page; Contents - 1 page; Abbreviations used in the text - 2 pages; Introduction - 3 pages; Literature review - 53 pages; Aims and tasks - 1 page; Material and methods - 16 pages; Results - 34 pages; Discussion of the results - 26 pages; Conclusions - 1 page; Contributions of the dissertation - 1 page.; Recommendations for the practice and publications related to the dissertation work - 1 page, Acknowledgments - 1 page and Reference - 34 pages. Structured in this way, the material meets the criteria for the formation of a dissertation, referred to in the Law of development the academic staff of Republic of Bulgaria its Rules, as well as the relevant Rules of University of Forestry.

Introduction:

In this part, the trends for the development of sheep breeding on a global and national scale and the production and composition of sheep's milk are examined. Attention is focused on inflammations of the mammary gland, one of the main problems is defined, subclinical

mastitis and its actuality in connection with the creation of intensive sheep farms with a continuous milking cycle in our country. The main directions of work on the subject are presented, including the study of the prevalence, etiology and diagnosis of subclinical mastitis in sheep for milk, the changes in the cytological composition and physicochemical indicators of milk and some of the protective mechanisms of the mammary gland in animals, with aim to optimize the early diagnosis, therapy and prevention of the disease.

Literature review:

The literature review is well structured and comprehensive. Information from studies of leading specialists and collectives on the subject is summarized. The cited literary sources are up-to-date and most of them date from the last ten years.

The most important elements of the anatomy, physiology and defense mechanisms of the mammary gland in sheep are examined chronologically. Considerable attention is paid to the prevalence and etiology of mastitis in sheep, the predisposing factors for the occurrence and development of mastitis, the diagnosis of mastitis and the methods of treatment and prevention.

Reasonably, in greater detail the questions concerning the defense mechanisms of the mammary gland, prevalence, etiology and diagnosis of mastitis in sheep, having a direct connection with the dissertation are examined.

The presented literature review shows the PhD student's in-depth theoretical knowledge and ability to systematize and analyze data from various literary sources.

At the end of the section, a summary of the achievements in the area to date is presented and the discussion questions are defined, which argues the need for further research on the topic.

Aim and tasks: The aim is correctly formulated and corresponds to the set tasks. To realize the aim, five main tasks have been set, which guarantee the obtaining of credible results.

Material and methods:

The research was conducted on a sufficient number of sheep from the breeds Tsigai, Lakon, Assaf and Synthetic population of Bulgarian dairy sheep, raised in farms located in four regions of the country. In four of the farms the milking technology is machine and in one of them is manual. The experimental design of the individual trials is well chosen and the

description of the experimental setups is comprehensive. 156 milk samples obtained from animals in the same lactation period and 78 blood samples were analyzed.

A sufficient number of modern and conventional methods have been used to determine the health status of animals and the mammary gland, to isolate and type microorganisms and determine their sensitivity to selected antibiotics, to measure individual parameters in milk and blood and to determine factors related to humoral and cellular defense mechanisms.

The possibilities of the non-contact thermography method for diagnosing the inflammatory processes of the mammary gland have been tested. All of them are described in detail, which shows the PhD student's ability to work independently with research methods and terminology. The statistical methods used provide an opportunity to establish the reliability of the results obtained.

Results:

The section contains 27 tables and 14 figures, giving a good idea of the summarized and statistically processed results. The correct approach was to initially test the animals for subclinical forms of mammary gland inflammation by a rapid mastitis test and then confirm the results by a highly sensitive electronic method.

The detailed presentation of the results of the microbiological studies, the changes in the cytological composition and the physico-chemical parameters of the milk in sheep with subclinical mastitis and the immunological parameters in healthy and affected by subclinical mastitis makes a good impression. Regardless of the negative result concerning the diagnostic value of the method non-contact thermography of the mammary gland, the data can be used in the future for comparative analysis in the diagnosis of different clinical forms of mammary gland inflammation. All figures and tables are accompanied by a textual description of the information they contain, making them easy to understand. However, the technical layout of some of the tables could be improved.

Discussion of the results:

In this part, the creative thinking of the PhD student and the ability to process, interpret and discuss the obtained results are most clearly evident. The summarized data from the studies are reasoned and skilfully compared with those of the other authors.

At the forefront of the discussion are breed variability in the prevalence of subclinical mastitis, the main causes of subclinical mastitis in the studied sheep breeds and their sensitivity to different types of antibiotics.

The effect of breed and changes in various milk components such as fat content, protein, lactose, dry matter, dry fat residue and freezing point and somatic cell count in

unaffected and affected by subclinical mastitis animals are reported and discussed. A very successful attempt has been made to compare some mammary defense mechanisms in ewes affected and unaffected by subclinical mastitis, with causal relationships indicated. The discussion regarding non-contact thermography is relatively modest, but this is understandable in view of the intended aim.

In the future, the relationship between level of daily milk yield, sequence of lactation, number of somatic cells in milk and skin temperature of healthy and diseased mammary glands could be investigated. In view of all the above and the published data on the dissertation, it can be assumed that the work performed is the personal work of the PhD student.

Conclusions, contributions, recommendations for practice and publications related to the dissertation work:

On the basis of the conducted research and the obtained results, the relevant conclusions were formulated - 6 in number. The contributions are categorized as original (3 nos.) and confirmatory (4 nos.). They correspond with the set tasks and adequately reflect the achievements of the dissertation work.

Two recommendations are made for the practice, and their real implementation would be useful in view of diagnosis of subclinical mastitis, selection of adequate therapy and preventive measures in intensive sheep farms for milk production.

In connection with the dissertation, two articles were published in a scientific journal referenced and indexed in world-renowned databases with scientific information (NACID ID No. 2849). The first publication is in a collective, and the second is independent, with the PhD student being the first author in both.

Reference: The review of the bibliographic reference shows that the cited literary sources are related to the topic of the dissertation. They are sufficient in number - 254, of which 8 in Cyrillic and 246 in Latin, and most of them reflect the experience of leading collectives in recent years. The inclusion of Bulgarian authors who worked on the topic makes a good impression.

Dissertation abstract:

The dissertation abstract is well structured, comprehensive, and the content corresponds to the information from the dissertation.

3. Critical notes and recommendations

The notes and recommendations made do not detract from the merits of the dissertation work, but are intended to help the PhD student in his future scientific activity.

A large part of the notes made when considering the readiness to defend the dissertation at an extended departmental council have been removed. However, I would recommend the author, when presenting the information in the separate sections, to respect the chronological order and in the future to expand his scientific research on the subject by analyzing in detail the influence of the sequence and stage of lactation and milk productivity of sheep on the cytological composition of milk and prevalence of subclinical mastitis.

4. Conclusion

The presented dissertation on the topic „RESEARCH ON THE PREVALENCE, AETIOLOGY AND NATURAL DEFENCE MECHANISMS OF THE MAMMARY GLAND IN SHEEP WITH SUBCLINICAL MASTITIS ” for the acquisition of an educational and scientific degree "Doctor" is a completed work of scientific and scientific-applied character and dissertable value.

The structure, content and quality of the presented material meet the requirements for the design of a dissertation, specified in the Law of development the academic staff of Republic of Bulgaria its Rules, as well as the relevant Rules of University of Forestry.

All of the above is a reason with conviction to give my positive vote and I suggest to the Honorable members of the Scientific Jury to vote positively for awarding the educational and scientific degree "Doctor", in the scientific specialty "Obstetrics and gynecology of animals and diseases of newborn animals", professional field 6.4 Veterinary medicine, field of higher education 6.0 Agricultural sciences and veterinary medicine of assistant Aleksandar Aleksandrov Stoimenov.

07.01.2023
Stara Zagora

Signature:

/Prof. Stanimir Yotov/