

## ABSTRACT

The Parapoxviruses are viruses that contain DNA and they are belonging to the family *Poxviridae*, subfamily *Chordopoxvirinae*. These viruses are causing eruptive skin diseases, occurring in domestic mammals, wild mammals and human. Viruses of this type cause: bovine papular stomatitis, bovine pseudocowpox, contagious ORF virus which leads to ecthyma in sheep and goats, all the species of this type are transmissible to humans.

Contagious ecthyma of sheep and goats is a contagious infectious disease caused by a epitheliotropic virus, with an acute evolution, clinically characterized by a vesicle-pustular eruption, with predominant peribuccal and mouth localization, rarely being seen locations on foot, mammary gland, genital and periocular.

The economically losses are due to the mortality in young animals, the decreasing of the daily weight gain and of the milk production in adults.

Pierderile economice sunt realizate prin mortalitate la tineret, scăderea sporului de creștere, scăderea sporului în greutate și scăderea producției lactate la adulte. At these losses are added costs for the treatments, prevention and control of contagious ecthyma.

The doctoral thesis entitled „***Researche regarding diagnosis, prophylaxis and combat strategy in parapoxvirus infection in the population with epidemiological risk***” comprises ..pages and it is structured according to the scientific criteria in two parts. The first part (chapter I, II, III and IV) comprises 46 pages, representing 28,75% and summarizes the main bibliographic information from literature regarding infections with parapoxvirus and represents “The knowledge’s level”. The second part is extended on 114 pages, which represent 71,25 %, comprise the chapters, V, VI, VII, VIII, IX, X, XI and it refers to the results of epidemiological investigations, anatomoclinical, histopathological and molecular biology undertaken and constitute “Own research”.

Each chapter from second part has included material and working methods, results, with their discussions and partial conclusions.

In chapter XI are summarized in the 27 formulations the main conclusions drawn from research and also the recommendations drawn from the results.

The paper work comprise a number of 120 figures, 33 tables and is based on 149 bibliographic titles.

The first part of the paper work, comprising four chapters, is a synthesis of the literature about infections with parapoxviruses, and also the current knowledge level in the world.

In the first chapter entitled „*Bibliographyc data on history and etiology of contagious ecthyma*” are presented currently knowledge available on parapoxvirus. It reviewed the history, the importance and taxonomy, morphology, virus structure and virus types characteristics.

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Between shepherds, the disease is known under different names: „sore mouth”, contagious ecthyma and contagious pustular dermatitis.

In the literature, the disease is known as Orf, Sore Mouth, Contagious Pustular Dermatitis, Scabby Mouth (*Berrier*, 2001; *Raczykowski*, 1994). In countries such as Scotland, England Atgentina, Australia and New Zeeland, the disease is cited as Dermatitis Pustular Contagiosa, Pustular Contagiosa, Orf, Boca Crostosa și Boquera (*Tortora*, 1987). The first records about the presence of this disease on sheep were made in Germany by Steeb (1787), and then in other countries, meantime being confused with the smallpox and with the necrobacilosis.

Currently the disease is reported on all continents, but with a higher incidence in Australia and New Zeeland. In Europe, the disease it is more common found in France, Norway and Greece, in other countries, including Romania, where are recorded only isolated outbreaks.

In Romania, the disease was recorded for the first time by *Riegler* (1935), near Bucharest, and then subsequently was stusied by *Isopescu* (1936), *Borcilă* et al., (1937), *Grigore* (1957), *Paul* et a., (1982), and after it has been repeatedly reported in all regions of the country (*Perianu și col.*, 2005). In this chapter are presented data on the virus taxonomy,

morphology, the body immune response against virus, the genome structure, the virus resistance at the environment factors, the pathogenetic pathway and the virus cultivation condition.

The second chapter, „*Epidemiology and pathogenesis of the orf virus infection*”, comprise five subchapters, where are presented the data about the epidemiological characters, receptivity, sources of infection, ways of penetration of the virus into the body and the epidemiological dynamic.

In the chapter III „*Symptoms and morfopathology of contagious ecthyma on ovines and goats*” are described the anatomo-cinical aspects of the disesase on the goat with lesions af contagious ecthyma and the histopathological modifications.

In the chapter IV „*Diagnosis, prevention and combat of the contagious ecthyma*” are presented the main methods of diagnosis, making reference to the etiological and differential diagnosis, and also to the control and prevention measures that must be taken to limit the spread of infection.

In the chapter V, “*Epidemiology investigation regarding contagious ectima in sheeps and goats in north - east of Romania*” are presented the epidemiological investigations accomplished. During the investigation period of four years, the researches research took into account five important objectives:

- Epidemiological investigations regarding the contagious ecthyma in sheep and goats from north-east of Romania: there are presented the results of the research concerning the presence and prevalence of contagious ecthyma on sheep and goats. In the fisrt subchapters are described the data about the studied herds from the three counties.
- Data about the animals from the studiedd herds;
- Epidemiological researches regarding contagious ecthyma;
- Spatial and temporal evolution in Iasi county;
- Spatial and temporal evolution in Botoşani county.

The epidemiological research on contagious ecthyma cases were conducted during 2008 -2012, in Iasi, Botosani and Galati counties, following the evolution of the disease, the territorial distribution, the evolution gravity of contagious ecthymeï in youth and adults and the casuistry frequency occurred in different areas from the specified counties. These researches were focused on spatial and temporal analysis of epidemiological process, and

intrinsic and extrinsic factors that led to the emergence and anatomical and clinical picture of the contagious ecthyma cases.

Analysing the morbidity and mortality during 2008 - 2012 we can notice that in 2008 the number of youth illness was 20.55%, increasing to 31.53 % in 2011, and in adults was seen a decreased number of sick animals from 65.71% in 2008 to 56.44% in 2012. The morbidity may be correlated with an increase number of young animals in the herd in the period 2008 -2012.

Regarding the mortality in youth, in 2008 was recorded a rate of 8.05% which increases to 10.15% in 2012. The lowest percentage of mortality was seen in adults and it varies from 5.24% in 2008 and 1.93% in 2012.

In the chapter VI entitled “*Clinical and anatomical investigation regarding the diagnosis of contagious ecthyma in sheep and goats*” are comprised three subchapter, in each is described the anatomical and clinical picture in youth, adults, also in humans, with the specific evolution forms. In youth, the most common locations were seen at the mouth peribuccal level and the mammary and foot localization was found rarely.

In adults, the lesions predominated at the mammary gland level, with the peribuccal and mouth localization in a small percentage.

In humans, the contagious ecthyma lesions appeared at the hand skin level. The most affected persons are those that permanently are coming into direct contact with the animals.

In chapter VII, called “*Research regarding the histopathological diagnosis in contagious ecthyma*” are described the contagious ecthyma lesions that were revealed by histopathological exam. The samples used for histological preparations were harvested from goats with contagious ecthyma lesions at mouth, peribuccal and mammary level.

In the structure of the chapter VIII, entitled “*Research regarding the detection of the orf virus in sheep and goats*”, does comprise the following subchapter:

- ✓ PLK and TOB cell culture preparation from testicles and lamb foreskin
- ✓ Orf virus extraction from animal infected tissue using Tazur method
- ✓ Experimental infection in goat lings with inoculum extracted from scabs taken from goats with contagious ecthyma and with viral inoculum extracted from scabs from cattle pseudocowpoxvirus infected
- ✓ Researches on viral DNA extraction from tissues and its amplification by PCR

In this chapter are described the research results regarding the orf virus detection. The researches were performed at the University of Veterinary Medicine from Bologna, Italy and

with the scope to highlight the virus by molecular biology methods (PCR, Multiplex PCR), and also the achieving an experimental infection in goats and sheep with orf virus and bovine pseudocowpoxvirus. The aim of the research was to verify the receptivity of the sheep and goats at the orf virus and pseudocowpoxvirus infection and if any genomic mutation might occur.

By PCR method was compared the viral DNA extracted from the samples collected from the goat with ecthyma lesions from Romania with the viral DNA extracted from samples collected from sheep and goats from different areas of the world. For the amplification it was B2L gene și VEGF gene (Orf 132).

The differential diagnosis between contagious ecthyma and bovine papillomavirus was performed using multiplex PCR method, to distinguish the infections caused by the two virus taxonomic groups.

In chapter IX entitled “*Researches regarding the contagious ecthyma immunoprophylaxis in sheep and goats*” are described the immunoprophylaxis measures that must be taken in the detected contagious ecthyma outbreaks. To prevent the contagious ecthyma illness in youth, it was used the *Scabivax* vaccine, administered in the first days after lambs and kids birth, as well in adults before and after calving.

By molecular biology methods (PCR), it was shown that the vaccine contains NZ2 strain, which is circulating in animals in Eastern Romania and provides immunity for ORF virus infection, being recommended in combating the contagious ecthyma.

In chapter X, “*Types of treatment used for contagious ecthyma on goats and sheep*” are described two treatment scheme, one of which refers to treatments commonly used in veterinary medicine (Neo Caf Spray, Terramycin, Spray Plus) and the second is referring to the phytotherapy treatment.

The own researches were performed in february-july 2010 in the University of Veterinary Medicine Alma Mater Studiorum, Bologna, Departament of Public Health and Animal Pathology, under the guidance of Prof.Univ.Dr. Alessandra Scagliarini. The aim of the study was to verify the receptivity of the sheep to orf virus infection and experimental testing of medicinal products prepared with oils extracted from plants; the phytotherapy is one of the new branches that entered in veterinary medicine and used in an attempt to treat some diseases such those with viral etiology. Such experiment was conducted in the Faculty of Veterinary Medicine, on a group of 10 animals that were purchased from a farm free of disease.

The laboratory methods for highlighting the virus were the molecular biology methods, viral extraction, and cell culture preparation with primary keratinocytes to highlight the cytopathic effect of the virus after infection and animal treatment with antiviral products.

In chapter XI are briefly presented a number of 27 final conclusions and the recommendations.