



Technical University of Moldova

# MACROSCOPIC AND MICROSCOPIC PATHOLOGICAL CHANGES IN FASCIOSIS IN SHEEP

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Chişinău, 2026



**Universitatea Tehnică a Moldovei**

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**MINISTRY OF EDUCATION AND RESEARCH OF THE REPUBLIC OF  
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„08” \_\_\_\_\_ 2026

**MACROSCOPIC AND MICROSCOPIC  
PATHOLOGICAL CHANGES IN FASCIOSIS IN  
SHEEP**

**Graduation thesis of integrated higher studies**

**Student:**

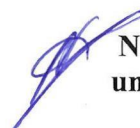


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## MODIFICĂRI PATOLOGICE MACROSCOPICE ȘI MICROSCOPICE ÎN FASCILOZĂ LA OVINE

Teză de absolvire al studiilor superioare integrate

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## Annotation

**Author:** Shorbaji Mohammad

**Thesis topic:** “Macroscopic and Microscopic Pathological Changes in Fascioliasis in Sheep.”

**Degree awarded:** Doctor of Veterinary Medicine. Integrated higher education.

**Location:** Chişinău

**Year of writing:** 2026.

**Structure and purpose of the thesis:**

The *purpose of the study* was to identify the severity of macroscopic morphopathological changes in the livers of sheep infected with *Fasciola* at the sheep farm under study, collecting liver samples from infected sheep and, following the preparation of histological sections, determining the microscopic changes according to the stage of the parasitic disease.

*Objectives of the study:*

- Necropsy of sheep carcasses;
- Determination and description of macroscopic changes in the livers of sheep infected with fasciolae according to the stage of the disease.
- Selection and collection of pathological material for microscopic examination of anatomopathological changes in the liver.
- Determination of microscopic changes in the liver depending on the stage of fasciolosis.

The thesis consists of an introduction, 4 chapters: literature review, main body, conclusions and recommendations, bibliography, and 11 subchapters. The main text comprises 45 pages, with 3 tables and 37 figures.

**Keywords:** *Fasciola hepatica*, morphopathological and histopathological changes, sheep, stages of development.

## Adnotarea

**Autor:** Shorbaji Mohammad

**Tema tezei:** „Modificări patologice macroscopice și microscopice în fascioloză la ovine”.

**Grad științific acordat:** Doctor, medic veterinar. Învățăământ superior integrat.

**Locație:** Chișinău

**Anul scrierii:** 2026.

### **Structura și scopul tezei:**

Scopul studiului întreprins s-a bazat pe identificarea gradului de severitate a modificărilor morfopatologice macroscopice în ficatul ovinelor infectate cu fasciole la ferma de oi supuse studiului, colectare de probe de ficat de la oninele invadate și ca urmare al efectuării preparatelor histologice, determinarea modificărilor microscopice în funcție de forma evolutivă a bolii parazitare.

Obiectivele propuse în studiu:

- Deschiderea și examinarea necropsică a carcaselor/cadavrelor de ovine;
- Determinarea și descrierea modificărilor macroscopice din ficatul ovinelor infestate cu fasciole în funcție de forma evolutivă.
- Selectarea și colectarea de material patologic pentru examinarea microscopică a modificărilor anatomopatologice din ficat.
- Determinarea modificărilor microscopice din ficat în funcție de forma evolutivă a fasciolozei.

Lucrarea constă din introducere, 4 capitole: revizuirea literaturii, partea specială, concluzii și propuneri, referințe bibliografice, 11 subcapitole. Textul principal este format din 45 de pagini, tabele -3, figuri-37.

**Cuvinte cheie:** fasciola, modificări morfopatologice și histopatologice, ovine, forme evolutive.

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## INTRODUCTION

It is well known that, among herbivorous animals, large and small ruminants kept on pasture during the warm season are at high risk of parasite infestation. Although the main methods of combating and preventing parasitic diseases have been reviewed in recent decades, helminthiasis such as fasciolosis, dicroceliosis, and hydatidosis remain widespread and cause significant economic losses. Their economic and health importance stems from their location in an important parenchymal organ-the liver.

Morphological studies of the liver have demonstrated its role as an accessory gland of the gastrointestinal tract, and due to its abundant blood supply from the portal vein and the biological transformations it undergoes within the hepatocytes, it is considered a veritable laboratory of the body. The functions of this organ are varied and important: it participates in digestion, acts as a store of reserve substances, synthesizes and degrades a multitude of substances, transforms substances according to the body's needs, maintains carbohydrate, lipid, protein, and hydro-saline balance, controls blood flow, detoxifies, regulates body temperature, etc.

These points highlight the importance of the liver for the animal's body and the need to be aware of the main diseases, of various kinds, that disrupt its function. Among these diseases are those of parasitic origin.

In sheep, goats, and cattle, the most important and common parasitic diseases, causing considerable illness and economic losses, include: trematodoses: fasciolosis and dicroceliosis; cestodoses: echinococcosis/hydatid disease, alveococcosis, hepatoperitoneal cysticercosis.

In recent years, fasciolosis has been widely detected in the CIS and EU countries: Russian Federation [10, 11, 12], Moldova [17], Belarus [13, 14, 15], Slovakia [16], Romania [17].

Recent studies indicate that parasitized cattle and sheep have reduced milk productivity: 20-25% in sheep and 10-20% in cattle, with a decrease in daily live weight gain of 7-16% in sheep and 5-15% in young cattle. Another factor that demonstrates the negative economic impact of this parasitic disease is the fact that the parasitic form is capable of altering the microbial flora in various organs, which will also reduce the safety and quality of animal products and the use of carcasses or slaughterhouse by-products.

The presence of parasites in the liver, bile ducts, or blood vessels causes pathogenic processes that are closely related to the intensity of the invasion and the evolutionary cycle of the parasitic form, the type of migration, the type of nutrition, etc.

Metabolism, with its two sides: anabolism/catabolism, is strongly influenced by the presence

of parasitic organisms, predominantly of the hepatic forms, where metabolism is affected at a general level, but also at a particular level: carbohydrates, lipids, proteins, vitamins, water, and mineral salts.

Sheep are infected with trematodes orally, but the infesting larval forms access the liver from the intestine mainly via the intra-abdominal route or through the bile duct. Depending on how they enter the parenchymal organ, the lesions caused can be serious or benign.

***The importance of studying*** this parasitic disease lies in the current trend of establishing small or medium-sized enterprises in the livestock sector and the fact that, in restricted grazing areas, there are a large number of animals of different species and ages, which carry their parasitic load and spread it to new areas. For this reason, it is advisable to study these zonal foci of parasitic diseases, the seasonal and age dynamics of parasitic diseases, including fasciolosis.

The importance of ongoing research into parasitic diseases affecting the liver also lies in the fact that damage to this organ not only causes functional disorders but also weakens the body's immune system, with all the consequences that this entails.

***The purpose of our study*** was to establish the severity of macroscopic morphopathological changes in the liver of sheep infected with fasciolas at the sheep farm under study, to collect samples from infected sheep, and to determine microscopic changes depending on the evolutionary form of the parasitic disease.

***The objectives proposed in the study:***

- Necropsy examination of sheep carcasses;
- Determination of macroscopic changes in the liver of sheep infested with fasciola depending on the evolutionary form.
- Collection of pathological material for microscopic examination of anatomopathological changes in the liver.
- Determination of microscopic changes in the liver depending on the evolutionary form of fasciolosis.

#### IV. BIBLIOGRAPHY

1. Ali S.F., Joachim A., Daudschies A., Eicosanoid production by adult *Fasciola hepatica* and plasma eicosanoid patterns during fasciolosis in sheep, *International Journal for Parasitology*, nr.29, page. 743-748
2. Boray JC (1967) Studies on experimental infection with *Fasciola hepatica*, with particular reference to acute fascioloses in sheep. *Ann Trop Med Parasitol.*, volume 61(4):439–450.
3. Dijk, van J.E., Gruys, E, Mouwen, J.M., *Color atlas of veterinary pathology*, Spania: Elsevier Limited, 2007, pp.193. ISBN: 978-0-7020-2758-1.
4. Dow C, Ross JG, Todd JR (1968) The histopathology of *Fasciola hepatica* infections in sheep. *Parasitol.*, volume 58(1):129–135
5. Hodzic A., Zuko A . et al., Influence of *Fasciola hepatica* on Serum Biochemical Parameters and Vascular and Biliary System of Sheep Liver., *Iranian Journal Parasitol*, vol.8, no. 1, 2013, pp.92-98. Tehran University of Medical Sciences Publication.
6. Leticia Fiss et al., Subacute and acute fasciolosis in sheep in southern Brazil, *Parasitol Res Journal*, 2013, pages. 883-887
7. Lindberg, Matthew R., Lamps, Laura W. *Diagnostic pathology: normal histology*. Philadelphia, USA, Elsevier Inc., 2018, 450 pp., ISBN: 978-0-323-54803-8.
8. Maxie M. Grant. Jubb, Kennedy, and Palmer's *Pathology of domestic animals*, volume 1, St. Louis, USA, by Elsevier, Inc., 2016,1250 pp., ISBN 978-0-7020-5317-7 (VOLUME 1).
9. Maxie M. Grant. Jubb, Kennedy, and Palmer's *Pathology of domestic animals*, volume 2, St. Louis, USA, by Elsevier, Inc., 2016,1129 pp., ISBN 978-0-7020-5318-4 (VOLUME 2)
10. Maxie M. Grant. Jubb, Kennedy, and Palmer's *Pathology of domestic animals*, volume 3, St. Louis, USA, by Elsevier, Inc., 2016, 868 pp., ISBN 978-0-7020-5319-1(VOLUME 3).
11. Modrý Lada, D., Hofmannová, A., Mihalca, D., Juránková, J., Neumayerová, H., 'Amico, G. Field and laboratory diagnostics of parasitic diseases of domestic animals: from sampling to diagnosis. 2012, Cluj-Napoca, pp.68.
12. Müller G (2007) Fascioloses. In: Riet-Correa F, Schil AL, Lemos RAA, Borges JRJ (eds)
13. Novobilsky A., et al., The field evolution of albendazole and triclabendazole efficacy against *Fasciola hepatica* by coproantigen ELISA in naturally infected sheep, *Veterinary Parasitology* 190, 2002, pp 272-276 Swedish University of Agricultural Sciences.
14. Perez, J., Ortega, J., Moreno, T., Morrondo, P. , Lopez-Sandez, C., Martinez-Moreno, A. Pathological and immunohistochemical study of the liver and hepatic lymph nodes of sheep

- chronically reinfected with *fasciola hepatica*, with or without triclabendazole treatment. 2002. *Jurnal Comparative Pathology*, volume 127, pp. 30–36.
15. Rushton B, Murray M (1977) Hepatic pathology of a primary experimental infection of *Fasciola hepatica* in sheep. *J Com Pathol* 87:459–470.
  16. Scott P.R., Sargison N.D., Macrae A., Rhind S.R., An outbreak of subacute fasciolosis in Soay sheep: Ultrasonographic biochemical and histological studies, *The Veterinary Journal* nr.170, 2005, pages 325-331.
  17. Scott, P.R., Sargison, N.D., Macrae, A., Rhind. S.R. An outbreak of subacute fasciolosis in Soay sheep: Ultrasonographic biochemical and histological studies. 2005, *The Veterinary Journal*, volume 170, pp. 325–331.
  18. Sewell MMH (1966) The pathogenesis of fasciolosis. *Vet Rec* 78:98–105.
  19. Terry W. Spithill et al., *Imunological Approaches for the Control of Fasciolosis*, *International Journal of Parasitology*, vol. 27, no. 10, pp. 1221-1235, 1997, Monash University, Clayton, Australia.
  20. Zachary, James F., McGavin, M. Donald. *Pathologic basis of veterinary disease*. Sant Luise, USA, Elsever Inc., 2012, 1339 pp., ISBN: 978-0-323-07533-6.
  21. Ballweber, L., *Veterinary parasitology*. USA, Butterworth–Heinemann, member of the Reed Elsevier group, 2001, pp.324, SBN 0-7506-7261-7.
  22. MANDAI, S.C. *Veterinary parasitology: At a Glance*. Lucknow, India, 2006, pp.442, ISBN 81-8189-131-7 (PB).
  23. Taylor, M.A., Coop, R.L., Wall, R.L. *Veterinary Parasitology*. USA, Iowa, Blackwell Publishing, 2007, pp.902, ISBN: 978-1-4051-1964-1.
  24. Blagburn, B., Dryden, M., *Veterinary clinical parasitology*. Pfizer, 1999, ISBN: 0-9678005-3-6.
  25. Zachary, James F. *Pathologic basis of veterinary disease*. Sant Luise, USA, Elsevier, Inc., pp. 1835, ISBN: 9780323357753.