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# Helminthological Examination of a Sheep Infected with *Dictyocaulus filaria*

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**Abstract:** Dictyocaulosis is a significant parasitic disease of domestic ruminants caused by *Dictyocaulus filaria*, which inhabits the respiratory tract and leads to respiratory disorders, reduced productivity, and economic losses. This study aimed to confirm and characterize ovine dictyocaulosis using larvoscopic and pathological diagnostic methods. In March 2026, a sheep suspected of dictyocaulosis was examined at the Helminthology Laboratory of the Veterinary Research Institute. Fecal samples were analyzed using the Baermann–Orlov–UzVRI larvoscopic method, which detected *Dictyocaulus* larvae. Necropsy was performed according to K. I. Skryabin’s partial dissection method. Macroscopic examination revealed numerous milky-white adult nematodes in the bronchi, accompanied by foamy mucous exudate, catarrhal inflammation, and excessive mucus accumulation in the lungs. The recovered helminths were preserved in 70% ethanol and identified as *Dictyocaulus filaria* based on their morphological characteristics. Male worms measured 4.8–7.2 cm, while females measured 6.5–8.7 cm. Larvated eggs in the female uterus measured 0.112–0.138 × 0.069–0.090 mm. These findings confirmed *D. filaria* infection and demonstrated that combining larvoscopic, pathological, and morphological examinations provides reliable diagnosis. Regular strategic deworming and effective anthelmintic treatment are essential for disease prevention and control.

**Keywords:** *sheep, Dictyocaulus filaria, dictyocaulosis, necropsy, lungworm, helmintholaryoscopy, morphology, anthelmintic control*

## Introduction

At present, one of the major challenges threatening the sustainable development of the livestock industry worldwide is the widespread occurrence of helminth infections. These parasitic diseases are prevalent under diverse climatic and production conditions and are particularly common in farm animals, including cattle, sheep, goats, equids, and poultry. Consequently, helminth infections lead to substantial reductions in livestock productivity, impaired feed conversion efficiency, and increased veterinary and sanitary expenditures.[1][2]

Under the conditions of the Republic of Uzbekistan, helminthiases remain one of the principal factors adversely affecting the economic efficiency of livestock production. These infections, particularly under intensive and semi-intensive production systems, induce complex pathophysiological alterations in the host organism. As a result, young animals exhibit growth retardation, reduced immunobiological reactivity, and diminished productive performance, while adult animals experience increased morbidity and mortality.[3][4]

## Methodology

Among these parasitic diseases, ovine dictyocaulosis is of particular veterinary and economic importance. This invasive disease is caused by nematodes that parasitize the respiratory tract and is characterized by its widespread epizootic distribution and severe clinical course. Dictyocaulosis damages the respiratory system of sheep, disrupts their physiological condition, retards growth, and reduces meat and wool production by approximately 20–35%.[5][6]

Dictyocaulosis is a chronic parasitic disease caused by the lungworm *Dictyocaulus filaria* (family *Dictyocaulidae*), which parasitizes the bronchi and trachea of sheep and goats. Infection results in impaired respiratory function and is clinically characterized by serous nasal discharge, persistent coughing, dyspnea, and, in cases complicated by secondary bacterial infections, elevated body temperature. These pathological changes lead to growth retardation, reduced productivity, and, particularly in young animals, may result in death [7].

*Dictyocaulus filaria* is a slender, thread-like, milky-white nematode with a very small buccal cavity surrounded by four lips. The species is dioecious, and the males possess short, dark brown, boot-shaped spicules. Adult males measure 3–8 cm in length and 0.35–0.46 mm in width. The caudal end bears a well-developed copulatory bursa supported by bursal rays, from which two equal spicules, each measuring 0.4–0.6 mm in length, protrude through the cloaca. Adult females are 23–73 mm long and 0.27–0.67 mm wide, with the vulval opening located approximately at the middle of the body (Rudolphi, 1809).[8]

The clinical manifestations of dictyocaulosis in ruminants vary according to the intensity of infection and the age of the host. The disease most commonly presents as bronchitis or bronchopneumonia, with young animals developing more severe clinical signs. In contrast, infections in adult animals are frequently subclinical, and such animals often serve as reservoirs of infection [9].

Experimental studies have demonstrated that dictyocaulosis in calves and lambs commonly develops as bronchopneumonia and may result in high mortality. In affected cattle, body temperature may increase to 41.0–41.5°C and is accompanied by tachypnea, tachycardia, persistent coughing, reduced appetite, weakness, and general exhaustion [10].

## Result

Pathomorphological investigations have shown that the principal lesions associated with dictyocaulosis are localized in the lungs. Gross examination typically reveals a bluish discoloration of the pulmonary surface, with normal lung tissue alternating with areas of inflammation and emphysema. Emphysematous lesions are predominantly observed in the apical lobes, whereas atelectatic areas of varying size are commonly found in the diaphragmatic lobes [11][12][13].

## Case report

### Clinical History

In March 2026, a sheep suspected of dictyocaulosis was submitted to the Helminthology Laboratory of the Veterinary Research Institute for parasitological examination.

During the initial clinical evaluation, an epizootiological history was obtained, followed by a comprehensive physical examination. The animal exhibited persistent coughing, particularly during

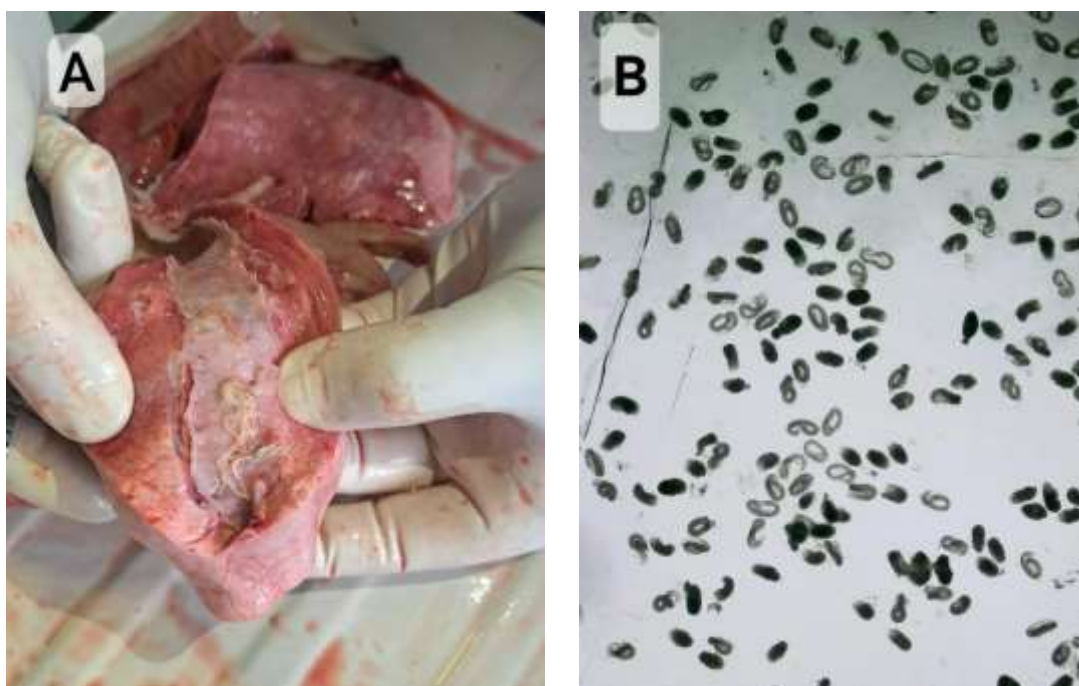
the morning and evening, weakness, progressive weight loss, bilateral nasal discharge, lethargy, and reduced appetite. Following helmintholaryoscopic examination, the diagnosis was confirmed by partial necropsy using the method described by K. I. Skryabin.

#### Pathological Examination

A complete postmortem examination was performed, and all internal organs were systematically evaluated. Necropsy was conducted according to the partial dissection method of K.I.Skryabin. Gross examination revealed that the lungs were enlarged, edematous, and firm in consistency. The affected pulmonary tissue appeared pale and dough-like. The trachea and both the major and minor bronchi were opened longitudinally, revealing numerous thread-like, milky-white nematodes embedded within foamy mucous exudate. Marked mucus accumulation and catarrhal inflammation were observed at the sites of parasite localization (Figure 1A).

The lungs were finely minced with scissors and processed using the sequential washing technique. The sediment obtained after washing was examined microscopically, and lungworm larvae were detected.

The recovered helminths were fixed in 70% ethanol and subjected to morphological examination under a light microscope. Based on their morphological characteristics, the parasites were identified as *Dictyocaulus filaria* (Soulsby, 1982). Adult males measured 4.8–7.2 cm in length and possessed a well-developed copulatory bursa with two dark-brown spicules protruding from the cloaca. Adult females measured 6.5–8.7 cm in length, with the vulval opening located approximately at the mid-body region (Figure 2A and 2B). The uterus of the female worms was filled with larvated eggs. The eggs were oval in shape, measuring 0.112–0.138 mm in length and 0.069–0.090 mm in width (Figure 1B). No other species of helminths were detected during examination of the remaining lung tissue.



**Figure 1. A)** *Dictyocaulus filaria* in sheep lung.  
**B)** Eggs of *Dictyocaulus filaria*



**Figure 2.** A) Posterior part of male worm with copulatory bursa and spicules.  
B) Posterior part of a female.

### Discussion

Dictyocaulosis is widely distributed in sheep farms throughout Uzbekistan. Previous studies have reported that the prevalence of *Dictyocaulus* infection in sheep ranges from 55% to 86.6% across different regions of the country, with an average parasite burden of 32–60 worms per infected animal. Furthermore, the widespread occurrence of dictyocaulosis in Uzbekistan and the biological characteristics of its causative agent have been extensively investigated by local researchers [14].

The larvae of *Dictyocaulus filaria* are highly susceptible to desiccation. First-stage larvae (L1) can survive in completely dry conditions for no longer than three days, whereas most third-stage infective larvae (L3) die within 15 days under the same environmental conditions. However, the majority of infective larvae are capable of surviving in sheep feces for up to one month [15].

*Dictyocaulus filaria* is considered the most important lung nematode of sheep. Following ingestion, infective larvae penetrate the intestinal wall and migrate to the lungs through the lymphatic and circulatory systems. Clinical manifestations of dictyocaulosis include coughing, tachypnea, nasal discharge, weight loss, and reduced growth performance. At necropsy, the bronchi are typically filled with foamy mucous exudate containing adult lungworms.

According to the published literature, infection occurs through the ingestion of infective larvae while grazing. Necropsy findings commonly include white, thread-like adult worms measuring 5–10 cm in length within the trachea and bronchi, accompanied by bronchitis, bronchiolitis, bronchopneumonia, mucous exudation, and, in severe cases, pulmonary atelectasis. Heavy infections may result in respiratory failure and death.

### Discussions

Dictyocaulosis primarily affects young sheep and is most frequently observed during the grazing season under cool and humid environmental conditions. Characteristic necropsy findings include the presence of *Dictyocaulus filaria* in the trachea and bronchi together with mucous exudate and bronchopneumonia. Regular strategic anthelmintic treatment and appropriate pasture management are recommended as effective control measures.

Firouzvand reported that affected sheep exhibited weight loss, reduced appetite, weakness, and frequent coughing. Postmortem examination revealed numerous milk-white *Dictyocaulus filaria* worms in the trachea and bronchi. The bronchi were filled with blood-tinged exudate, the small bronchi showed inflammatory changes, and inflammatory lesions were observed in the lung parenchyma. The author recommended regular strategic deworming and the use of broad-spectrum anthelmintic drugs for disease prevention.

In the present study, the infected sheep exhibited coughing, particularly during the early

morning and evening hours, weakness, weight loss, bilateral nasal discharge, and reduced appetite. The body length of male worms ranged from 4.8 to 7.2 cm, whereas female worms measured 6.5–8.7 cm. The uterus of female worms was filled with larvated eggs, which measured 0.112–0.138 mm in length and 0.069–0.090 mm in width.

### Conclusion

The infective larvae (L3) of *Dictyocaulus filaria* possess the ability to move actively, ascend moist vegetation, and survive in water, enabling them to remain viable in the external environment for extended periods. Sheep become infected primarily through the ingestion of infective larvae while grazing on contaminated pastures or drinking water from contaminated puddles and other natural water sources.

The effective control of ovine dictyocaulosis requires timely treatment with anthelmintic drugs such as ricobendazole and ivermectin, combined with the implementation of appropriate preventive measures. Based on the findings of the present study, prophylactic deworming of sheep is recommended twice annually, specifically in March and September, to reduce pasture contamination and minimize the risk of infection.

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### Conflict of interest statement:

The authors declare no conflicts of interest.

### Ethical approval:

Not applicable.

## REFERENCES

- [1] M. Sh. Akbaev, A. A. Vodyanov, and N. E. Kosminkov, *Parasitology and Invasive Diseases of Animals*. Moscow, Russia: Kolos Publishing House, 2000.
- [2] E. Kh. Ergashev, "Distribution of dictyocaulosis in sheep in Uzbekistan," *Proceedings of the Uzbek Research Institute of Veterinary Medicine*, vol. 16, pp. 67–73, 1963.
- [3] A. O. Oripov, A. G. Gafurov, N. E. Yuldashev, Sh. A. Djaborov, R. B. Davlatov, and M. E. Goyipova, *Parasitology and Invasive Diseases of Farm Animals*. Tashkent, Uzbekistan, 2023.
- [4] A. O. Oripov, R. B. Davlatov, and N. E. Yuldashev, *Veterinary Helminthology*. Tashkent, Uzbekistan, 2016.
- [5] D. I. Panasyuk and V. I. Shilnikov, *Dictyocaulosis and Methods of Its Elimination*. Moscow, Russia: Kolos Publishing House, 1966, pp. 4–7.
- [6] K. I. Skryabin and A. M. Petrov, *Fundamentals of Veterinary Nematodology*. Moscow, Russia: Kolos Publishing House, 1964.
- [7] Z. D. Totikov, A. A. Sokhieva, and R. Kh. Gouzaonov, *Morphological Changes in the Lungs Caused by Pulmonary Helminthiasis*. Rostov-on-Don, Russia, 1990.
- [8] G. M. Urquhart, J. Armour, J. Duncan, *et al.*, *Veterinary Parasitology*. Moscow, Russia: Aquarium Ltd., 2000.
- [9] Z. Kholikova, "Dictyocaulosis of sheep in Uzbekistan," *Uzbekistan Biology Journal*, no. 4, pp. 51–54, 1968.
- [10] M. M. Shakhmurzov, "Clinical features of associative disease in calves caused by *Dictyocaulus* and *Pasteurella*," in *Proceedings of the Conference on Pulmonary Helminthiasis of Ruminants*. Moscow, Russia, 1981, pp. 116–121.
- [11] Y. Firouzvand, "A field outbreak of *Dictyocaulus filaria* in sheep in the northwest of Iran," *Journal of Alternative Veterinary Medicine*, vol. 6, no. 18, pp. 1097–1102, 2023.
- [12] E. J. L. Soulsby, *Helminths, Arthropods and Protozoa of Domesticated Animals*, 7th ed. London, U.K.: Bailliere Tindall, 1982, pp. 262–268.
- [13] M. A. Taylor, R. L. Coop, and R. L. Wall, *Veterinary Parasitology*, 4th ed. Oxford, U.K.: Wiley-Blackwell, 2016.
- [14] D. D. Bowman, *Georgis' Parasitology for Veterinarians*, 11th ed. St. Louis, MO, USA: Elsevier, 2021.

- [15] World Organisation for Animal Health (WOAH), *Terrestrial Manual: Helminth Infections of Ruminants*. Paris, France: WOAH, 2024.