



## PREVALENCE AND EPIZOOTOLOGICAL CHARACTERISTICS OF GASTROINTESTINAL STRONGYLE INFECTIONS IN SHEEP IN THE SAMARKAND REGION, UZBEKISTAN

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**Abstract.** Gastrointestinal strongylatoses remain among the most important parasitic diseases limiting sheep productivity worldwide and are responsible for considerable economic losses due to reduced weight gain, poor feed conversion, decreased wool and meat production, and increased mortality, particularly in young animals. The present study aimed to determine the epizootological status and prevalence of gastrointestinal strongylatoses in sheep raised under the climatic conditions of the Samarkand region of Uzbekistan. A total of 321 fecal samples were collected from sheep of different breeds maintained in private households, farms, and experimental units of the Veterinary Research Institute located in Nurabad and Payariq districts. Helminthological examinations were performed using the Fülleborn flotation method, sequential washing technique, and the improved Baermann–Orlov method. The results demonstrated that gastrointestinal strongylatoses were widely distributed among the examined sheep, with an overall prevalence of 77.57%. Mixed infections were the predominant form of invasion. Marshallagiosis was detected in 45.17% of the animals, nematodirosis in 39.88%, and other gastrointestinal strongylatoses in 68.54%. District-level analysis revealed prevalence rates of 73.47% in Nurabad and 68.33% in Payariq, while infection among sheep maintained in the Veterinary Research Institute reached 72.22%. In addition, fasciolosis and monieziosis were detected in 24.07% and 7.40% of sheep,



respectively. The obtained data indicate a high circulation of gastrointestinal nematodes in the region and emphasize the necessity of systematic parasitological monitoring, strategic anthelmintic treatment, and integrated parasite control programs adapted to local ecological conditions.

**Keywords:** *sheep, helminth, helminthiasis, strangulation, marshalliasis, general infection, extensive infection.*

**Introduction.** Gastrointestinal helminthiasis are among the most important parasitic diseases affecting sheep worldwide and remain a major obstacle to the sustainable development of sheep farming. These infections reduce growth performance, body weight gain, wool and meat production, reproductive efficiency, and overall animal health, resulting in considerable economic losses. In regions where sheep are raised under extensive grazing systems, gastrointestinal strongylatosis are particularly widespread because environmental and climatic conditions favor the development and transmission of infective larvae on pastures.

The prevalence and intensity of gastrointestinal strongylatosis depend on several factors, including climate, geographical location, pasture contamination, stocking density, animal age, management practices, and the effectiveness of preventive veterinary measures. Therefore, continuous epizootological monitoring is essential for understanding the distribution of these parasites and for developing scientifically based control strategies adapted to regional conditions.

Samarkand region is located in the central part of the Republic of Uzbekistan and is characterized by a sharply continental climate, with hot summers and relatively cold winters. Such environmental conditions create favorable circumstances for the survival and circulation of many gastrointestinal nematodes affecting sheep. Despite the importance of sheep breeding in this region, updated information on the prevalence and species composition of gastrointestinal strongylatosis remains limited.



Therefore, the present study was undertaken to investigate the current epizootological situation of gastrointestinal strongylatoses in sheep raised in different farms and households of the Samarkand region, to determine the prevalence of the principal helminth infections, and to provide scientific evidence for improving regional prevention and control programs.

**Materials and methods.** The research was conducted this year in the Samarkand region, which is located in the central geographical climate zone of our Republic. Samples were taken from 321 sheep from the Nurobot Tiklanish farms, Nurli Yo'l farms, Shodlik Fayz farms, Nurmatov Eshpolat farms, the experimental field of the Veterinary Research Institute and the population in the Nurabad and Payariq districts of the region, and the results were analyzed. The samples obtained during the research were examined using the Fulleborn and sequential washing methods of helminth ovoscopy, and the Berman-Orlov method improved at VITI.

**Results and their analysis.** In our research carried out in Samarkand region, dung samples were taken from the rectum of a total of 321 sheep of different breeds (Korakol, local breed) kept in the experimental areas of the laboratories of the Veterinary Research Institute, mainly located in Nurabad and Payariq districts, and were examined by helmintocoprological (Fülleborn, serial washing, Berman-Orlov) methods. According to the results of our research, 249 of the examined sheep (IE=77.57%) were found to be extensorsed with gastrointestinal strongylatosis in a mixed way.

In the studied areas of Samarkand region, 145 sheep (IE=45.17%) were found to be extensively infected with marshalliasis, 128 sheep (IE=39.88%) with nematodirosis, and 220 sheep of different breeds (IE=68.54%) with other types of gastrointestinal strongyloidiasis. Of the examined local sheep, 229 were found to be extensively infected with common, mixed gastrointestinal strongyloidiasis, that is, IE=71.34%.

Nurabad district is one of the regions of the region with a hilly-continental



climate (cold and semi-dry winters and long, hot and dry summers), and a total of 147 sheep, mainly of local breeds, were examined using coprological methods.

**Table 1**

**Extensive infection of sheep with gastrointestinal strongyloidiasis in Nurabad district, based on helminthic coprological examinations**

| №                | Name of territories (farms) | Total head count | n=147                                   |       |                 |       |               |       |                                                  |       |
|------------------|-----------------------------|------------------|-----------------------------------------|-------|-----------------|-------|---------------|-------|--------------------------------------------------|-------|
|                  |                             |                  | General infection with gastrointestinal |       | Marshallagiosis |       | Nematodirosis |       | Other types of gastrointestinal strongyloidiasis |       |
|                  |                             |                  | n=                                      | %     | n=              | %     | n=            | %     | n=                                               | %     |
| Nurabad district |                             |                  |                                         |       |                 |       |               |       |                                                  |       |
| 1                | Residential buildings       | 47               | 35                                      | 74,47 | 24              | 51,1  | 19            | 40,4  | 34                                               | 72,3  |
| 2                | “Nurobod tiklanish” f/x     | 50               | 37                                      | 74,0  | 21              | 42,0  | 20            | 40,0  | 37                                               | 74,0  |
| 3                | “Nurli yo‘l” f/x            | 50               | 36                                      | 72,0  | 17              | 34,0  | 16            | 32,0  | 35                                               | 70,0  |
|                  | Total:                      | 147              | 108                                     | 73,47 | 62              | 42,18 | 55            | 37,41 | 106                                              | 72,11 |

Table 1 shows that, according to the results of the studies, 108 heads of the examined sheep (IE=73.47%) were found to be extensively infected with common gastrointestinal strongyloidiasis. When we analyzed the infection of the examined sheep by each helminthiasis separately, we found that 62 heads (IE=42.18%) had marshalliasis, 55 heads (IE=37.41%) had nematodirosis, and 106 heads (IE=72.11%) had invasive eggs of other types of gastrointestinal strongyloidiasis.

Our next studies were conducted in the Payariq district. The climate of the Payariq district is typical continental (hot and dry in summer, cold and rainy in



winter). A total of 120 local sheep from some sheep farms and households in this district were examined by coprological methods using traditional methods, using rectal samples. The feces samples were examined in special paper bags in the Institute's Helminthology Laboratory "Motic 1" luminescence (light microscope) with 1x10; 1x40 lenses (Table 2).

Table 2

**Extensive infection of sheep with gastrointestinal strongyloidiasis in Payariq district**

| №                | Name of territories (farms) | Total head count | n=120                                   |       |                 |      |              |      |                                                  |       |
|------------------|-----------------------------|------------------|-----------------------------------------|-------|-----------------|------|--------------|------|--------------------------------------------------|-------|
|                  |                             |                  | General infection with gastrointestinal |       | Marshallagiosis |      | Nematodiosis |      | Other types of gastrointestinal strongyloidiasis |       |
|                  |                             |                  | n=                                      | %     | n=              | %    | n=           | %    | n=                                               | %     |
| Payariq district |                             |                  |                                         |       |                 |      |              |      |                                                  |       |
| 1                | Residential buildings       | 30               | 21                                      | 70,0  | 19              | 63,3 | 17           | 56,7 | 21                                               | 70,0  |
| 2                | “Shodlik Fayz” f/x          | 42               | 30                                      | 71,43 | 23              | 54,8 | 18           | 42,8 | 30                                               | 71,4  |
| 3                | “Nurmatov Eshpo‘lat” f/x    | 48               | 31                                      | 64,58 | 21              | 43,7 | 19           | 39,6 | 29                                               | 60,4  |
|                  | Total:                      | 120              | 82                                      | 68,33 | 63              | 52,5 | 54           | 45,0 | 80                                               | 66,67 |

When analyzing the data in Table 2, it was found that 82 heads of the examined sheep (IE=68.33%) were extensively infected with common gastrointestinal strongyloidiasis. When we analyzed the infection of the examined



sheep by each helminthiasis as a result of our research, 63 heads (IE=52.5%) had marshalliasis, 54 heads (IE=45.0%) had nematodirosis, and 80 heads (IE=66.67%) had invasive eggs of other types of gastrointestinal strongyloidiasis.

During our research, examinations were regularly conducted on sheep available in the laboratories of the Institute of Veterinary Medicine and kept as experimental animals. In this case, 54 sheep, mainly located in 3 laboratory experimental sites, were examined for helminthic copropathy, and 39 of them (IE=72.22%) were found to be extensively infected with mixed gastrointestinal strongyloidiasis. When we determined each helminthiasis, 20 of the examined sheep (IE=37.04%) were found to be infected with marshalliasis, 19 (IE=35.19%) were found to be infected with nematodiriasis, and 34 (IE=62.96%) were found to be infected with other types of gastrointestinal strongyloidiasis (Table 3).

**Table 3**

**Extensive infection with gastrointestinal strongyloidiasis in sheep kept in  
SRIV laboratories**

| №                          | Laboratory name | Total head count | n=54                                    |       |                 |       |               |       |                                                  |       |
|----------------------------|-----------------|------------------|-----------------------------------------|-------|-----------------|-------|---------------|-------|--------------------------------------------------|-------|
|                            |                 |                  | General infection with gastrointestinal |       | Marshallagiosis |       | Nematodirosis |       | Other types of gastrointestinal strongyloidiasis |       |
|                            |                 |                  | n=                                      | %     | n=              | %     | n=            | %     | n=                                               | %     |
| Sheep in SRIV laboratories |                 |                  |                                         |       |                 |       |               |       |                                                  |       |
| 1                          | Virology        | 28               | 17                                      | 60,71 | 6               | 21,4  | 9             | 32,1  | 13                                               | 46,4  |
| 2                          | Microbiology    | 16               | 12                                      | 75,0  | 7               | 43,7  | 3             | 18,7  | 11                                               | 68,7  |
| 3                          | Helminthology   | 10               | 10                                      | 100,0 | 7               | 70,0  | 7             | 70,0  | 10                                               | 100,0 |
|                            | Total:          | 54               | 39                                      | 72,22 | 20              | 37,04 | 19            | 35,19 | 34                                               | 62,96 |



In addition, during our research, it was found that 24.07% of sheep were infected with fascioliasis and 7.4% with moniliosis. Since the main goal of our research was to combat gastrointestinal strongyloidiasis, we observed that although the tables and figures did not show helminthiasis of other species and families, we also observed that antihelminthic drugs were effective in treatment and prevention measures against these helminthiasis.

In conclusion, 71.34% of the examined sheep (n=321 heads) were infected with mixed gastrointestinal strongyloidiasis (marshalliasis, nematodiriasis, other types of gastrointestinal strongyloidiasis, i.e. ostertagiasis, trichonstongilliasis - since the eggs of the causative agents of these helminthiasis are somewhat smaller and morphologically similar to each other, we found it necessary to call them collectively other types of gastrointestinal strongyloidiasis). If we explain, the infection was recorded depending on whether the eggs of all the above helminthiasis causative agents were found or not, or whether some of them were present and the rest were absent.

**Discussion.** The findings of the present study demonstrate that gastrointestinal strongylatoses remain one of the predominant parasitic diseases affecting sheep in the Samarkand region. The overall prevalence recorded during the investigation indicates that these helminth infections are widely distributed regardless of production system or management conditions. The high proportion of mixed infections suggests that sheep are continuously exposed to several species of gastrointestinal nematodes under natural grazing conditions.

Differences observed between Nurabad and Payariq districts may be associated with variations in climatic conditions, pasture characteristics, grazing intensity, and veterinary management practices. Nevertheless, the prevalence remained high in both districts, confirming that gastrointestinal strongylatoses represent a persistent epizootological problem throughout the region.



Marshallagiosis and nematodiosis were among the most frequently detected helminthoses, while other gastrointestinal strongylatoses collectively constituted the largest proportion of infections. The predominance of mixed invasions is epidemiologically important because simultaneous infection with several parasite species may intensify clinical manifestations, reduce feed conversion efficiency, suppress immune responses, and ultimately decrease meat and wool production.

The detection of fasciolosis and monieziosis together with gastrointestinal strongylatoses further indicates that sheep are exposed to multiple parasitic infections simultaneously. Therefore, parasite control strategies should not be limited to a single disease but should be based on integrated control programs including regular coprological monitoring, strategic anthelmintic treatments, rotational grazing, pasture management, and continuous veterinary supervision.

The results obtained in this investigation provide updated epizootological information for the central region of Uzbekistan and may serve as a scientific basis for improving regional parasite control programs aimed at reducing infection prevalence and economic losses in sheep farming.

### **Conclusion.**

1. Coprological examination of 321 sheep in the Samarkand region revealed that 249 animals (77.57%) were infected with mixed gastrointestinal strongylatoses, indicating the widespread occurrence of these helminth infections under the regional climatic and management conditions.

2. Among the examined sheep, the prevalence of marshallagiosis, nematodiosis, and other gastrointestinal strongylatoses was 45.17%, 39.88%, and 68.54%, respectively. The prevalence of mixed gastrointestinal strongylatoses reached 73.47% in Nurabad District and 68.33% in Payariq District, demonstrating a consistently high level of infection in the study area.

3. In addition to gastrointestinal strongylatoses, fasciolosis and monieziosis were detected in 24.07% and 7.40% of sheep, respectively, highlighting the



necessity of regular coprological surveillance and integrated parasite control programs to improve sheep health and productivity in the Samarkand region.

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