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MONITORING OF THE DETECTION OF SHEEP INFECTION BY HELMINTOSES IN THE SOUTHERN BORDER REGIONS OF THE BOLGRAD DISTRICT, THE ODESSA REGION

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The article presents the results of the research of lamb carcasses during 2020-2022 during the post-slaughter veterinary and sanitary examination for backyard slaughter of animals in private homesteads. It was revealed sheep's damage by strongylatosis, moniesiosis, echinococcosis, fasciolosis, dicroceliosis. It has been established that polyinvasions (strongylatosis-moniosis and moniosis-echinococcosis) occur most often among sheep.

It has been proven that carrying out a veterinary and sanitary examination is a necessary element even for backyard slaughter, because it allows to obtain high-quality raw materials and plan preventive anti-epizootic measures in the future.

Key words: *backyard slaughter, extent of infestation, helminthiasis, sheep, post-slaughter veterinary and sanitary examination.*

Formulation of the problem.

Animal helminthiasis is one of the leading factors that significantly inhibit the development of various branches of animal husbandry. Sheep breeding is no exception. This branch of animal husbandry is traditional in southern Ukraine and is closely related to the gastronomic preferences of the population of Bessarabia. Helminth infections have a negative impact on the quality of raw materials, their shelf life, lead to contamination of lamb with pathogenic and opportunistic pathogens, which poses a threat to the health of consumers. The issue becomes most relevant under the conditions of European integration, especially if we take into account that the southern regions of Odesa region border Moldova and Romania.

To date, it has been proven that the application of the technology of stream production of lamb makes it possible to achieve continuous year-round production of the same amount of raw materials [12, 20].

For the purpose of European integration, Ukraine has adopted UN/ECE ECE/TRADE/308-2007 "Lamb. Carcasses and offal. Guidelines for supply and quality control". This regulatory act sets out internationally accepted specifications, as well as cutting lines according to anatomical terms. The standard makes it possible to obtain raw materials that are competitive on the world market. Also, in order to control the quality of mutton, domestic normative acts were developed by scientists of the Institute of Animal Husbandry of the Steppe Regions "Askaknia-Nova" (DSTU "Mutton and goat meat in carcasses. Technical conditions" and DSTU "Meat. Mutton and goat meat in cuts . Specifications"). They also comply with international standards and requirements [19].

Scientists have identified the main factors that have a direct impact on the quality of products produced by the sheep industry. Among them are air, animal hygiene, animal veterinary measures at enterprises, feed and water, primary processing and conditions of supply of products to meat processing enterprises. A total of 53 factors affect the quality of sheep breeding products [9]. Worm infestation of sheep is particularly unfavorable for organic livestock farming [7]. Sheep carcasses are characterized by different nutritional value. Their morphological composition is directly related to the breed, age, fatness, and sex of the animals. Lamb is characterized by the content of 53-72% water, 28-47% dry substances (including fat, protein). In general, mutton is inferior to beef in terms of protein content, but exceeds them in terms of fat content and calorie content. Lamb fat contains palmitic, oleic and stearic acids. A total of 18 fatty acids out of the known 40 are counted in lamb. In addition, lamb fat is characterized by a low cholesterol content (half as much as pork and beef) [18].

There are reports of scientists regarding the falsification of carcasses with alkaline detergents in order to extend their shelf life and reduce bacterial contamination of raw materials [2].

Literature data show that in the northern regions of the Odesa region, in sheep and goats during the post-mortem examination, tenuicol cysticercosis was recorded 5.4% more than in the southern regions, while in the

sheep from the southern regions, echinococcosis (11.9%) and coenurosis prevailed [1]. Data from other scientists report that in the north of the Odesa region, sheep are affected by moniesia in 61.2%, and in the southern part - 74.1%. At the same time, two-component polyinvasion prevails [15].

Moniesiosis is characterized by seasonality and age dynamics. Thus, trichostrongylide lesions predominate in adult sheep. Helminth infestation of the hepatobiliary system is almost the same (27-30%). Strongyloidiasis of the lungs occurs twice as often in adult animals [13]. At the same time, other scientists did not find seasonal and age dynamics for moniesiosis among sheep in Nigeria. Therefore, it can be concluded that seasonal and age-related dynamics are related to climatic conditions and features of the region [4].

In Ukraine, echinococcosis is registered mainly in Odesa, Mykolaiv, Zaporizhzhia, Kherson, and Donetsk regions. In Ukraine, the sheep type circulates in the southern steppe zone, while the pig type prevails in the steppe and forest-steppe zones. Affected sheep in Odesa region is 32% [6, 21]. The main measure that makes it possible to reduce the damage of animals by echinococcosis is the reduction of the population of homeless dogs, as well as the responsible and reliable disposal of affected raw materials and animal waste [11].

Separate literary sources indicate the imperfection of the system of monitoring the safety and quality of raw materials. According to the data of scientists, animals are not affected by invasive diseases during yard slaughter. However, lesions are still detected in State Laboratories of Veterinary Medicine. This indicates the low efficiency of supervision and control at the stage of animal slaughter. Echinococcosis and dicroceliosis of ruminants is a risk factor that must be taken into account during the sanitary evaluation of products and raw materials [8].

Anoplocephalites influence the processes of immunogenesis by excreting regulatory metabolites. Helminths suppress the immune response. This suppressive action may be related to the stage of helminth development. Accordingly, these changes cannot help but reflect on the quality indicators of raw materials [5]. At the same time, foreign literary sources report that lambs affected by moniesia do not significantly affect their growth rate (in young meat breeds) [3]. Most often, damage to sheep/lambs by strongyliatous-moniasis infestation is registered. The lesion is accompanied by significant leukocytosis, an increase in AST, ALT, and bilirubin [10]. According to Ukrainian scientists, damage to sheep by the causative agent of moniasis causes an increase in the level of CIC in the blood serum of animals, which indicates the formation of an immune response. The relationship between the increase in the level of CIC in blood serum and the growth of bacterial contamination of lamb carcasses was established [14].

28% of 4-6-month-old lambs affected by moniesia were affected during the post-mortem examination. A gradual increase in bacterial insemination from May to July was recorded in affected carcasses (NMAFAnM $5,22 \pm 0,11 \times 10^6$ CFU/g). At the same time, the number of bacteria of the Escherichia coli group did not exceed the maximum permissible value [16]. In cases of damage to sheep by moniesia, shifts in the pH indicator (change in the alkaline direction) are recorded. This is the reason for a significant reduction in the storage of raw materials, which becomes a possible cause of outbreaks of food toxic infections [17].

Thus, the above literary data indicate the relevance of our chosen research topic.

The goal of the work.

The purpose of the work was to monitor the detection of helminth infection in sheep during the post-slaughter veterinary and sanitary examination for yard slaughter in the private sector farms of the settlements of the south of Odesa region, bordering the neighboring states (Moldova), during 2020-2022.

Materials and methods.

To conduct a monitoring study, veterinary data obtained during the post-slaughter veterinary and sanitary examination of sheep after their backyard slaughter were taken. The animals belonged to private farms (homesteads). Data were collected over 3 years (2020-2022). A total of 313 carcasses of sheep older than one year were examined during the specified period. The frequency of detection of sheep carcasses affected by causative agents of moniesiosis, echinococcosis, strongylatosis, and others was determined.

The main type of research was helminthological dissection and helminthoscopy.

The obtained data were processed statistically.

Results and discussion.

During the experimental period (2020-2022), all animals subjected to post-mortem veterinary and sanitary examination 313 sheep are older than one year. During 2020, 84 carcasses were examined, and during 2021 and 2022 – respectively 121 and 108 sheep carcasses.

In 2020, 12 sheep were affected by strongylates, which is 14.3% of the total number of animals examined during the year (EI 14.3%), moniesia was detected much more often - EI 28.6% (in 24 animals during the year), echinococcal cysts were found in the livers of 5 sheep (EI 6%), and during slaughter, damage to the liver of animals with fasciolae and dicrocelia was often recorded - EI 9.5 and 19.0%, respectively. Thus, during 2020, during the post-slaughter veterinary-sanitary examination for secret slaughter, lesions of moniesia and dicrocoele were most often registered in sheep. The fatness of the animals was satisfactory, and no visual signs of pathology were detected during the pre-slaughter examination. Schematically, damage to sheep by various causative agents of helminthiasis is shown in fig. 1.

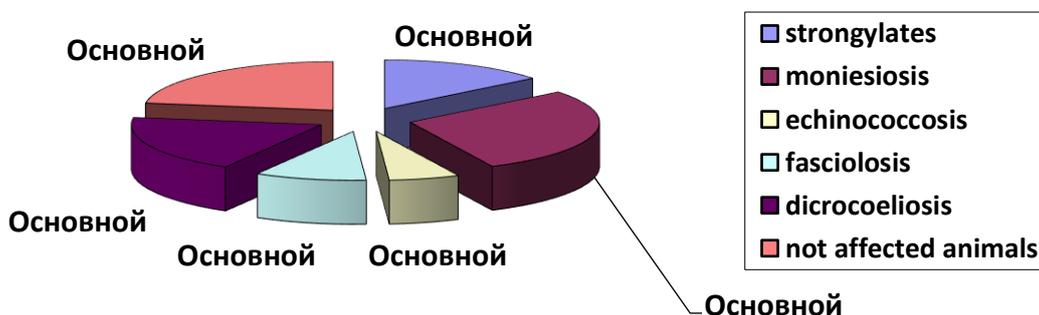


Fig. 1. The frequency of detection of helminth infection in sheep during 2020 (EI %) (n=84)

The situation registered during 2021 was somewhat different. Thus, out of 121 animals slaughtered in the yard (sheep older than 1 year), 70 sheep were found to be affected by helminths during the course of the year. Moniesia lesions were most often recorded (EI 19%), strongylate lesions (EI 12.4%) and dicrocelia (EI 10.7%) were detected in animals somewhat less often. Infestation with causative agents of echinococcus and fasciolosis was, respectively, 7.4 and 8.3% (EI) (Fig. 2). That is, damage to animals by strongylates decreased by 13.3%, moniesia by 33.6%, fasciolae by 12.6%, and dicrocelia by 43.7%. In the same year, a 23.3% increase in cases of detection of echinococcus lesions of the liver of sheep was noticed and recorded.

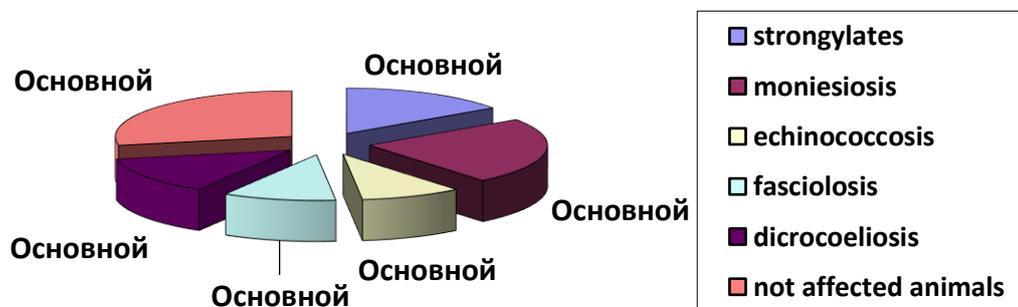


Fig.2. The frequency of detection of damage to sheep by pathogens of helminthiasis during 2021 (EI %) (n=121)

In 2022, a yard post-slaughter veterinary and sanitary examination of 108 sheep over the age of 1 year was carried out. Of this number of animals, 51 animals were not affected by helminths. The results obtained during the experimental period are shown in Fig. 3. The data shown in the diagram indicate that among animals during the year, damage by moniesia was most often registered (EI 24.1%), slightly inferior to the number of animals affected by strongylates - EI 14.8%. This year, the lowest percentage of lesions caused by echinococcosis, fasciolosis, and dicroceliosis was found - EI was 3.7%, 2.8%, and 6.5%, respectively. We associate such fluctuations with the climatic features of the area.

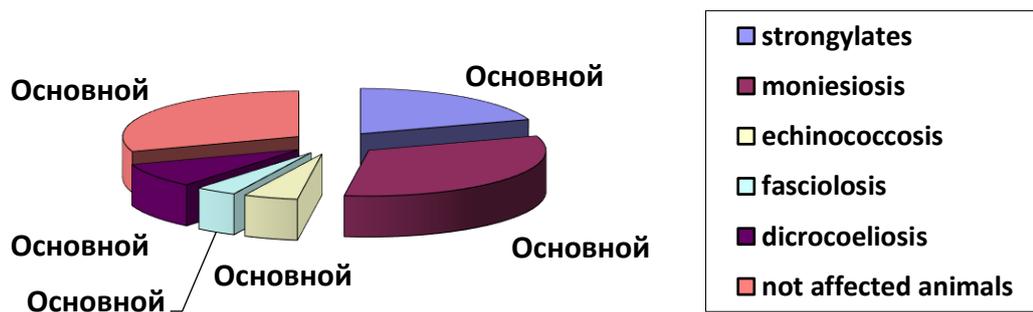


Fig.3. The frequency of detection of helminth infection in sheep during 2022 (EI %)(n=108)

If we evaluate the results of research over the three research years, we can come to the conclusion that adult sheep are affected by moniesia in the range of 19.0-28.6%, by strongylates - 12.4-14.8%, by echinococcosis - 3.7-7.4%, fasciolas – 2.8-9.5%, dicrocelias – 6.5-19%. The situation with moniesian and strongylatous lesions during the experimental period is more or less stable, with minor fluctuations. As for the damage by fasciolae and dicrocelia, the fluctuations of these samples are significant, especially between the indicators of 2020 and 2022, which we associate with the peculiarities of the area and climate, dry and arid summer.

An interesting trend is that sheep are not officially affected by causative agents of helminthiasis, or isolated cases are recorded. This proves that post-slaughter veterinary and sanitary examination is a necessary element in obtaining quality raw materials and is mandatory even for secret slaughter.

Conclusion. Sheep breeding in the settlements of the Bolgrad district of the Odesa region, which border the settlements of neighboring states, is a traditional branch of animal husbandry. The main raw materials used are lamb and sheep's milk, from which brine cheeses (brynza) are made. For sheep breeding in the region, the problem of helminth infection of adult sheep is acute. Most often, lesions caused by the causative agents of strongylatosis, moniesiosis, echinococcosis, fasciolosis, and dicroceliosis are registered. The extent of damage to adult sheep during 2020-2022 by causative agents of moniasis is in the range of 19.0-28.6%, by strongylates - 12.4-14.8%, by echinococcosis - 3.7-7.4%, by fasciolas - 2.8 -9.5%, dicrocelia – 6.5-19%. In the detection of lesions after backyard slaughter, the leading place belongs to the conduct of a qualified veterinary and sanitary examination, which allows obtaining high-quality raw materials, carrying out a qualified sanitary assessment of the affected lamb, and also makes it possible to objectively assess the epizootic situation from the data of helminthiasis among sheep and plan further preventive measures activities.

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МОНІТОРИНГ ВИЯВЛЕННЯ УРАЖЕННЯ ОВЕЦЬ ГЕЛЬМІНТОЗАМИ В ПІВДЕННИХ ПРИКОРДОННИХ РАЙОНАХ БОЛГРАДСЬКОГО РАЙОНУ ОДЕСЬКОЇ ОБЛАСТІ

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У статті наведено результати дослідження баранячих туш протягом 2020-2022 років під час післязабійної ветеринарно-санітарної експертизи за подвірного забою тварин в приватних присадибних господарствах. Виявлено ураження овець збудниками стронгілятозів, монієзіозу, ехінококозу, фасціольозу, дикроцеліозу. Встановлено, що найчастіше серед овець трапляються поліінвазії (стронгілятозно-монієзіозна та монієзіозно-ехінококозна).

Доведено, що проведення ветеринарно-санітарної експертизи є необхідним елементом навіть за подвірного забою, адже дозволяє отримувати сировину високої якості та планувати профілактичні протиєпізоотичні заходи в подальшому.

Ключові слова: *гельмінтози, вівці, екстенсивність інвазії, післязабійна ветеринарно-санітарна експертиза, подвірний забій.*