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Main helminthiases in chickens and their control in the central geographical and climatic regions of Uzbekistan

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Abstract. Helminthiasis in farm poultry remains one of the most significant veterinary problems in households in the central regions of Uzbekistan, where poultry farming plays an important role in food security and sustainable development of the agricultural sector. The purpose of this study was to determine the prevalence of the main types of intestinal nematodes in chickens in three key regions of the country – Jizzakh, Syrdarya, and Samarkand provinces – and to evaluate the effectiveness of antiparasitic therapy using tetramisole-based drugs. Between 2022 and 2024, 747 chickens were examined, with helminthological and coprological analyses of faecal samples showing that the overall infection rate was 52.07%. The distribution of infected birds by region revealed significant variability: the lowest level of infestation was recorded in the Jizzakh Region (41.9%) and the Syrdarya Region (50.6%), and the highest in the Samarkand Region, where 58.57% of birds were infected. The main nematodes identified were ascaridiosis with an infection rate of 32.8%, heterakidosis with 32.53%, and capillariosis with 37.48%. Such a high prevalence indicates a wide range and pronounced endemicity of helminthiasis in these regions. Antiparasitic therapy with a tetramisole-based drug demonstrated high efficacy: 92.86% after the first course of treatment and 100% elimination of parasites after repeated use. The results of the study emphasised the need to adapt veterinary preventive measures to regional characteristics, which will reduce economic losses in poultry farming and improve poultry health indicators in households. The practical significance of the study lies in the development of scientifically based recommendations for optimising helminthiasis control and prevention programmes, which is an important factor in increasing productivity and biosafety in the agricultural regions of Uzbekistan

Keywords: ascariasis; capillariosis; helminth fauna; *Ascaridia galli*; *Heteraks gallinarum*; *Capillaria obsignata*; *C.bursata*

Introduction

Poultry farming is one of the leading sectors in the livestock industry, providing the population with valuable food products – meat and eggs – and supplying light industry with by-products of processing. In the Republic of Uzbekistan, the state pays special attention to the development of this sector, with an emphasis on the introduction of modern international standards. One of the priority tasks in this context is the development and implementation of effective measures to combat infectious, invasive, and non-contagious poultry diseases, which is of key importance for preventing economic losses and reducing risks to human health.

A systematic review and meta-analysis by A. Shifaw *et al.* (2021) covered more than 190 studies published

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between 1942 and 2019 to assess the global and regional prevalence of helminthiasis in chickens. According to the summarised data, the most prevalent were *Ascaridia galli* (35.9%), *Heterakis gallinarum* (28.5%), *Capillaria* spp. (5.9%), and *Raillietina* spp. (19.0%). The overall prevalence rate was 79.4%. It was noted that birds kept in free-range conditions and on smallholdings were significantly more likely to be infected with helminths than chickens raised in cage systems, which highlights the need to strengthen preventive measures in extensive forms of husbandry.

S. Rabbimov (2024) presented a comprehensive study of helminthiasis in domestic chickens in the north-eastern regions of Uzbekistan, including the Tashkent, Syrdarya, and Jizzakh regions. The researcher examined 927 domestic and wild birds and identified about 30 species of helminths, the most dangerous of which were representatives of the families *Davaineidae*, *Ascarididae*, *Heterakidae* and *Capillariidae*. The study highlighted the high degree of infestation in birds, especially during warm seasons, and the need to consider the bioecological characteristics of parasites when developing preventive measures. However, the study did not consider the effectiveness of antiparasitic therapy and does not address the clinical aspects of the course of infestations, which will be further investigated in this study with a focus on anti-nematode drugs in domestic settings.

S.N. Ritu *et al*. (2024) investigated the epidemiology, pathogenesis, and sensitivity of *Ascaridia galli* in semi-domesticated chickens in Bangladesh. The researchers found a high prevalence of infection (45.6%) and demonstrated the efficacy of levamisole and ivermectin, while albendazole, mebendazole, and piperazine showed no antiparasitic activity. Despite the valuable data, the study covered only one species of nematode and did not consider regional distribution patterns, which requires further study in other climatic conditions.

In a study by D.B. Fayzieva (2020), a systematic analysis of the helminth fauna of domestic birds – chickens, ducks, and geese – was conducted. A total of 38 species of helminths were identified: 9 trematodes, 12 cestodes, and 17 nematodes. The greatest diversity of parasites was found in chickens – 32 species, including representatives of the families *Echinostomatidae, Cyclophyllidae, Trichocephalidae, Ascarididae*, etc. Twelve species of helminths were found in ducks and four species in geese. The study described the taxonomic composition of the identified helminths by class, genus, family, and species, but did not consider the clinical manifestations of parasitic diseases or evaluate the effectiveness of antiparasitic therapy.

The development and evaluation of the action of anthelmintic drugs in poultry farming is given special attention, since the choice of an effective treatment method directly affects the productivity and biosafety of farms. An experimental study by T. Feyera *et al*. (2021) included a comparative evaluation of the effectiveness of three anthelmintic drugs – levamisole, piperazine, and fenbendazole – in the treatment of artificial *Ascaridia galli* infestation in chickens, using both oral administration and addition to drinking water. It was found that individual oral administration of drugs provides higher efficacy than group treatment through water. Levamisole, piperazine and their combination showed over 96% reduction in helminths when administered orally, and fenbendazole in bolus form was significantly more effective than when administered in water.

Thus, the high prevalence of helminthiasis in chickens, its impact on health, productivity, and product quality, especially in extensive farming, requires regular monitoring and the use of effective antiparasitic measures. However, there is still a lack of relevant data on the structure of helminth fauna and the clinical efficacy of drugs in the central regions of Uzbekistan. In this regard, the purpose of the study was to identify the prevalence of intestinal nematodes in chickens in households in the Samarkand, Jizzakh, and Syrdarya regions and to evaluate the effectiveness of therapy using tetramisole.

Materials and Methods

Geography and conditions of the study. The study was conducted in three central regions of the Republic of Uzbekistan – Samarkand, Jizzakh, and Syrdarya provinces – between 2022 and 2024. These regions are characterised by a continental climate with hot, dry summers and cold winters. Average temperatures during the study period ranged from +15°C to +32°C, with relative humidity of 40-60%. The research was conducted in households, mainly private farms with free-range chickens, where sanitary conditions were assessed as average, with factors contributing to the spread of parasitic diseases.

Objects of research. The study focused on domestic chickens of various meat and egg breeds and local breeds. A total of 747 birds were examined: 167 in the Jizzakh Region, 259 in the Syrdarya Region, and 321 in the Samarkand Region (Akramov, 2023). The conditions of keeping included free-range grazing, feeding with compound feed and grain mixtures, without strict control of sanitary standards.

Methods for selecting and analysing biomaterial. The material for the study consisted of faeces and intestinal contents of birds, taken in pure form directly from farms or after autopsy of dead individuals. Helminths were diagnosed using the Fulleborn method (Bench Aids for the diagnosis of intestinal parasites, 1994) to detect nematode eggs in faeces and the sequential washing method to isolate adult parasites from intestinal contents (Techniques for parasite assays and identification in faecal samples, n.d.). In some cases, the Baerman method was also used to detect larvae (Hansen & Perry, 1994). Microscopic analysis was performed using a LOMO ML-2200 light microscope (Russia) with morphological identification of parasites.

Identification and classification of helminths. The identification of helminth species was based on the morphological characteristics of adult specimens and eggs. *Ascaridia galli*, *Heterakis gallinarum*, *Capillaria obsignata* and other common nematodes were considered key species. The classification was in accordance with modern taxonomic guidelines. (Despommier *et al.*, 2019).

Investigation of regional and seasonal dynamics. The studies were conducted systematically, considering seasonal fluctuations, which allowed identifying differences in the intensity of invasions depending on the region and time of year (Akramov, 2024). Samples were collected in each area during different seasons to compare the level of infestation with climatic conditions.

Application of control and prevention methods. For deworming, the drug "Tetramizol 10%" in powder form was used, which was added to feed or drinking water (Lavrenova, 2018). The dose was 200 mg per 1 kg of live bird weight. The treatment was repeated after 14 days. The effectiveness of the drug was assessed based on the reduction in the level of helminth eggs in faeces and the decrease in the number of parasites during autopsy.

Ethical standards. The study was conducted in accordance with the principles of humane treatment of animals and veterinary bioethics. All samples were obtained with the consent of the bird owners, without causing harm to live specimens. No interventions requiring separate ethical approval were performed.

Results

Analysis of the data obtained showed that the level of nematode infection in chickens varies significantly depending on the region and district, reflecting differences in housing conditions, sanitary practices and access to veterinary care. The results presented below allow identifying the epizootiological characteristics of the spread of helminthiasis, and to establish the predominant species of nematodes and the frequency of their combination.

Regional distribution of nematode infections in chickens in certain areas of the Jizzakh, Syrdarya, and Samarkand regions. In the Jizzakh Region, 167 chickens from three districts – Pakhtakor, Sharof Rashidov, and Forish – were examined. The overall level of nematode infection was 41.9% (70 chickens). The distribution of helminth species and the level of infestation by district is shown in Table 1.

Table 1. Extent of nematode infections in chickens from different districts of Jizzakh Region

District	Total number of chickens examined	Number of infected chickens	Infection rate (EZ)	Types of nematode infections
Forish District	52	31	59.6%	40.4% ascaridiosis, 32.7% heterakidosis, 51.9% capillariasis
Pakhtakor District	77	34	44.2%	3.89% ascaridiosis, 11.7% heterakidosis, 42.9% capillariasis
Sharof Rashidov District	38	5	13.2%	7.89% ascaridiosis, 2.63% heterakidosis, 7.89% capillariasis

Note: the total number of infections by type may exceed the total number of infected chickens, as some birds have been found to have mixed infestations with two or more types of nematodes
Source: developed by the authors

The highest level of infection was recorded in the Forish District (59.6%). High rates of all three types of nematode infections were observed simultaneously, especially capillariasis (51.9%), which may be related to environmental conditions (moisture, constant contact of birds with the soil) and limited access to veterinary drugs in remote rural areas. In the Pakhtakor District, the infection rate was 44.2%, with capillariasis predominating (42.9%), and the proportion of ascariasis being low – only 3.89%. This distribution may indicate the chronic presence of capillariasis pathogens in the environment, particularly in litter, and inadequate sanitation of premises. Mixed infestations were detected in 44.2% of infected chickens, indicating a high intensity of parasite circulation. The Sharof Rashidov District showed the lowest infection rates (13.2%), which may be explained by lower bird density, better sanitary conditions, or the seasonality of sampling. However, even in this district, cases of all three types of nematodosis were detected, indicating the endemicity of the parasitic load.

As part of the comprehensive helminthological survey, additional investigations were carried out in Syrdarya Region, where climatic and ecological conditions differ from those in the previously studied Jizzakh Region. In Syrdarya Region, a total of 259 chickens were examined using faecal samples, which were collected in a clean state and subjected to helminthoscopy. The study revealed that ascaridiosis, heterakidosis, and capillariasis are also widespread among chickens in Syrdarya Region. The results showed that 50.58% (131 chickens) were infected with nematodes. Specifically, 74 chickens (28.57%) had ascaridiosis, 79 chickens (30.5%) had heterakidosis, and 79 chickens (30.5%) were infected with capillariasis eggs (Table 2).

Table 2. Extent of nematode infections in chickens from different districts of Syrdarya Region

District	Total number of chickens examined	Number of infected chickens	Infection rate (EZ)	Types of nematode infections
Mirzaabad District	54	13	24.1%	12.9% ascaridiosis, 7.4% heterakidosis, 20.4% capillariasis
Guliston District	55	31	56.4%	41.8% ascaridiosis, 38.2% heterakidosis, 29.1% capillariasis
Boyovut District	47	34	72.3%	29.8% ascaridiosis, 34.0% heterakidosis, 55.3% capillariasis
Xovos District	50	27	54%	38% ascaridiosis, 32% heterakidosis, 26% capillariasis
Sardoba District	53	26	49.1%	20.7% ascaridiosis, 41.5% heterakidosis, 30.2% capillariasis

Note: the total number of infections by type may exceed the total number of infected chickens, as some birds have been found to have mixed infestations with two or more types of nematodes

Source: developed by the authors

The level of nematode infection in chickens in the districts of the Syrdarya Region varied from moderate to high, which may be related to both the ecological characteristics of the region and differences in poultry husbandry conditions and preventive measures. The highest prevalence of nematode infections was recorded in the Boyovut (72.3%) and Guliston (56.4%) districts, which probably reflects unfavourable sanitary conditions, crowded housing of birds and insufficient frequency of deworming. Particularly high rates of capillariasis were observed in the Boyovut district (55.3%), which may indicate long-term contamination of the environment with parasite eggs and the pathogen's resistance to external influences. In contrast, the Mirzaabad district had the lowest infection rate (24.1%), which may be due to either a more favourable epizootological situation or lower livestock density on farms. The widespread combination of three types of nematodes (*Ascaridiosis, Heterakidosis* and *Capillariasis*) indicates widespread circulation of parasite eggs in the environment and insufficient biosafety in most farms. The variation in infection rates between districts highlights the need for a differentiated approach to prevention, considering local risk factors.

In Bulung'ur District of Samarkand Region, 51 chickens, in Tayloq district 96 chickens, in Ishtixon district 82 chickens, in Jomboy district 44 chickens, and in Pastdarg'om district 48 chickens were examined, totalling 321 chickens from households raising egg-laying chickens. Faecal samples were collected from these chickens and were subjected to helminthological examination (Table 3). As a result of the study of chickens in the Samarkand Region, 188 out of 321 were found to be infected.

Table 3. Extent of nematode infections in chickens from different districts of Samarkand Region

District	Total number of chickens examined	Number of infected chickens	Infection rate (EZ)	Types of nematode infections
Bulung'ur District	51	35	68.6%	68.6% ascaridiosis, 54.9% heterakidosis, 43.1% capillariasis
Tayloq District	96	44	45.8%	36.5% ascaridiosis, 22.9% heterakidosis, 39.6% capillariasis
Ishtixon District	82	63	76.8%	39.0% ascaridiosis, 64.6% heterakidosis, 41.5% capillariasis
Jomboy District	44	21	47.7%	43.2% ascaridiosis, 38.6% heterakidosis, 47.7% capillariasis
Pastdarg'om District	48	25	52.1%	47.9% ascaridiosis, 37.5% heterakidosis, 43.8% capillariasis

Note: the total number of infections by type may exceed the total number of infected chickens, as some birds have been found to have mixed infestations with two or more types of nematodes

Source: developed by the authors

In the Samarkand Region, the results of the study indicate a significant prevalence of nematode infections in chickens, especially in densely populated areas and areas where poultry is traditionally kept on private farms. The highest infection rates were recorded in the Ishtixon and Bulung'ur districts, which is probably due to a combination of high poultry density, inadequate sanitary control and possible resistance of parasites to the drugs used. The proportion of heterakidosis is particularly high in the Ishtixon District, which may indicate a long-term presence of the infestation and untimely preventive measures.

In districts with less pronounced indicators, such as Tayloq and Jomboy, the infection rate also remains significant, indicating widespread circulation of nematode eggs in the environment and potentially insufficient awareness of biosafety measures among farm owners. The widespread combination of three types of nematodes in the samples – *Ascaris*, *Heterakis* and *Capillaria* – indicates the simultaneous presence of several parasite development cycles, which complicates diagnosis and treatment. The absence of singamosis in all districts of the Samarkand Region is consistent with data from other regions and may be due to both climatic characteristics and the biology of the parasite itself, which is less resistant to current poultry farming conditions. The cumulative infection rate (58.6%) in the region highlights the need for a systematic approach to helminthiasis control, including routine testing, educational work among owners, and regular deworming, considering regional epizootic characteristics.

Comparative assessment of nematode infection in chickens across three regions. For a comprehensive assessment of the epizootic situation regarding nematode infections in chickens in the central climatic zone of Uzbekistan, data from studies conducted in three administrative regions were summarized: Jizzakh, Syrdarya, and Samarkand regions. A total of 747 chickens kept on private subsidiary and small farms were examined between 2022 and 2024. Diagnosis was carried out using the Fulleborn method and sequential washing. The results are presented in Table 4, which shows the levels of infection and prevalence of the main types of intestinal nematodes: ascariasis, heterakidosis, and capillariasis.

Table 4. Extent of nematode infections in chickens in Jizzakh, Sirdarya, and Samarkand Regions based on helminthological and coprological examinations

Region	Number of chickens examined	Number of infected chickens	Infection rate (%)	Ascaridiosis (%)	Heterakidosis (%)	Capillariosis (%)
Jizzakh	167	70	41.92	16.17	15.57	37.13
Sirdarya	259	131	50.6	28.57	30.5	31.66
Samarkand	321	188	58.57	44.86	42.99	42.37
Total	747	389	52.07	32.80	32.53	37.48

Source: developed by the authors

The comparative analysis of nematode infections in chickens across the Jizzakh, Syrdarya, and Samarkand regions, based on the summarised data in Table 4, demonstrates noticeable regional differences in both the prevalence and structure of parasitic infestations. Among the three regions, Samarkand recorded the highest overall infection rate, with 188 out of 321 chickens (58.57%) infected. This elevated prevalence is closely associated with the dominant presence of ascaridiosis (44.86%), heterakidosis (42.99%), and capillariosis (42.37%), all showing nearly equal distribution. The high co-occurrence of these three types of nematodes suggests that complex mixed infections are widespread in this region. This pattern aligns with field observations indicating that backyard poultry in Samarkand is often raised in semi-extensive systems with limited biosecurity measures, promoting continuous exposure to contaminated environments.

In the Syrdarya Region, 50.58% of the examined chickens were infected, with heterakidosis (30.50%) slightly more prevalent than capillariosis (31.66%), and ascaridiosis (28.57%). These figures indicate a relatively even distribution of nematode species and a moderate level of infection compared to Samarkand. The presence of all three helminth types also points to polyparasitism, though not as intense as in Samarkand. Factors such as climatic conditions and similar management practices, including the lack of regular deworming and outdoor access to contaminated feed and soil, likely contribute to maintaining persistent parasitic circulation.

In Jizzakh, the overall infection rate was the lowest, at 41.92%, with a notably high proportion of capillariosis cases (37.13%) compared to ascaridiosis (16.17%), and heterakidosis (15.57%). This may reflect the ecological specificity of the area and the resilience of *Capillaria* eggs in the local environment, particularly in moist soil and litter where these nematodes are known to thrive. While the total infestation level is lower, the high rate of *Capillaria* infection still poses a significant health risk due to the pathogenic nature of these parasites, especially in young or immunocompromised birds.

In total, across all three regions and 747 chickens, the study found 389 infected birds, representing an overall infection rate of 52.07%. The dominant nematode infections were capillariosis (37.48%), followed by ascaridiosis (32.80%) and heterakidosis (32.53%).

This relatively even distribution confirms the complex parasitological landscape in the central climatic zone of Uzbekistan and underscores the importance of regional epidemiological monitoring and targeted helminth control strategies.

The climate of central Uzbekistan is characterised as continental, with hot, dry summers and mild winters, which, according to literature data, creates optimal conditions for the survival of intestinal nematode eggs and larvae in the environment due to moderate humidity and temperatures favourable for their encrustation and development (Shifaw *et al.*, 2021). Factors related to the bird's environment in free-range systems (backyard and free-range systems) play a key role, as they provide constant contact with soil, infected feces, intermediate hosts (such as earthworms, beetles), and plant biomass, which significantly increases the risk of nematode infection.

A separate study by F. Sadeghi *et al.* (2024) confirmed that in free-range conditions, the prevalence of *Ascaridia galli*, *Heterakis gallinarum*, and *Capillaria* spp. reaches 80-90% in chicken populations, regardless of organic or conventional farming methods. Moreover, the link between housing conditions (overcrowding, lack of pasture rotation, contaminated litter) and high intensity of helminthiasis has been repeatedly confirmed by survey data in different climatic zones, including similar climatic zones (Sherwin *et al*., 2013).

Thus, the continental climate of the region, free-range poultry farming, contact with a contaminated environment, and the lack of regular preventive measures have been confirmed as contributing factors to the widespread distribution of three key species of intestinal nematodes in the central zone of Uzbekistan.

Investigation of the effectiveness of an antihelminthic drug in farm conditions. In the final stage of the study, a therapeutic intervention was carried out using the anthelmintic agent Tetramizol 10%, a broad-spectrum nematodicidal preparation widely recognised in veterinary parasitology. The drug was administered in powdered form, mixed either with feed or diluted in drinking water, at a standardised dosage of 200 mg per 1 kg of live body weight, in accordance with veterinary pharmacological guidelines.

The choice of Tetramizol 10% was based on prior clinical evidence of its efficacy against the most prevalent nematode species affecting poultry, including *Ascaridia galli*, *Heterakis gallinarum*, and *Capillaria* spp. – all of which were identified during the present research. The active substance, levamisole hydrochloride, acts by inducing spastic paralysis in nematodes via nicotinic acetylcholine receptor stimulation, which facilitates expulsion of parasites from the host's digestive tract.

To quantitatively assess the therapeutic efficacy, faecal egg count reduction (FECR) was monitored post-treatment using standardised flotation and sedimentation techniques. Results showed that after the first administration, the prevalence of helminth eggs dropped by 92.86%, and complete elimination (100%) was achieved following a second application, administered 7 days after the initial dose. No adverse reactions were observed in the treated chickens, supporting the safety profile of the drug.

These findings affirm the suitability of Tetramizol 10% for the control of nematode infections in backyard poultry systems under the agroecological conditions of Uzbekistan's central climatic regions. The successful reduction in parasite load highlights its potential role in regional helminthiasis prevention programmes, especially in private farming settings where uncontrolled infections remain prevalent.

Discussion

The lack of systematic deworming, low levels of veterinary education among owners of smallholdings, and a tendency to independently use ineffective antiparasitic agents create favourable conditions for the preservation of parasitic cycles and stable species associations of helminths. These factors are confirmed by a study conducted by M.H. Radfar *et al.* (2012) conducted in the Sistan Region of eastern Iran, where 93.2% of free-range chickens were found to have mixed infestations involving *Ascaridia galli*, *Heterakis gallinarum*, *Subulura brumpti*, and several species of tapeworms and ectoparasites. A similar epizootic situation was observed in a number of farms in Central Uzbekistan, which indicates the need to introduce educational programmes and regular preventive treatments to break the epidemiological chains.

K. Wongrak *et al*. (2014) conducted a long-term study on free-range farms in Germany, observing the dynamics of nematode infection in chickens over two production cycles. By the end of the second period, the prevalence of *Heterakis gallinarum* reached 98.5%, *Ascaridia galli* – 96.2%, and *Capillaria* spp. reached 86.1%. In contrast to the data obtained (maximum prevalence of 58.6% in Samarkand), K. Wongrak *et al.* noted almost universal infestation with high parasitic pressure. This difference is conditioned by more intensive monitoring, post-mortem diagnosis and climatic conditions conducive to egg accumulation. However, both studies emphasised the key role of free-range systems in maintaining infectious cycles. F. Kaufmann *et al.* (2011) also took an interest in German farms. A study of 55 organic farms recorded a prevalence of *Ascaridia galli* at 88%, *Heterakis gallinarum* at 98%, and *Capillaria* spp. at 75.3%, with an average parasite burden of 218 worms per bird. Despite more favourable housing conditions and modern infrastructure, prevalence remains extremely high. This is consistent with the high resistance of helminths and the importance of seasonality and sanitation. In Uzbekistan, prevalence is lower, but the environmental risks are similar, especially with weak veterinary control.

The study by J.T. da Silva *et al.* (2022) on chickens in the Brazilian semi-arid region recorded a prevalence of endoparasites of 62.6%, with nematodes accounting for 40.5%. The key risk factors were unsanitary conditions, feeding from the ground, and heat, which inhibits the development of immunity. The result was subclinical infections, increased susceptibility to other pathogens, and a drop in productivity, which was fully consistent with the identified effects of reduced egg production and weight gain in infected birds in the central regions of Uzbekistan.

In a cross-sectional study by K. Wuthijaree *et al.* (2017) of free-range chickens in South Tyrol (Italy), the prevalence was almost 99.3%; *Heterakis gallinarum* (95.7%), *Capillaria* spp. (66.8%), and *Ascaridia galli* (63.6%) predominated. The intensity of infestation was significantly higher in organic farms compared to traditional ones (318.9 vs 112.0 worms/animal). The results correlate with data on mixed infections in the central regions of Uzbekistan, but chickens in Italia had a much higher infection rate, especially in winter, pointing to the strategic need for regional monitoring and individual preventive measures.

According to summary data on helminthiasis in poultry, the greatest threat to chickens is posed by nematodes of the genera *Ascaridia*, *Heterakis* and *Capillaria*, which are highly resistant and widespread in floor-based and especially free-range housing systems. It was noted that these housing systems contribute to an increased risk of infection due to contact with contaminated soil, faeces and intermediate hosts – earthworms and insects (Poultry Diseases, n.d.). This information is fully consistent with the results of the present study, where an increase in infection was observed in all regions where birds had free access to outdoor areas.

The epidemiological study conducted by T. Ferdushy et al. (2016) in Narsingdi District (Bangladesh) revealed a high prevalence of gastrointestinal helminths in free-range chickens, highlighting the high risk of parasitic infestations in free-range conditions. The study, which covered 150 individuals from three villages, found that the most common cestode was *Raillietina* spp. (86-92%), while *Ascaridia galli* (70-86%) and *Heterakis gallinarum* (70-76%) were the most common nematodes. Some individuals showed characteristic pathological changes, such as petechial haemorrhages on the walls of the small intestine in cases of *A. galli* infection and small white nodules in the caecum in cases of *H. gallinarum* infestation. It is noteworthy that most chickens were infected with several species of parasites at once, which indicates favourable conditions for the preservation and transmission of helminths in rural environments, and the insufficient effectiveness of current preventive measures in such housing systems.

Thus, the results obtained are generally consistent with data presented in studies conducted in various countries, including Germany, Iran, Italy, Bangladesh, and Brazil, despite varying levels of infection. Everywhere, the high prevalence of nematodes among free-range chickens and the stable circulation of the main helminth species, primarily *Ascaridia galli*, *Heterakis gallinarum* and *Capillaria* spp. Differences in infection levels are conditioned by both climatic conditions and the intensity of monitoring, veterinary services and the sanitary conditions of farms. Nevertheless, the overall epidemiological picture confirms the significance of helminthiasis as a constant threat to poultry farming in extensive farming systems. These data form the basis for the development of effective preventive strategies.

Conclusions

The study established the epizootological situation regarding intestinal nematodes in chickens kept on individual farms in three key regions of central Uzbekistan: Samarkand, Jizzakh, and Kashkadarya regions. Of the 747 biomaterial samples examined, 386 were found to be infected, accounting for 52.07% of the total, confirming the high prevalence of helminthiasis in farm poultry. Among the identified pathogens, the most significant were nematodes of the species *Ascaridia galli*, *Heterakis gallinarum* and representatives of the genus *Capillaria*, which dominated in all regions surveyed. Their presence, and the frequent combination of several species in one sample, indicate the active circulation of parasitic agents in conditions of free range and limited veterinary control.

The results obtained are fully consistent with data from epizootic observations conducted in other countries, such as Iran, Italy, Germany, Bangladesh, and Brazil. Despite differences in climate, veterinary care, and diagnostic methods, a high degree of vulnerability of poultry to nematode infestations was observed in systems close to extensive farming. This highlights the universality of the problem and the need for transnational exchange of knowledge and control methods. Particular attention was paid to evaluating the effectiveness of antiparasitic therapy. It was found that the use of Tetramizol 10% provided a pronounced antiparasitic effect in mixed infestations, achieving an effectiveness of 92.86% to 100%. This makes the drug a reliable tool in the fight against helminthiasis in poultry and allows it to be recommended for use in private and farm households. The high effectiveness of the drug is especially significant in conditions of limited access to laboratory diagnostics and professional veterinary services.

The study identified the leading types of helminths, determined the level of infection in chickens, and confirmed the effectiveness of the therapeutic approach, which indicates that the set goals have been achieved. The practical significance of the study lies in the possibility of using the data obtained to plan regional strategies for the prevention and control of helminthiasis, adapted to the conditions of the private sector. In the future, further research should focus on investigating

the seasonal dynamics of infection, monitoring the possible resistance of pathogens to various groups of anthelmintics, and comprehensively assessing the environmental factors and sanitary and hygienic conditions that contribute to the maintenance of parasitic cycles. This would enable the development of more sustainable and scientifically sound biosafety measures in poultry farming.

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None.

Finding

None.

Conflict of Interest

None.

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Өзбекстандын борбордук географиялык жана климаттык аймактарындагы тооктордун негизги гельминтоздору жана алар менен күрөшүү

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Аннотация. Айыл чарба тоокторундагы гельминтоздор Өзбекстандын борбордук аймактарындагы үй чарбаларында эң маанилүү ветеринардык көйгөйлөрдүн бири бойдон калууда. Бул аймактарда тоок чарбасы азык-түлүк коопсуздугунда жана айыл чарбасын туруктуу өнүктүрүүдө маанилүү ролду ойнойт. Бул изилдөөнүн максаты – өлкөнүн үч негизги аймагында – Джизак, Сырдарыя жана Самарканд облустарында тооктордун ичегисиндеги негизги нематоддордун жайылышын аныктоо жана тетрамизол негизиндеги каражаттарды колдонуу менен паразиттерге каршы терапиянын натыйжалуулугун баалоо болду. 2022-2024-жылдар аралыгында 747 тоок текшерилип, гельминтологиялык жана копрологиялык анализдердин жыйынтыгы боюнча жалпы инфекция деңгээли 52,07 % түзгөн. Аймактар боюнча инфекциянын таралышы маанилүү өзгөрүүлөрдү көрсөттү: Джизак облусунда – 41,9 %, Сырдарыя облусунда – 50,6 %, ал эми Самарканд облусунда эң жогорку көрсөткүч – 58,57 % аныкталган. Негизги аныкталган нематоддорго аскариддер – 32,8 %, гетеракистер – 32,53 %, жана капиллариялар – 37,48 % кирет. Бул жогорку таралышы гельминтоздордун кеңири аймакка жайылгандыгын жана эндемик экендигин көрсөтөт. Тетрамизолго негизделген каражат менен паразиттерге каршы терапия биринчи дарылоодон кийин 92,86 % натыйжалуулукту, экинчи курстун жыйынтыгында болсо 100 % паразиттердин жоголушун камсыздаган. Изилдөөнүн натыйжалары ветеринардык алдын алуу чараларын региондук өзгөчөлүктөрдү эске алуу менен адаптациялоонун зарылдыгын баса белгилейт, бул тоок чарбасындагы экономикалык чыгымдарды азайтууга жана үй чарбаларындагы тооктордун ден соолугуна оң таасирин тийгизет. Практикалык мааниси – гельминтоздорду көзөмөлдөө жана алдын алуу программаларын оптималдаштыруу боюнча илимий негизделген сунуштарды түзүү, бул Өзбекстандын айыл чарба аймактарында өндүрүмдүүлүктү жана биобезопастыкты жогорулатууда маанилүү фактор болуп саналат

Негизги сөздөр: аскаридоз; капилляриоз; гельминтофауна; *Ascaridia galli*; *Heteraks gallinarum*; *Capillaria obsignata*; *C. bursata*

Основные гельминтозы кур и борьба с ними в центральных географических и климатических регионах Узбекистана

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Аннотация. Гельминтозы у сельскохозяйственной птицы остаются одной из наиболее значимых ветеринарных проблем в домашних хозяйствах центральных регионов Узбекистана, где птицеводство играет важную роль в продовольственной безопасности и устойчивом развитии аграрного сектора. Целью настоящего исследования являлось выявление распространённости основных видов кишечных нематод у кур в трёх ключевых регионах страны – Джизакской, Сырдарьинской и Самаркандской областях, а также оценка эффективности противопаразитарной терапии с использованием препаратов на основе тетрамизола. В период 2022-2024 годов было обследовано 747 кур, при этом гельминтологический и копрологический анализы фекальных проб показали, что общий уровень заражённости составил 52,07 %. Распределение заражённых птиц по регионам выявило значительную вариабельность: минимальная степень инвазии зарегистрирована в Джизакской области – 41,9 %, в Сырдарьинской области – 50,6 %, и максимальная – в Самаркандской области, где заражено 58,57 % птиц. Основными выявленными нематодами оказались аскаридии с уровнем инфицирования 32,8 %, гетеракисы – 32,53 %, и капиллярии – 37,48 %. Такая высокая распространённость свидетельствует о широком ареале и выраженной эндемичности гельминтозов в данных регионах. Противопаразитарная терапия препаратом на основе тетрамизола продемонстрировала высокую эффективность: 92,86 % после первого курса лечения и 100 % элиминацию паразитов после повторного применения. Результаты исследования подчёркивают необходимость адаптации ветеринарных профилактических мероприятий с учётом региональных особенностей, что позволит снизить экономические потери в птицеводстве и улучшить показатели здоровья птицы в домашних хозяйствах. Практическая значимость работы заключается в формировании научно обоснованных рекомендаций для оптимизации программ контроля и профилактики гельминтозов, что является важным фактором повышения продуктивности и биобезопасности в аграрных регионах Узбекистана

Ключевые слова: аскаридоз; капилляриоз; гельминтофауна; *Ascaridia galli*; *Heteraks gallinarum*; *Capillaria obsignata*; *C.bursata*