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РАСПРОСТРАНЕНИЕ И ВОЗРАСТНАЯ ДИНАМИКА ГЕЛЬМИНТОЗОВ КУР В АЗЕРБАЙДЖАНСКОЙ РЕСПУБЛИКЕ

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Исследования выполнены в частных птицеводческих хозяйствах пяти экономических районов Азербайджанской Республики: Апшеронском, Шеки-Закатальском, Ленкоран-Астаринском, Губа-Хачмазском и Аранском. Установлено, что гельминтокомплекс домашних кур представлен паразитами, относящимися к классам *Nematoda*, включающими четыре вида – *Ascaridia galli*, *Heterakis gallinarum, Syngamus trachea, Capillaria obsignata,* и *Cestoda,* представленный одним видом *Raillietina tetragona.* Установлено их повсеместное распространение, однако при однородном таксономическом составе в экономических районах зараженность кур возбудителями отдельных гельминтозов варьирует. *Ascaridia galli* и *Heterakis gallinarum* являются доминирующими видами. Инвазированность ими кур максимальна (экстенсивность инвазии 36,8 и 35,5%) и не имеет существенных территориальных различий. Зараженность птицы нематодами *C. obsignata* и ленточными червями *Raillietina tetragona* характеризуется более низкими показателями экстенсивности инвазии и их выраженной вариабельностью в границах районов. Пораженность кур капилляриозом и райетинозом варьирует от 7,1% в Аранском районе до 28,8% в Ленкоран-Астаринском, от 5,4 до 24,8% в Апшеронском и Губа-Хачмазском районах. В среднем по республике она составляет 17,8 и 18,5% соответственно. Возрастные особенности зараженности кур гельминтами характеризуются однотипным таксономическим спектром паразитов и максимальным заражением возбудителями аскаридиоза, гетеракидоза, сингамоза, капилляриоза и райетиноза цыплят в возрасте 2,5–5,0 мес с экстенсивностью инвазии соответственно 38,9; 40,8; 21,9;19,7 и 20,9%. Пораженность взрослой птицы указанными нозоформами значительно ниже – 32,0; 30,8; 15,3; 16,2 и 16,0%.

Ключевые слова: домашние куры, гельминтоз, зараженность, экономические районы Азербайджана

DISTRIBUTION AND AGE DYNAMICS OF CHICKEN HELMINTH INFECTIONS IN THE REPUBLIC OF AZERBAIJAN

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Studies were conducted in private poultry farms in five economic regions of the Republic of Azerbaijan: Apsheronsky, Sheki-Zakatalsky, Lenkoran-Astarasky, Guba-Khachmazsky and Aransky. It was found that helminthocomplex of domestic chickens is represented by parasites belonging to class Nematoda, including 4 species - *Ascaridia galli*, *Heterakis gallinarum*, *Syngamus trachea*, *Capillaria obsignata* and Cestoda, represented by one species, *Raillietina tetragona*. Their ubiquitous distribution has been established; however, with a homogeneous taxonomic composition in economic areas, the infestation of chickens with pathogens of individual helminthic diseases varies. *Ascaridia galli* and *Heterakis gallinarum* are the dominant species. Their invasion of hens is maximum (36.8 and 35.5% prevalence) and does not have significant territorial differences. Bird

infestation with nematodes *C.obsignata* and tapeworms *Raillietina tetragona* is characterized by lower prevalence rates and their pronounced variability within areas. The infestation of chickens with capillariasis and ryetinosis varies from 7.1% in Aransky district to 28.8% in Lenkoran-Astarsky district, from 5.4% to 24.8% in Apsheronsky and Guba-Khachmazsky districts. On average, it is 17.8 and 18.5% in the republic, respectively. Age peculiarities of chickens' helminth infestation are characterized by the same taxonomic spectrum of parasites and maximum infection with the causative agents of ascariasis, heterokidosis, syngamosis, capillariasis and ryetinosis in chickens aged 2.5-5 months with prevalence of 38.9; 40.8; 21.9; 19.7 and 20.9%, respectively. The incidence of these nosoforms in adult birds is much lower and amounts to 32.0; 30,8; 15,3; 16.2 and 16.0%.

Keywords: domestic chicken, helminthosis, infestation, economic regions of Azerbaijan

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The authors declare no conflict of interest.

INTRODUCTION

Agrarian reforms carried out in the Republic of Azerbaijan have led to the creation of industrial and private poultry farms of various directions, which play an important role in raising productive breeds of poultry, satisfying the needs of the population for quality meat and eggs.

There are various factors that hinder the intensive development of poultry farming, production of quality poultry meat and eggs, the main of which are parasitic diseases. The causative agents of *A. galli*, *H. gallinarum*, *S. trachea*, *C. obsignata* and *R. tetragona* are parasites that intensively infect domestic chickens. Infestation occurs in both mono- and associative forms [1-3]. One of the reasons for intensive infestation of domestic chickens is the high contamination of the environment with propagative forms of helminths [4-6].

The degree of extensiveness and intensity of parasite distribution depends on the age of birds, as well as on environmental factors [7-10].

The aim of the study is to study the distribution of helminth infections in chickens and to determine the age dynamics of helminth infestation in poultry under the conditions of Azerbaijan.

MATERIAL AND METHODS

Research work on helminth infestation of chickens was conducted in 2017-2019 in five economic regions of Azerbaijan: Apsheronsky, Sheki-Zakatalsky, Lenkoran-Astarsky, Guba-Khachmazsky and Aransky.

Fecal samples were examined by helminthoscopy according to the Füllerborn method, as well as by the method of successive washes. A total of 13,976 samples were examined. 6728 birds were examined by the incomplete helminthological autopsy method (IHA) according to K.I. Skryabin. Detected cestodes were preserved in 70% alcohol, nematodes - in Barbagallo liquid.

In order to identify age-specific infestation of chickens, helminthological studies were conducted in young chickens aged 2.5-5.0 and 5-7 months and in adults.

The following indicators were calculated based on the results of the work: infestation rate (IR) - the number of infested individuals in the bird population, %, infestation intensity (II) - variability of helminth numbers in the infested birds, pcs.

The species identity of helminths was established according to their morphological features using an identifier [11].

RESULTS AND DISCUSSION

In the poultry farms of Apsheronsky, Sheki-Zakatalsky, Lenkoran-Astarsky, Guba-Khachmazsky and Aransky economic regions, helminths of two classes (nematodes and cestodes) form a helminthic complex in chickens, with a clear dominance of nematodes. This extensive group of parasitic worms is the most diverse and is represented by four suborders and four species: *Ascaridata* (*Ascaridia galli*, Schrank, 1788), *Oxiurata* (*Heterakis gallinarum*, Gmelin, 1790), *Strongylata* (*Syngamus trachea*, Montagu, 1811) and *Trichocephalata (Capillaria obsignata*, Madsen, 1945). Tapeworms (class *Cestoda*, order *Cyclophylidea*, Braun, 1900) include one species, *Raillietina tetragona*, Molin, 1858.

Ascaridiosis, heterokidosis, syngamosis, capillariasis, and ryetinosis are widespread everywhere, but within the borders of economic regions the infestation of birds with individual helminth species varies.

Two nematode species, A. galli and H. gallinarum, are dominant in Azerbaijan. Their infestation of chickens Apsheronsky, Sheki-Zakatalsky, Lenkoran-Astarsky, Guba-Khachmazsky and Aransky districts is maximal and does not have significant interdistrict differences. The number of infected birds with ascariasis and heterokidosis varies from 32.6% (AI 1-28) to 41.2% (AI 1-188) and from 27.2 (AI 1-18) to 39.1% (AI 1-30), respectively. On average for the Republic of Azerbaijan, these indicators are 36.8 and 35.5% respectively (see Table). Average infestation by other helminths species including *S. trachea*, *C. obsignata* and *R. tetragona* was recorded at 18.9% (AI 1-28); 17.8 (AI 1-33) and 18.5% (AI 1-19), respectively, two times lower than by pathogens of ascariasis and heterokidosis.

The similar helminthological situation was in Aransky and Guba-Khachmazsky districts, but the poultry here had the lowest values of C. obsignata infestation extensiveness - 7.1% (CI 1-32 ind.) and 13.8% (CI 1-14 ind.) respectively.

The minimum indicators of the infestation of domestic chickens with syngamosis, capillariasis and rayetinosis were found in the Apsheronsky district. The infestation rate of poultry by the helminth infections is 13.7% (AI 1-6), 15.0% (AI 1-7) and 5.4% (AI 1-5) respectively, which is 2-4 times lower than in other economic areas. This peculiarity is most typical for geohelminths *S. trachea*, *C. obsignata*, developing with participation of reservoir hosts, and biohelminths *R. tetragona*, having intermediate hosts in their development cycle.

Thus, helminth infestations of chickens in the Republic of Azerbaijan are widespread. The species composition of helminth complex in economic areas is homogeneous and represented by four species of nematodes and one species of cestodes with a clear dominance of *A. galli* and *H. gallinarum*, having the highest and closest values of IR. Variability of infestation of birds with some helminth species is due to heterogeneity of climatic conditions, vertical zonality and formation of characteristic ecosystems that determine the distribution of biotopes of intermediate and reservoir hosts and density of their populations.

Significant interest is the understanding of the age dynamics of chicken infestation, by which we can judge both about the nature of the epizootic process and the effects of anthropogenic pressure. The results of the research indicate the infestation of poultry of all sex and age groups (see table). Maximum incidence of all nosoforms was recorded in chickens aged 2.5-5.0 months. Their infestation with nematodes *A. galli*, *H. gallinarum*, *S. trachea* and *C. obsignata*, and also with cestodes *R. tetragona* was 38.9; 40.8; 21.9; 19.7 and 20.9%, respectively. The helminth infestation of birds gradually decreases with age. The minimum values of IR in adult birds are 32.0; 30.8; 15.3; 16.2 and 16.0%.

CONCLUSIONS

1. In poultry farms of Azerbaijan the helminth complex of house chickens is represented by parasites of two classes: Nematoda, including four suborders and four species of parasitic multicellulars - *Ascaridata* (*Ascaridia galli*), *Oxiurata* (*Heterakis.gallinarum*), *Stron-*

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Infection of chickens of different age groups with helminths in some economic areas of Azerbaijan

Poultry age, months	Fecal samples examined	Examined by PHD technique, heads	Infested									
			A. galli		*H. gallinarum*		*S. trachea*		*C. obsignata*		*R. tetragona*	
			EI, %	II, pcs.	EI, %	II, pcs.	EI, %	II, pcs.	EI, %	II, pcs.	EI, %	II, pcs.
Apsheronsky region												
2,5–4,0	540	90	34,8	1–12	36,2	1–15	16,3	1–4	17,2	2–7	6,8	2–3
5–7	670	70	38,6	1–24	23,8	1–13	13,6	1–6	14,3	1–5	5,5	1–5
Adult livestock	475	55	24,4	1–15	21,7	1–18	10,7	2–4	13,6	1–6	4,0	1–3
Total	1685	215	32,6	1–28	27,2	1–18	13,7	1–6	15,0	1–7	5,4	1–5
Sheki-Zakatalsky region												
3–5	847	440	46,5	1–27	43,3	1–27	23,7	1–4	27,0	1–14	20,4	1–10
6–8	678	536	40,0	1–22	38,6	1–23	22,3	1–9	24,9	1–17	21,5	1–11
Adult livestock	781	542	33,6	2–28	33,9	2–30	19,8	1–7	21,2	1–19	16,7	1–12
Total	2306	1518	40,0	1–28	38,6	1–30	21,9	1–9	24,4	1–19	19,5	1–12
Lenkoran-Astarasky region												
2–4	611	83	44,1	1–87	36,0	2–67	22,5	1–28	30,9	4–33	24,4	2–13
6–8	465	85	40,3	1–62	36,2	2–75	18,1	1–21	27,8	1–23	19,5	1–9
Older than 8 months	360	75	34,9	4–69	30,3	1–91	19,4	1–16	27,7	1–18	18,4	1–5
Total	1436	243	39,8	1–87	34,2	1–91	20,0	1–28	28,8	1–33	20,8	1–13
Guba-Khachmazsky region												
2,5–5,0	1090	490	48,2	1–19	45,8	1–30	26,4	1–9	15,1	1–13	30,1	1–11
5–8	1297	459	38,9	1–28	36,9	1–23	21,3	1–19	14,6	1–12	21,7	2–8
Adult livestock	1225	386	36,4	1–881	34,5	1–24	15,2	1–9	11,6	1–14	22,6	1–7
Total	3612	1335	41,2	1–881	39,1	1–30	20,9	1–19	13,8	1–14	24,8	1–11
Aransky region												
3–5	1562	1282	48,5	1–97	43,1	1–97	20,9	1–27	8,4	2–32	23,1	1–17
6–8	1888	1141	39,8	1–113	38,4	1–53	18,6	1–18	5,9	1–24	24,5	2–13
Adult livestock	1487	994	30,5	1–87	33,8	1–46	11,2	1–22	7,1	1–19	18,4	1–19
Total	4937	3417	39,0	1–113	38,4	1–97	16,9	1–27	7,1	1–32	22,0	1–19
Throughout the Republic of Azerbaijan												
2,5–5,0	4650	2385	38,9	1–97	40,8	1–97	21,9	1–28	19,7	1–33	20,9	1–17
5–8	4998	2291	39,5	1–113	34,8	1–75	18,8	1–21	17,5	1–24	18,5	1–13
Adult livestock	4328	2052	32,0	1–881	30,8	1–91	15,3	1–22	16,2	1–19	16,0	1–19
Total	13976	6728	36,8	1–881	35,5	1–97	18,9	1–28	17,8	1–33	18,5	1–19

gylata (*Syngamus trachea*) and *Trichocephalata* (*Capillaria obsignata*) - and *Cestoda* of *Cyclophylidea*, *Raillietina tetragona* species. The taxonomic composition of helminth complex of domestic chickens in economic areas is characterized by relative stability.

2. Helminth infections of chickens are widespread in Azerbaijan, but the infestation of poultry by individual helminth species varies. Infestation of poultry with ascariasis and heterokidosis in economic areas is the highest and has no significant differences, infestation of other species is several times lower. The minimum infestation of chickens with C. obsignata is in Apsheronsky, Guba-Khachmazsky and Aransky districts, the infestation of R. tetragona in four economic districts of the republic is 15.0; 13.8; 7.1 and 5.4% respectively.

3. Age dynamics of chicken infestation is characterized by maximum infestation of young birds with helminths *A. galli*, *H. gallinarum*, *S. trachea*, *C. obsignata* and *R. tetragona*. Infestation of adults by these helminth infections decreases.

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