Т. 7. №4. 2021
https://doi.org/10.33619/2414-2948/65

UDC 576.895.1
AGRIS L20
https://doi.org/10.33619/2414-2948/65/07

THE ROLE OF DOMESTIC CARNIVORES IN THE FORMATION OF PARASITIC FOCI IN THE TERRITORY OF AZERBAIJAN

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РОЛЬ ДОМАШНИХ ПЛОТОЯДНЫХ ЖИВОТНЫХ В ОБРАЗОВАНИИ ПАРАЗИТАРНЫХ ОЧАГОВ В АЗЕРБАЙДЖАНЕ

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Abstract. Domestic carnivores play an important role in the transfer of pathogenic helminths from natural foci to synanthropic ones and in the formation of strong parasitic foci for humans and domestic animals. The extensiveness and powerful natural and synanthropic and mixed foci of some main helminth infectors of domestic carnivores have been specified. Upon studying the role of carnivores in the creation and improvement of foci firstly in Azerbaijan. For the first time, it was found out that domestic carnivores are the new host for 14 types of helminths infected with wild animals have also influence on mixed foci. 2 species (*Gongylonema pulchrum*, *Mesocestoides corti*) of 14 species of helminths assume epidemiological significance; while 5 species (*Taenia cervi*, *T. krabbei*, *Tetratirotaenia polyacantha*, *Trichocephalus vulpis*, *Strongyloides vulpis*) assume epizootic significance. It was found out that intermediary hosts, ecological and anthropogenous along with carnivorous animals have also an influence on the creation and spread of parasitic foci. Therefore, studying the factors that lead to the creation of parasitic foci is of practical importance.

Аннотация. Домашние плотоядные животные играют важную роль в передаче патогенных гельминтов из природных очагов в синантропные и в формировании сильных паразитарных очагов для человека и домашних животных. При изучении роли плотоядных в образовании и распространении очагов впервые на территории Азербайджана выявлена интенсивность некоторых основных гельминтозных возбудителей, сильных природных, синантропных и смешанных очагов. Наряду с плотоядными животными антропогенные факторы играют важную роль в формировании и поддержании паразитарных очагов. Таким образом, в результате действия антропогенных факторов образовались паразитарные смешанные очаги, в которые вошли 14 видов гельминтов хищников. Плотоядные животные, инфицированные патогенными гельминтами в результате этой вспышки, заражают людей, и домашних животных во время синантропной вспышки. В результате антропогенных факторов, у животных в первую очередь меняется образ жизни. В результате в состав гельминтофауны животного входят опасные гельминты, имеющие эпизоотологическое и эпидемиологическое значение: из 14 видов гельминтов 2 вида (*Gongylonema pulchrum, Mesocestoides corti*) являются эпидемиологическими; эпизоотологическое значение имеют 5 видов (*Taenia cervi, T. krabbei, Tetratirotaenia polyacantha, Trichocephalus vulpis, Strongyloides vulpis*). Поэтому выявление каждого из факторов, обеспечивающих появление паразитарных очагов имеет практическое значение.

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Keywords: stray dogs, domestic cats, helminths, parasitic foci, anthropogenous factors.

Ключевые слова: бродячие собаки, домашние кошки, гельминты, паразитарные очаги, антропогенные факторы.

Introduction

Having avoid spread in all parts of the republic, the domestic carnivores (stray dogs and cats) are primary hosts of the dangerous helminths and their carriers and transmitters. Domestic carnivores are of ecological, epizootological and epidemiological importance and they are main sources of spreading pathogen helminths in the environment and infecting humans and ruminants.

Therefore, the domestic carnivores play an important role in creation and expansion of parasite foci in the different areas.

There is some information about studying the foci of pathogen helminths in the territory of Azerbaijan Republic [1–4]. However, the information is not satisfactory for the current period.

Therefore, in consideration of the effect of some factors in creation of parasite foci (urbanization, anthropogenic), studying the main role of carnivorous animals is a topical issue for the modern era and is of practical importance.

Natural focus is related to certain natural complexes and exists in the nature without human activity.

Along with a number of factors that affecting formation of natural focus in the ecological zones, the helminths themselves have some properties. Sometimes dense population of animals goes up related to the suitable conditions in the area, so animals infect each other with certain types of helminths frequently. As a result of frequent infections, helminth exchange occurs among animals and natural parasite foci are formed with a source of infection remained in the nature.

Professor I. A. Sadigov has determined that, wild animals play an important role in formation of natural foci of helminths while domestic carnivores provide suitable condition for formation of sinantrop foci [1].

The locality fratures of animal's cause formation of territorial foci in spreading of helminths.

While studying the helminths of stray dogs in Azerbaijan, some information was obtained on cycle of 26 helminths found in dogs in natural foci [3].

Cycle of helminths in a certain territory, the capability of their eggs to live in nature for long period of time and sufficient development and increase of intermediary hosts in the territory cause constant formation of natural foci in the territories.

It was found out when analyzing the role of domestic carnivores, intermediary hosts and other factors in spread of parasite worms that, these 3 factors play an important role in formation and storage of natural and synanthrope foci of helminth infectors in the specified territories.

E. N. Pavlovski considered that, for formation of natural focus, there should be healthy animal that is sensitive to infection in the unhealthy territory, transmitter animal and ill animal for the helminthosis infectors. The infected domestic carnivores infect healthy animals and human with helminthosis infectors [5].

Different types of intermediary hosts (insects, ruminants, rodents, fresh-water snails) provide formation of infection in the form of natural foci, their transmission to synanthrope environment and circling in a certain area. E. N. Pavlovski's theory about natural foci of infectious diseases forms the basic principle of the study of helminths infected with animal origin infectors. The training of "natural foci" included into the infectious diseases by the academic E. N. Pavlovski can be considered proper. Formation and spread of foci found during our study in the territory of the

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republic comply with the infection's disease theory of Pavlovski. The parasite foci found comply with this mechanism:

Animal infected with helminth→transmissive factor (intermediary host)→healthy animal

Existence of dangerous parasite focus on the nature is dangerous for humans and domestic carnivores [2].

Material and methods

Domestic carnivores were collected from the territories of the republic with various bioecological properties and studied by the method of full helminthological autopsy to determine the role of domestic carnivores in formation of parasite foci [6].

The collected trematodes and cestodes were preserved in 70% ethanol, whereas nematodes were fixed in 4% formalin solution. To identify the species belonging of trematodes and cestodes alum carmine-stained slides were prepared. Nematode species were treated in solution of lactic acid and glycerol in a ratio 1:1.

All helminth species were identified with the aid of MBS-6 and Olympus (Olympus SZ2 = ST, *Olympus corporation*, Japan) stereomicroscopes.

Conclusions and discussions

54 types of helminths have been found in domestic carnivores upon research. 4 species of these helminths are trematodes, 23 species are cestodes, 1 is acanthocephalus and 26 are nematodes.

When studying the role of domestic carnivores and intermediary hosts in formation and expansion of focus for the first time in the territory of Azerbaijan Republic, synanthrope foci of *echinococcosis, alveococcosis, dipilidiosis, dirofilariasis, senurosis, taeniidiosis, difillobotriosis, trichinosis, toxocariasis, ankilostomatosis, unsinariosis, toxocariosis* hookworm have been determined (map).

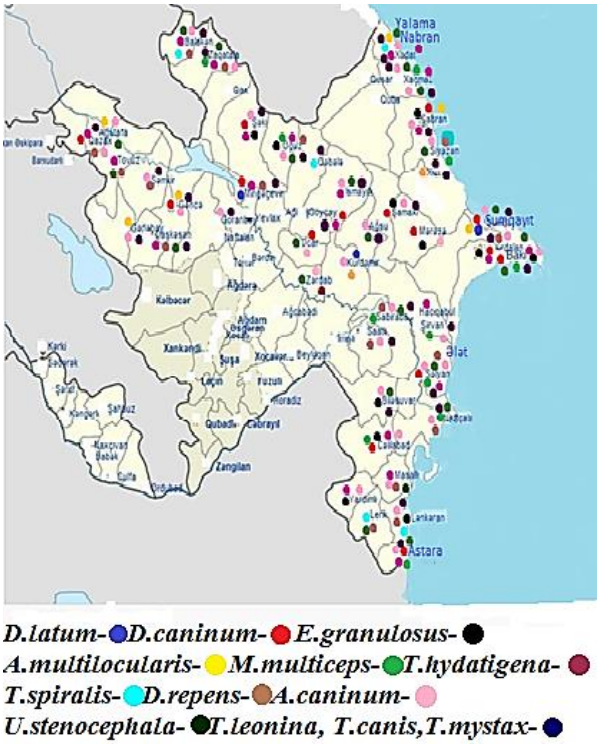

Figure. Synanthrope cages of major helminthic trafficked animals in Azerbaijan

In all studied territories of Azerbaijan, it was found out that synanthrope focus of

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Echinococcosis one is 12,7%; *Alveococcus multilocularis* one is 10,1%; *Multiceps multiceps* one is 28,1%; *Taenia hydatigena* one is 38,5%. Powerful synanthrope focus of echinococcosis in the territories circulates among dogs, ruminants and humans.

As a result of research conducted in all territories, powerful synanthrope focus of dipilidiosis infector was found to be 32.5%. Powerful synanthrope foci circulate among dogs, cat fleas and people. 2 foci of *Dipylidium caninum* species were found: weak-natural focus; powerful-synanthrope focus. Synanthrope focus circulates among dog, cat fleas and humans, while natural foci are among wild animals and fleas. Dipilidiosis infector transmits to synanthrope focus and vice versa. Humans can be infected with invasion infector when they do not properly abide by sanitary rules.

Upon research, 23,9% powerful synanthrope foci of dirofilariasis infectors were found mainly in Lankaran and Masalli regions. This is related to wide spread of *Aedes* and *Anopheles* species that are intermediary hosts in the territories of the regions.

2 foci of *Dirofilaria repens* species have been found: invasion infector in natural focus — jackal, fox, wolf and mosquitoes of *Anopheles* species; dog, cat, human and mosquitoes in synanthrope focus. Mainly mosquitoes that are intermediary hosts play an important role [7].

Following research, along with biohelminths, *Ancylostoma caninum, Uncinaria stenocephala, Toxascaris leonine* of geohelminths have been found to have synanthrope focus in all regions of the territory. Since the eggs of these parasite warms reached the phase of invasion keep their ability to live in a natural environment (soil) for long period of time they lead humans and carnivorous animals to be infected with ankilostomatosis and toksokarosis.

Ankilostomatosis and toksokarosis were found to be relatively 16,9% and 27,0% in all regions of Azerbaijan Republic.

A. caninum, U. stenocephala, T. leonina, T. canis, T. mystax species circulate in natural focus among wild animals, and among stray dogs, domestic cats and humans in synanthrope foci. They can transfer from natural foci to synanthrope ones and vice versa in suitable conditions [8].

2 types of *Trichinella spiralis* species were found: powerful-natural and weak-synanthrope foci. Invasion infectors circulate among wild domestic carnivores, swine and rodents in natural foci and among stray dogs, domestic swine and sometimes rodents in synanthrope foci.

For the first time, we have found the focus of difillobotriosis in Mingachevir reservoir that may pose danger for humans and domestic carnivores in the future.

To preserve biodiversity of animals in the republic, density of animals has significantly increased because of prohibitions imposed on hunting of wild animals. It has caused lack of food among animals. On the other hand, natural areas of wild domestic carnivores have narrowed, and it has caused difficulties for feeding of animals under the effect of anthropogenic factors (deforestation, cutting of bushes for expansion of farmlands and so forth).

Such factors have led the wild animals to transfer from natural foci to synanthrope ones regularly for feeding of wild animals. Since such conditions last long, a mixed focus has emerged between natural and synanthrope foci.

There are always helminth eggs polluted with cestodes in the mixed focus and the invasion exchange happens among wild and domestic carnivores. So, domestic carnivores are infected with helminths inherent to wild animals in mixed focus, and wild animals with helminths inherent to domestic carnivore's animals. Since such condition lasts long, these helminths have entered into the fauna of domestic carnivores and fauna has shaped its modern helminthological form.

During our research, carnivorous animals have been infected with 14 types of helminths inherent to wild animals of mixed focus (*Pl. elegans, T. parenchimatosa, T. cervi, T. krabbei, T.*

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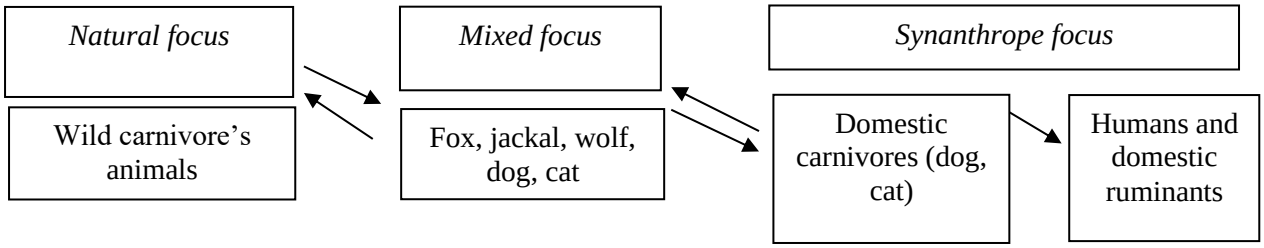
laticollis, T. polyacantha, M. corti, G. pulchrum, A. tubaeforme, G. vulpis, T. vulpis, S. vulpis, A. strongylina, S. lupi) and new hosts were considered for those helminths [9].



As a result of the anthropogenic factors, the species assuming epizootic and epidemiological significance have included in the newly formed helminth fauna of the domestic carnivores. 2 (*Gongylonema pulchrum, Mesocestoides corti*) of 14 species of helminths assume epidemiological significance; while 5 species (*T. cervi, T. krabbei, T. polyacantha, T. vulpis, S. vulpis*) assume epizootic significance.

Stray dogs and domestic cats shall infect domestic ruminant animals and humans in synanthrope focus with pathogen helminths infected from mixed focus.

So, it was found after long-time parasitological explorations that, along with carnivorous animals, intermediary hosts, complex ecological and anthropogenous factors have significant role in formation of main natural, synanthrope and mixed parasite foci in those areas.

Therefore, disruption of the ways of cycle of main helminth infectors, formation of new foci and their widespread shall be prevented in the natural, synanthrope and mixed focus that exist in the territory of Azerbaijan. Such condition shall always stand attention.

Separate studying of each factor that provide formation of parasite foci is of both scientific and practical importance. By examining these factors, it is possible to prepare preventive measures by scientific methods to prevent formation of parasite foci and spread of their infectors in those territories in future.

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Работа поступила
в редакцию 29.03.2021 г.

Принята к публикации
04.03.2021 г.

Ссылка для цитирования:

Ibrahimova R. The Role of Domestic Carnivores in the Formation of Parasitic Foci in the Territory of Azerbaijan // Бюллетень науки и практики. 2021. Т. 7. №4. С. 52-57. https://doi.org/10.33619/2414-2948/65/07

Cite as (APA):

Ibrahimova, R. (2021). The Role of Domestic Carnivores in the Formation of Parasitic Foci in the Territory of Azerbaijan. *Bulletin of Science and Practice, 7*(4), 52-57. https://doi.org/10.33619/2414-2948/65/07