

*Faculty of Veterinary medicine Belgrade, University of Belgrade
Department of infectious animal diseases and diseases of bees
Section of zoonoses of Serbian Veterinary Association*

SECOND INTERNATIONAL EPIZOOTIOLOGY SYMPOSIUM

(XIV SERBIAN EPIZOOTIOLOGY DAYS)

PROCEEDINGS



Hotel "Srbija"

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ISBN: 978-86-83115-20-4

UDC: 636.09:616(082)

Publisher / Издавач

Serbian Veterinary Association - Српско ветеринарско друштво
Section of zoonoses SVA - Секција за зоонозе СВД

For the publisher / За издавача

Проф. др Босилка Ђуричић

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Technical Editor / Технички уредник

Доц. др Милорад Мириловић

Print / Штампана

Научна КМД

Тираж 200 примерака

3. ROLE OF THE JACKAL IN SYLVATIC TRICHINELLOSIS IN SERBIA

*Petrović J., Pušić I., Milanov D., Urošević M., Stojanov I., Grgić Ž.**

Abstract

The Republic of Serbia is one of the countries where trichinellosis is present in domestic, sinanthropic and sylvatic animals. Sylvatic trichinellosis has been relatively little studied in Serbia. The key indicators of sylvatic cycle are trichinellosis prevalence in different species of wild animals, infestation levels and trichinella species. In sylvatic cycle the transmission of parasite primarily occurs among carnivores (red foxes, wolves, jackals), and to a lesser extent among omnivores (wild boars, bears and rats). Generally, sylvatic trichinellosis affects carnivores with cannibalistic and scavenger behavior. So far, the red fox has been the main reservoir of sylvatic trichinellosis in our country; however, the increasingly important role of jackals must be noted. The presence of jackals in Serbia was noticed twenty years ago. Jackals came to Serbia over the Carpathians and the Danube Basin and settled areas of Eastern Serbia. Later on jackals spread to Belgrade and Vojvodina. Today the population of jackals is very numerous and they inhabit different terrains. Jackals can be found on the lower mountains and plains. The increase of jackal population has led to reduction of population of deer and foxes.

This paper presents the results of the prevalence of trichinellosis in jackals with a view to determine their role in the natural cycle of trichinellosis in our country. Twelve jackals were examined, all of them belonging to the genus of golden jackal (*Canis aureus*). Diaphragms were tested using artificial digestion (Commission Regulation (EC) No 2075/2005). There was relatively high prevalence of trichinellosis in jackals (8.33%) on the territory of Vojvodina with a high degree of infestation (3 larvae/g), which is much higher than in countries considered to be trichinellosis free. Jackals, foxes and rats belong to synanthropic animals and present a link between sylvatic trichinellosis and domestic animals. If the prevalence of sylvatic trichinellosis in particular geographical area is high, than a significant risk of spreading the infestation to domestic pigs exists.

Key words: trichinella, sylvatic animals, synanthropic animals

Introduction:

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Acknowledgements: The presented work is part of the research done in the project TR31084 granted by the Ministry of Education and Science of Serbia.

In Europe, wildlife represents the most important reservoir of *Trichinella*, which makes eradication impossible and explains why the parasite continue to circulate, even though the prevalence in wildlife can be very low for many years (Rafter et al., 2005). Trichinellosis appears in Serbia endemically in the regions of Srem, Danube, Drina and Kolubara Basins (Đorđević 1989, Čuperilović et al., 1989). The domestic pig is the main reservoir of trichinellosis for humans and the infection usually appears after consumption of undercooked meat where live worms are present. The average annual prevalence of trichinellosis in the period 1995-2004 in domestic pigs in endemic regions of Serbia was 0.42%. In the same period human trichinellosis was diagnosed in 432 persons (Tešić et al., 2011). Serbia belongs to a group of countries where *T. spiralis* is present in domestic but also in sylvatic and synanthropic animals. Synanthropic animals are species of wild animals that live near and benefit from humans, some species of rodents, pigeons (Pozio 2007; Cvetković et al., 2011; Petrović et al., 2012).

Sylvatic trichinellosis has been relatively little studied in Serbia. This paper presents the results of the prevalence of trichinellosis in jackals with a view to determine their role in the natural cycle of trichinellosis in our country.

Material and methods

Twelve jackals were examined, all of them belonging to the genus of golden jackal (*Canis aureus*). The diaphragms were tested using artificial digestion (Commission Regulation (EC) No 2075/2005).

Results and discussion

There was relatively high prevalence of trichinellosis in jackals (8.33%) on the territory of Vojvodina with a high degree of infestation (3 larvae/g), which is much higher than in countries considered to be trichinellosis free. Results are shown in Table 1.

Table 1: Prevalence of Trichinellosis in jackals in Vojvodina region

Animal	Municipality	No samples	Positive	No of larvae per g
Jackal	Bač	3	0	0
<i>Canis aureus</i>	S. Mitrovica	1	0	0
	Pećinci	3	0	0
	Ruma	1	0	0
	Šid	1	0	0
	Fruška gora	3	1	3 larvae/g
Total	6	12	1	-

The key indicators of sylvatic cycle are trichinellosis prevalence in different species of wild animals, infestation levels and trichinella species.

The transmission of parasite in silvatic cycle primarily occurs among carnivores (red foxes, wolves, jackals), and to a lesser extent among omnivores (wild boars, bears and rats). Generally, sylvatic trichinellosis affects carnivores with cannibalistic and scavenger behavior (Campbell, 1988). So far, the red foxes have been the main reservoir of sylvatic trichinellosis in Serbia because of their high population

level. However, an increase in jackal population leads to increasing importance of their role as a reservoir of trichinellosis. The presence of jackals in Serbia was noticed twenty years ago. Jackals came to Serbia over the Carpathians and the Danube Basin and settled areas of Eastern Serbia. Later on jackals spread to Belgrade and Vojvodina. Today the population of jackals is very high and they inhabit different terrains. Jackals can be found on the lower mountains and plains. The increase of jackal population has led to reduction of population of deer and foxes. According to our examinations there is high prevalence (8.33%) of *Trichinella* in jackal population in Vojvodina region. In countries where trichinellosis in domestic animals is eradicated, like Denmark, the prevalence of sylvatic trichinellosis is low (0.001%) (Enemark et al., 2000). Level of infestation in jackals from our country (3 larvae/10g) is much higher than in carnivores in Denmark (1 larvae/10g). It may be concluded that jackal takes role of the main reservoir of sylvatic trichinellosis in Vojvodina region.

Natural ecosystem characteristics have main influence on *Trichinella* species and life cycle in nature. Three *Trichinella* species are most common in European wildlife: *Trichinella britovi* which is indigenous over a broad area from Scandinavia to southern Europe; *Trichinella nativa* which is found predominantly in colder areas of Scandinavia and the Baltic countries; *Trichinella pseudospiralis* which also has a broad distribution range and has been detected in wildlife of Italy, France, Russia, Lithuania, Sweden, Slovak Republic, the Netherlands and Finland. A fourth species, *Trichinella spiralis*, is also found in European wildlife, but its occurrence here is often associated with improper disposal of slaughter offal from pigs in areas where *T. spiralis* occurs in the domestic pig population (Pozio, 1998; Pozio, 2000).

The *T. spiralis* and *T. britovi* were detected in sylvatic animals in Serbia (Cvetković et al., 2011; Petrović et al., 2012). There is a general consensus that *T. spiralis* easily causes infestation in swine and humans, while *T. britovi* has lower significance for swine and is less pathogen for humans (Enemark et al., 2000). Climate conditions in Serbia favourable to life cycle of *T. spiralis* while prevalence of this trichinella species is low in cold and trophic regions. The main reservoirs of *T. britovi* in Serbia are the red fox, racoon, wolf and bear. The *T. spiralis* is more often found in wild hogs than *T. britovi* (Cvetković et al., 2011; Petrović et al., 2012). In region with high prevalence of trichinellosis in population of sylvatic animals more than one species of trichinella can be found, because these animals are infested several times during their lifetime (Pozio, 2000).

Jackal belongs to synantrophic animals and may present a link between sylvatic trichinellosis and domestic animals. If the prevalence of sylvatic trichinellosis in particular geographical area is high, than a significant risk of spreading the infestation to domestic pigs exists. Sylvatic trichinella, like *T. britovi*, may be found in domestic animals but this type of infection present an end of their life cycle because they can survive only among populations of sylvatic carnivores living in natural ecosystems (Pozio et al., 1998).

According to our previous examinations (Petrović et al., 2012) *T. spiralis* was found in jackal from our country. The presence of this *Trichinella* in sylvatic animals is strictly related to trichinellosis in domestic animals. Murell et al. (1987) prove that jackals, foxes, rats and other synantrophic animals presents a link between sylvatic and trichinellosis in domestic animals when it is caused with *T. spiralis*. Spread of *T.*

spiralis is directly influenced by the vicinity of habitats where domestic and wild animals live. *T. spiralis* is rarely found in sylvatic animals which live far away from farms. The key factor responsible for the presence of *T. spiralis* is the feeding behavior of jackals. Cannibalism and scavenger behavior occur more frequently in wilderness areas than in areas like Vojvodina, because animal corpses are not attractive food source for jackals living near human habitats where other food sources, such as rubbish dumps and domestic animals are accessible. The *T. spiralis* from jackals may return to the domestic habitat when humans fail in the management of wildlife by pasturing domestic pigs in or near wild areas which is common in some regions of Vojvodina and feeding domestic animal with the offal of sylvatic animals.

The spread of trichinellosis is influenced by poor socioeconomic conditions, insufficient education of hunters and farmers, insufficient veterinary control and improper disposal of dead animals. Prevalence of trichinellosis of domestic swine is high in Serbia and it is a significant risk for human health but it is also significant risk for sylvatic animals. These data suggest that in measures for reduction of trichinellosis in domestic animals is necessary to involve measures for reduction of spread of trichinellosis to sylvatic animals.

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УЛОГА ШАКАЛА У ЦИКЛУСУ ШИРЕЊА СИЛВАТИЧНЕ ТРИХИНЕЛОЗЕ У СРБИЈИ

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Кратак садржај

Србија спада у земље у којима је трихинелоза поред домаћих животиња, присутна код синантропних и силватичних животиња. Силватична трихинелозе је релативно мало проучавана у Србији. Основни показатељи силватичног циклуса су преваленца трихинелозе код различитих врста дивљих животиња, степен инфестације и врста трихинела. У силватичном циклусу, преношење паразита пре свега се одиграва међу карнивोरима (лисице, вукови, шакали), а у мањој мери и међу омнивोरима (дивље свиње, медведи и пацови). Главни резервоар силватичних трихинела су карнивори који имају канибалистичко и стрвинарско понашање. До сада је црвена лисица била главни резервоар силватичних трихинела код нас, међутим мора се указати на све значајнију улогу шакала. Присуство шакала у Србији евидентно је од пре двадесетак година. Преко Карпата и слива Дунава шакал је прво населио области источне Србије да би се затим проширио до Београда и даље на територију Војводине. Данас је популација шакала веома бројна, они насељавају различите терене, могу се наћи на нижим планинама и отвореним равничарским ловиштима. Повећање бројности популације шакала је довело до смањења броја срнеће дивљачи и лисица.

У раду су приказани резултати испитивања раширености трихинелозе код шакала, са циљем утврђивања њихове улоге у природном циклусу трихинелозе у нашој земљи. Прегледано је 12 шакала сви су припадали роду златни или обични шакал (*Canis aureus*). Корен дијафрагме је испитан методом вештачке дигестије (*Commission Regulation (EC) No 2075/2005*). Установљена је релативно висока преваленца трихинелозе код шакала (8.33%) на територији Војводине са степеном инфестације (3 ларве/г) који је много већи у односу на земље у којима нема трихинелозе домаћих животиња. Синантропне животиње у којима припадају шакали поред лисица и пацова представљају везу између силватичне и трихинелозе домаћих животиња. Уколико је преваленца силватичне трихинелозе у одређеном географском подручју висока, онда постоји значајан ризик за ширење инфестације на домаће свиње које се напасају у силватичним хабитатима.

Кључне речи: трихинела, силватичне и синантропне животиње