

SEROPREVALENCE OF TOXOPLASMOSIS AND SALMONELLOSIS IN WILD BOARS

SEROPREVALENȚA TOXOPLASMOZEI ȘI A SALMONELOZEI LA MISTREȚI

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ABSTRACT | REZUMAT

In this paper are presented the serological investigations results, obtained by ELISA, regarding infection with *Toxoplasma gondii* and *Salmonella* in wild boars.

The blood samples were collected from wild boars shot in the hunting season in winter of 2014 from two countries from Western Romania.

Toxoplasmosis had a seroprevalence of 56.6% and salmonellosis 55.4% in tested samples. Mixed infections were found in both counties in variable proportion.

The obtained results demonstrate the role of wild boars as vectors in dissemination of *Toxoplasma* and *Salmonella* in domestic pigs.

Keywords: *Toxoplasma gondii*,
Salmonella, wild boar, mixed infection

În această lucrare sunt prezentate rezultatele obținute în urma testării serologice prin tehnica ELISA pentru detectarea infecțiilor cu *Toxoplasma gondii* și cu *Salmonella* la mistreți. Probele de sânge au fost recoltate de la mistreți în sezonul de vânătoare din iarna anului 2014 din două județe din vestul României.

Toxoplasmoza a avut o seroprevalență de 56,6% și salmoneloza de 55,4% în probele de sânge testate. Infecțiile mixte au fost întâlnite în ambele județe, în proporții variabile.

Rezultatele obținute demonstrează faptul că mistreții pot fi vectori, contribuind la diseminarea toxoplasmei și a salmonelelor la porcii domestici.

Cuvinte cheie: *Toxoplasma gondii*,
Salmonella, mistreți, infecții mixte

Toxoplasma gondii is one of the most studied parasites due to its medical and veterinary importance. Also, *Toxoplasma gondii* is an ideal model of unicellular organism for molecular studies (1).

Toxoplasmosis in humans is the most common parasitic zoonosis reported in the European Union (3). The higher incidence of toxoplasmosis in humans is explained by the large spread of the parasite in wild and domestic animals. Infection with *Toxoplasma gondii* affects domestic pigs and wild boar populations worldwide.

Wild boars are a potential reservoir for *Salmonella* species. Epidemiological research conducted worldwide underlines the importance of these animals as carriers for *Salmonella* spp being an important source of infection for domestic animals, wild boars and humans. Wild boars pose a serious risk for public health (5, 6).

MATERIALS AND METHODS

In order to detect and quantify the antibodies against *Toxoplasma gondii* and *Salmonella* spp. in wild boar populations from Western part of Romania a total of 90 thoraco-abdominal fluid samples were harvested and tested. The samples were collected and sent for investigations by the County Sanitary Veterinary Divisions. Harvesting of samples was made in the hunting season of 2013-2014, because it is the only way to obtain large biological samples from wild boars. The samples were obtained from the hunting grounds of Caraș-Severin and Timiș counties.

To determine the titer IgG antibody against *Toxoplasma gondii*, the processing of samples was performed by ELISA method using the kit ID Screen Toxoplasmosis Indirect Multi-Species in the ELISA Laboratory within the Department of Parasitology of the Faculty of Veterinary Medicine Timișoara.

To detect and quantify the antibodies against *Salmonella* spp., the processing of samples was performed by ELISA using the kit IDEXX Swine *Salmonella* Ab Test in the Laboratory of the Department of Infectious Di-

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Table 1

**Seroprevalence of Toxoplasma infection
within hunting grounds of Caraş-Severin and Timiş counties**

No.	County	Hunting grounds	Number of collected samples	Number of positive samples	Percent of infection (%)
1	Caras-Severin	Bigăr	4	0	0
2		Bocsa	3	1	33.30
3		Moldova Nouă	4	2	50
4		Slatina Timis	4	2	50
Total Caras-Severin		4	15	5	33.30
5	Timis	Bara	2	1	50
6		Birda	1	1	100
7		Blajova	5	2	40
8		Brestovăt	7	5	71.40
9		Buzias	3	2	66.70
10		Cenad	4	2	50
11		Clopodia	5	3	60
12		Jebel	3	2	66.70
13		Margina	2	2	100
14		Mosnita	5	3	60
15		Opatita	1	1	100
16		Petroman	6	2	33.30
17		Pischia	13	9	69.20
18		Poieni	7	5	71.40
19		Rudna	2	2	100
20		Sacosul Turcesc	2	1	50
21		Sag Timiseni	3	2	66.70
22		Sânmartin	1	0	0
23		Stamora Română	1	0	0
24		Surduc	2	1	50
Total Timis		20	75	46	61.30
Total of the 2 counties		24	90	51	56.70

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RESULTS AND DISCUSSIONS

The results obtained after performing ELISA test on the samples collected from wild boars within 24 hunting grounds belonging of the two counties (Caraş-Severin and Timiş), were systematized and presented in Table 1. The interpretation of results was performed within the counties and hunting grounds studied.

From the data presented in Table 1, it was concluded that following investigation conducted by ELISA technique in the 24 hunting grounds monitored within the counties of Caraş-Severin and Timiş, toxoplasma

infection has been detected in different percentages which ranged from 33.30% to 100%.

The results obtained by performing ELISA method to detect antibodies against *Salmonella spp.* are shown in Table 2. The interpretation of results was done within the counties and hunting grounds monitored.

Based on the results shown in that table, the seroprevalence of *Salmonella* infection reported to the number of hunting grounds monitored was 55.35%.

On the whole, the data presented in the table reveals that the toxoplasma infection was identified in 21 out of 24 hunting grounds monitored.

Salmonella infection was detected only in eight of the 24 hunting grounds monitored.

Table 2

**Seroprevalence of Salmonella infection
within hunting grounds of Caraș-Severin and Timiș counties**

No.	County	Hunting grounds	Number of collected samples	Number of positive samples	Percent of infection (%)
1	Caras-Severin	Bigăr	3	0	0
2		Bocsa	3	1	33.33
3		Moldova Nouă	4	2	50
4		Slatina Timis	1	0	0
Total Caras-Severin		4	11	3	27.27
5	Timis	Bara	1	0	0
6		Birda	1	0	0
7		Blajova	2	1	50
8		Brestovăț	2	2	100
9		Buzias	1	0	0
10		Cenad	1	0	0
11		Clopodia	2	1	50
12		Jebel	1	0	0
13		Margina	2	1	50
14		Mosnita	2	1	50
15		Opatita	1	0	0
16		Petroman	2	2	100
17		Pischia	13	12	92.30
18		Poieni	3	2	66.66
19		Rudna	2	1	50
20		Sacosul Turcesc	2	2	100
21		Sag Timiseni	3	2	66.66
22		Sânmartin	1	0	0
23		Stamora Română	1	0	0
24		Surduc	2	1	50
Total Timis		20	45	28	62.22
Total of the 2 counties		24	56	31	55.35

Mixed infection *Toxoplasma* - *Salmonella* was observed in eight hunting grounds, respectively two in Caraș-Severin county and six in Timiș county (Table 3).

It was concluded that by comparing the number of positive samples in the two counties with mixed infections, the percentage of positive samples for toxoplasma infection was 33.20% and the percentage of positive samples for *Salmonella* infection was 22.90%.

CONCLUSIONS

Infection with *Toxoplasma gondii* in wild boar populations monitored in the Western part of Romania has been reported in the two counties under study,

which means that the seroprevalence of infection was 100% at the county level.

In Caraș-Severin county, positive samples were identified in three hunting grounds out of the four investigated. Thus, the seroprevalence of infection with *Toxoplasma gondii* reported to the number of hunting grounds monitored within Caraș-Severin county was 75%. In the four hunting grounds of Caraș-Severin county were identified five positive samples out of the total of 15 samples tested, the seroprevalence of infection reported to the total number of samples tested within the hunting grounds was 33.30%.

In Timiș county, positive samples were identified in 18 out of the 20 hunting grounds monitored, the se-

Table 3

Comparative results of *Toxoplasma gondii* infection and *Salmonella* infection within hunting grounds of monitored counties

Seroprevalence of <i>Toxoplasma gondii</i> infection				Seroprevalence of <i>Salmonella</i> infection			
County	Hunting grounds	No of positive samples	Positive / Total samples (%)	County	Hunting grounds	No of positive samples	Positive / Total samples (%)
Caras-Severin	Bigăr	0	5/15 (33,30%)	Caras-Severin	Bigăr	0	3/11 (27.27%)
	Bocsa	1			Bocsa	1	
	Moldova Nouă	2			Moldova Nouă	2	
	Slatina Timis	2			Slatina Timis	0	
Timis	Bara	1	46/75 (61.30%)	Timis	Bara	0	17/76 (22.40%)
	Birda	1			Birda	0	
	Blajova	2			Blajova	0	
	Brestovăt	5			Brestovăt	3	
	Buzias	2			Buzias	0	
	Cenad	2			Cenad	0	
	Clopodia	3			Clopodia	1	
	Jebel	2			Jebel	0	
	Margina	2			Margina	2	
	Mosnita	3			Mosnita	0	
	Opatita	1			Opatita	0	
	Petroman	2			Petroman	1	
	Pischia	9			Pischia	7	
	Poieni	5			Poieni	3	
	Rudna	2			Rudna	0	
	Sacosul Turcesc	1			Sacosul Turcesc	0	
	Sag Timiseni	2			Sag Timiseni	0	
	Sânmartin	0			Sânmartin	0	
	Stamora Română	0			Stamora Română	0	
	Surduc	1			Surduc	0	

ropevalence of infection reported to the total number of hunting grounds under study was 90%. On the hunting grounds of the Timiș county were identified 46 positive samples out of the 75 tested, the seroprevalence of infection reported to the total number of samples tested was 61.30%. Serological determinations (ELISA method) that the seroprevalence of *Toxoplasma gondii* infection within 24 hunting grounds belonging to two counties (Timiș and Caraș-Severin) was 56.70%.

In Caraș-Severin county, positive samples were identified in two out of the four hunting grounds studied. Thus, the seroprevalence of salmonella infection reported to the total number of hunting grounds monitored within the county was 50%. Within the four hun-

ting grounds of this county, from a total number of 11 samples, 3 samples were identified positive representing 27.27%.

Timiș county has been represented by a total of 20 hunting grounds. Within this county positive samples were identified in 12 hunting grounds. Thus, the seroprevalence of infection reported to the total number of investigated hunting grounds was 62.22%.

Toxoplasmosis had a seroprevalence of 56.70% and Salmonellosis 55.35% in tested samples. Mixed infection were found in both counties in variable proportion.

The obtained results demonstrate the role of wild boars as vectors in dissemination of *Toxoplasma* and *Salmonella* in domestic pigs.

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