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EPIDEMIOLOGICAL STUDY ON *TRICHINELLA* INFECTION IN PIGS AND WILD BOARS IN HUNEDOARA COUNTY (ROMANIA), DURING OF 2010-2014 PERIOD

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Trichinellosis is a cosmopolitan parasitic disease, affecting different species of wild and domestic animals, as well as humans, being determined by the nematodes of the Trichinella genus. Research conducted on the Romanian territory proves that up to 20 species of mammal and bird species are naturally susceptible to Trichinella spp. infection. This helminthic zoonosis maintains its incidence in Hunedoara County through the appearance of multiple outbreaks. The aim of this study was to determine the incidence of Trichinella infection in domestic pigs and wild boars from Hunedoara County, during of 2010 – 2014 period. For this, intercostal muscle samples collected from the animals slaughtered and/or hunted were examined for Trichinella infection by trichinelloscopy and/or artificial digestion. In domestic pigs, we registered a prevalence of trichinellosis of 0.016% (2/12390), 0.02% (4/13800), 0.016% (2/11954), 0.048% (5/10325), and 0.017% (2/11290), for the year 2010, 2011, 2012, 2013, and 2014, respectively. In wild boars, trichinellosis had a prevalence of 0.82% (1/121), 0% (0/117), 1.30% (2/153), 1.11% (1/179), and 0.74% (3/403), in the year 2010, 2011, 2012, 2013, and 2014, respectively. These results showed the ongoing circulation of Trichinella spp. amongst domestic and wild animals in the study area and emphasize potential risks for the public health. Considering that the Trichinella eradication in wildlife cannot be achieved, the surveillance of the domestic pigs is strongly recommended by applying appropriate and continuous veterinary measures. Moreover, knowing that humans become infected by eating raw or under-cooked meat containing infective larvae, the education of consumers should be promoted.

Keywords: *Trichinella* spp., domestic pigs, wild boars, epidemiology, Romania

INTRODUCTION

Trichinellosis is a cosmopolitan parasitic disease, affecting different species of mammals (wild and domestic animals) and birds, as well as humans, being determined by the nematodes of the *Trichinella genus*[1]. This parasite was identified in all continents (except Antarctica), with different values of incidence by species[2].

Research conducted on the Romanian territory proves that up to 20 species of mammals and birds are naturally susceptible to *Trichinella* spp. infections, in two evolving forms: the adult forms - localized in the small intestine and larval forms – localized in striated muscle tissue, in the same host. The most common *Trichinella* species encountered in our country have been *Trichinella spiralis* and *Trichinella britovi*[1].

Considering the fact that wild boars (*Sus scrofa*), and domestic pig (*Sus scrofa domesticus*) are often consumed by humans, *Trichinella* spp. in these animals represents a threat to human health[3]. Regarding safety and consumption of food containing meat products derived from animals hunted or domesticated, *Trichinella* spp. surveillance programs should be implemented. The public awareness as well needs to be increased by more informations about the possible risk of acquiring trichinellosis[4].

Romania is recognized as a country with the most serious zoonotic risk for this diseases[5]. In the last quarter of the century, incidence of trichinellosis in domestic pig peaked in 1993, when from 6.676.640 examined animals, 10.540 were infected with *Trichinella* spp. larvae, representing 0.16%[6].

The majority of outbreaks of trichinellosis in humans are represented by infected meat products, uncontrolled and derived from slaughtering animals in private household[7]. This helminthic zoonosis with intestinal worms (helminths) maintains its incidence in Hunedoara county through the appearance of multiple outbreaks[8].

The aim of this study was to determine the incidence of *Trichinella* infection in domestic pigs and wild boars from Hunedoara county, between 2010 and 2014. In this area was identified a high incidence of the disease in both animals and humans.

MATERIALS AND METHODS

Between 2010 and 2014, in a county in western Romania, the intercostal and/or pillar muscles from domestic pigs (slaughtered animals) and wild boars (hunted animals) were examined. During this period, a total number of samples from 59.759 domestic pigs raised in households and from 973 wild boars have been collected. These animals were sacrificed and examined in order to obtain information regarding the presence/absence of *Trichinella* spp., by trichineloscopic examination and/or by digestion with different methods in agreement with the European legislation. The data have been transmitted from the registers of trichinellosis from Veterinary Sanitary Direction (DSV) Hunedoara.

RESULTS AND DISCUSSIONS

In domestic pigs: in 2010, out of a total of 12390 animals examined two (0.016%) were diagnosed positive; in 2011 from a total of 13.800 examined animals, 4 were diagnosed as positive (0.02%); in 2012 , 2 were positive, from a total of 11954 examined (0.016%); in 2013 from a number of 10325 examined pigs, 5 were diagnosed as positive (0.048%), and in 2014, 2 were diagnosed as positive from 11.290 animals (0.017%). Between 2010 and 2014, in Hunedoara county, after trichineloscopic examination (by artificial digestion method) of pigs sacrificed in households, only 15 of the 59759 examined pigs, were diagnosed positive, representing 0.025% (Table 1). *Trichinella* spp. larvae have been identified, with slightly curved or spiral appearance, but without capsules and with almost constant sizes in naturally infected domestic pigs (Figure 1 and 2).

In wild boars: in 2010 were examined a number of 121 wild boars and out of the mentioned number only one was tested positive (0.82%); in 2011, from the 117 examined animals none was positive (0%); in 2012, from 153 wild boars, two were found positive for *Trichinella* spp. (1.30%);

Year	Animals examined	Animals infested	Incidence %
2010	12390	2	0.016
2011	13800	4	0.020
2012	11954	2	0.016
2013	10325	5	0.048
2014	11290	2	0.017
TOTAL	**59759**	**15**	**0.025**

Table1. Trichinellosis evolution in domestic pigs in Hunedoara county, between 2010-2014

Figure1. *Trichinella* spp. Larvae collected from striated muscles of domestic pig (80x)

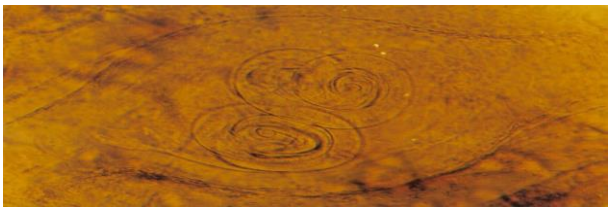

Figure 2. *Trichinella* spp. cyst, along the striated muscle fibers in domestic pig (80x)

In 2013, two were diagnosed as positive out of 179 (1.11%), and in 2014 out of a number of 403 wild boars, three were diagnosed positive (0.74%). In this period were examined 973 wild boars, and found 7 infected animals, the incidence being 0.72%. (Table 2). In wild boars, the *Trichinella* spp. cysts appear as almost round (Figure 3).

These results showed the continuous circulation of *Trichinella* spp. among domestic and wild animals in the studied area, and highlight potential risks to public health. In Hunedoara county, the pigs are reared in the farm system, in shelters more or less improvised, on the outskirts of towns, in the private micro-farms[8]. The postmortem diagnosis of trichinellosis in animals has a higher level of safety, being more accurately than clinical and paraclinical examinations. In practice trichineloscopy examination and artificial digestion are performed. The trichineloscopy diagnosis by artificial digestion is especially used to establish more accurate rates of *Trichinella* spp infections. Since 2005, in slaughterhouse, trichineloscopic examination by artificial digestion must be carried out[9,10]. Similar studies by Bandino *et al.* and Gomez *et al.* showed that wild boars are more often infected with *Trichinella* spp. than domestic pigs, this leading to an ongoing circulation of *Trichinella* spp. among domestic and wild animals in the studied area and also emphasized potential risks for public health[4,11]. This widespread zoonotic helminth in the world and in our country continues its evolution in western Romania by outbreaks in both domestic pigs and wild boars[12].

During the studied period (2010-2014), the emergence and persistence correlations of the trichinellosis outbreaks in domestic pigs infected with *Trichinella* spp. from wild animals were followed, as well as the influence of geographic area and of the human factor (such as hunters). Synantropic trichinellosis outbreaks remain at a high level in Hunedoara county and are represented especially by non-commercial pigs raised

in households. The sylvatic outbreak, represented by the wild boars, is a maintenance factor for the disease, with the possibility of trichinellosis interfocal transfer and interspecific transmission to domestic animals and humans[8]. The emergence and evolution of trichinellosis outbreaks still have risk factors, especially in urban area, where pigs continue to be grown in makeshift shelters on the outskirts of cities, where proper derating cannot be performed[13].

Year	Animals examined	Animals infested	Incidence (%)
2010	121	1	0.82
2011	117	0	0
2012	153	2	1.30
2013	179	1	1.11
2014	403	3	0.74
TOTAL	**973**	**7**	**0.72**

Table 2. Trichinellosis evolution in wild boars in Hunedoara county, between 2010-2014

Figure 3. *Trichinella* spp. cysts striated muscles of wild boar (80x)

CONCLUSIONS

Our epidemiological research on the evolution of *Trichinella* spp. infections in domestic pigs and wild boars in Hunedoara county between 2010 and 2014, revealed the following aspects: (1) In domestic pigs from households, the percentage of infected animals was constant throughout the years, ranging between 0.016% (2010) and 0.048% (2013); (2) In wild boars, outbreaks from sylvatic reservoir fluctuated from year to year, but the number of positive cases was very low (n=3). Considering that *Trichinella* eradication in wild animals cannot be achieved, surveillance of domestic pigs is recommended by applying the appropriate veterinary.

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