

I Lupi hanno un ruolo nella diffusione della *Trichinella britovi* in Italia? Una breve nota - Does Wolf have a role in the spreading of *Trichinella britovi* in Italy ? A short note

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Abstract. Trichinellosis is one of the most studied zoonosis and its causative agent *Trichinella* spp. is world wide distributed. Many reservoirs are reported for each species in different countries. In the studied Area, *T. britovi* and *T. pseudospiralis* are described, but only *T. britovi* in carnivores. we present the Dataset of *Trichinella* Surveillance in wildlife (Commission Regulation EC no.2075/2005) of Istituto Zooprofilattico of Umbria and Marche referred to the period January 2008- march 2012. In this Apennines Area of Central Italy, we found positive 6 wolves out of the 65 examined as well as 2 out of the 62758 wild boars analyzed. None of 603 tested foxes were found positive (as well as others receptive species observed), notwithstanding the role of foxes as reservoir for *T. britovi* is well documented in literature. The spreading of wolves population in Central Italy is discussed in order to the consequences for the surveillance of trichinellosis, taking into the account that the mean life of *T. britovi* in wolf is longer than in wild boar, so it may represents a new epidemiological problem in our Country.

Riassunto. La Trichinellosi è una delle zoonosi più studiate e il suo agente eziologico, la *Trichinella* spp. è praticamente ubiquitaria. Molti serbatoi infettivi sono riportati per ciascuna specie in Paesi diversi. Nell'area studiata, sono segnalate *T. britovi* e *T. pseudospiralis*, ma solo la prima è presente nei carnivori. In questo lavoro presentiamo il set di dati relativi alla sorveglianza sulla *Trichinella* nella fauna selvatica (regolamento CE no.2075/2005) effettuata dall'Istituto Zooprofilattico di Umbria e Marche dal Gennaio 2008 al Marzo 2012. In questa area dell'Appennino del Centro Italia, sono stati riscontrati positivi sei lupi su 65 e 2 cinghiali su 62.758 esaminati. Nessuna delle 603 volpi testate sono risultate positive (così come le altre specie suscettibili osservate), nonostante il ruolo delle volpi come serbatoio di *T. britovi* sia ben documentato. La diffusione della popolazione di lupi in Italia centrale è discussa in ordine alle conseguenze per la sorveglianza della trichinellosi, considerando che la vita media di *T. britovi* nel lupo è più a lunga che nel cinghiale, si potrebbe ipotizzare un nuovo scenario epidemiologico, per questa zoonosi, nel nostro Paese.

Here we present the results of the Survey for Trichinellosis in Wildlife between the years 2008 and 2011 according to the EC Regulation 2075/2005 for the Regions Umbria and Marche (Italy). None of the test performed on slaughtered pigs or horses (not reported data) were found positive.

Introduction

In Italy *Trichinella* genus is endemic in Wildlife: two species are involved in two different sylvatic cycles: *T. pseudospiralis* in Raptors and *T. britovi* in Carnivores. *T. pseudospiralis* was found in Central Italy in Little owl (*Athene noctua*) (Pozio et al., 1999) and recently in Wild Boar (*Sus scrofa*) (Meriardi et al., 2011) while *T. britovi* is often detected in scavengers like Red Fox and Wolf. In the Marche and Umbria Regions, both species have been previously reported. Apennines divides the Marche from the Umbria Region (8,456 km²; Population: 906,940; 110 inhabitants/km²) with the highest point at Monte Vettore (2,476 m), in the Sibillini National Park. Sibillini mountain chain stretches for about 40 km in the southern sector of Apennines Umbria - Marche (43 ° north 13 ° east). The Park covers an area of approximately 69,000 hectares.

The snowfall is concentrated in the months between November and April with the highest values in January and February. The vegetation is typical of the Apennines hilly area where up to 1000 m are forests of deciduous oaks (*Quercus pubescens*, *Q. Cerris*) hornbeam (*Ostrya carpinifolia*) and flowering ash (*Fraxinus ornus*) In these environments flora is very rich and has many endemic vegetation.

Most of detected *T. britovi* arises from dead wolves found in this area where 80 wolves are estimated living in about 1250 km². In this area there is the lower human density of both Regions (18,85 inhabitants/km²).

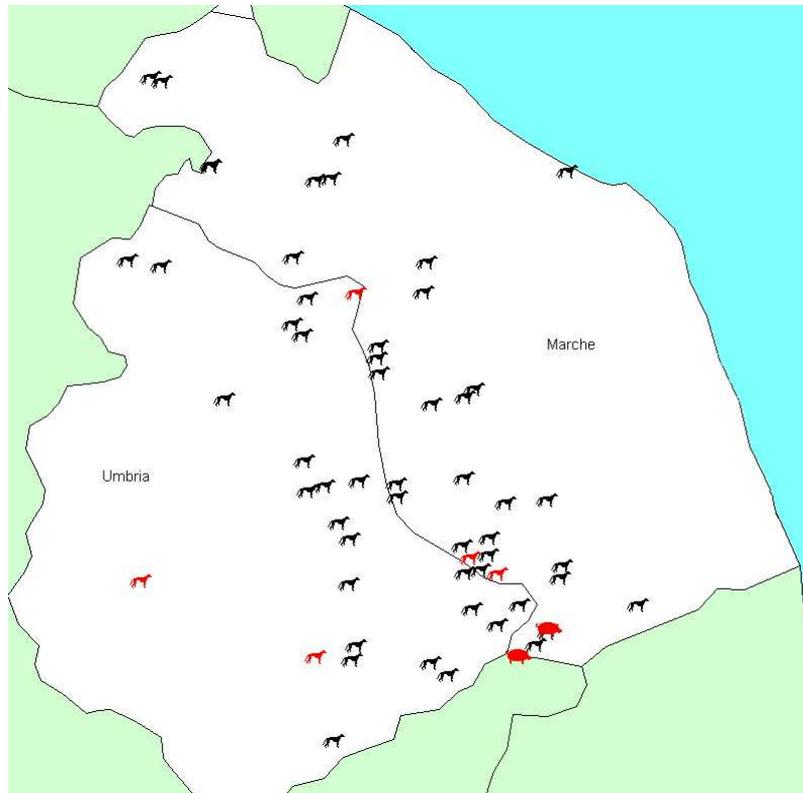


Figure 1. Distribution of wolves and wild boars in the test area

Occurrence of the *Trichinella* parasites in natural environment

Pseudospiralis is a cosmopolitan species of the genus *Trichinella*. Raptors represent the reservoir for the specie but also mammalians are receptive and sporadically infested.

The name of this species is due to the lack collagen capsule.

This characteristic makes the larval detection within the infested flesh harder especially if trichinelloscopy is used like once. Consequently, according to the Regulation EC 2075/2005, now all domestic pigs, wild boars and slaughtered horses, must be analyzed with one of the digestive methods performed by ISO certified laboratories.

T. britovi in temperate areas is endemic in wildlife (northern limit of January isoterma -6°C); the cycle is mainly within the family of Canidae (Pozio et al., 2008).

In Italy the prevalence for trichinellosis in wildlife is higher in mountain areas (more than 500m asl) and where human density is lower (average 73 inhabitants/km²) (Pozio et al., 1996). In the Apennines, Red Fox (*Vulpes vulpes*) and Wolf (*Canis lupus*) and other predators are involved in the cycle; the resistance at winter temperature and to the corruption, allows the transmission of Trichinellosis along all the year by the scavenging behaviour (Pozio et al., 1996; 1998).

In humans epidemics caused by *T. britovi* occurred for the consumption of cured products from wild boar or free range pigs.

Suidae contracts Trichinellosis by scavenging or cannibalism: consequently a correct management of waste is recommended were the cycle is endemic. When garbage and hunting residues are

properly managed, *T. britovi* affects a very low percentage (prevalence <0,001%) of wild boar (Pozio et al., 1998) and it is absent in pigs.

Despite the eradication of the sylvatic cycle is impossible, nevertheless the certification of *Trichinella*-free pork meat can be reached if is implemented an high standard of bio-security in industrial farms.

In fact the EC Regulation 2075/2005 provides that a Surveillance for Trichinellosis in Wildlife will be conducted to detect the hosts involved and monitoring the environmental variables affecting the sylvatic cycle. Surveys should be carried out to prevent the transmission to the domestic animals and finally to avoid the zoonotic risk.

Table 1. Wildlife analyzed for <i>Trichinella</i> (2008-2011; Umbria and Marche, Italy)			
Species	No. Tests	No. Positives	<i>Trichinella</i> sp.
Raptors	64	0	-
Corvidae	450	0	-
Wild rodents	11	0	-
Mustelids	9	0	-
Red Fox	603	0	-
Wolf	67	6 (8,9%)	<i>T. britovi</i>
Wild boar	62758	2 (0,003%)	<i>T. britovi</i>
Others	10	0	-
totals	63972	8	<i>T. britovi</i>

Table 2. Wild boar analyzed for <i>Trichinella</i> (2008-2011; Umbria and Marche, Italy)			
Source	No. Test	No. Positive	Species
Necropsy	50	0	-
Backyard farming	291	0	-
Slaughtered	4712	1	<i>T. britovi</i>
Hunted or culled	57705	1	<i>T. britovi</i>
Total	62758	2 (0,003%)	<i>T. britovi</i>

Consistency wolf "reservoir" in Sibillini National Park

In the park were estimated about 30 wolves on an area of 700 sq km and about 50 on a larger area outside the park of 1250 sq. km (Data Winter 2011 - 2012; methods used: wolf howling in summer snow tracking in winter and DNA analysis on feces).

Table 3. Wolves analyzed for <i>Trichinella</i> ; cause of death, age and no. of positives. (2008-2011; Umbria and Marche, (Italy)				
Class of age	Sarcoptic Mange	Poaching	Road Accident	Not conclusive
Undetected	-	7	20 (2+)	5 (1+)
Juvenile	2	-	6	3
Subadult	-	3 (2+)	4	-
Adult	2	5	7 (1+)	1
67 (6+)	4	15 (2+)	37 (3+)	9 (1+)

Results

This data confirm Wolf as an helpful indicator for the presence of *T. britovi* in wildlife. Moreover, in our experience, this specie was found positive more than Red Fox.

In fact, out of 65 wolves, six were found infested to *T. britovi* (prevalence 8,9%) and none out of 603 foxes have been found infested.

This survey suggests that in our environment, where the two species are sympatric, Wolf could be the main reservoir for Trichinellosis in the places or in addition to Red Fox.

However this Survey needs further evidences because of the provenience of the dead foxes: mainly came from hilly areas (and hunting districts) while the most of wolves examined became nearby Parks or mountain Areas. Just two Wild Boars out of 62,578 examined were been found infested (prevalence 0,003%) suggesting a good management of hunting and garbage dumps.



Figure 2. Apennine wolf in its environment.
(Massimo Dell'Orso picture, 2011)

Nevertheless, increased wild boar and wolf populations, as observed in the last years, could lead Trichinellosis outside the infested area, with new endemic foci.

In our Survey at least two new areas were found (see map). This situation doesn't represent a risk itself because were not involved new ecosystems.

It confirms the necessity of continuous monitoring of Wildlife, managing of hunting, as the impact of bio-security in pig farming (both extensive and intensive), not just where a risk is expected.

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