



Eco-patologia dell'interfaccia tra uomo e lupo

Stefano Gavaudan
IZS Umbria e Marche

IZS competenze

- E' un Ente Pubblico Sanitario che opera nell'ambito del *Servizio Sanitario Nazionale*, garantendo al Sistema Veterinario delle *Regioni Umbria e Marche* le prestazioni e la collaborazione tecnico-scientifica necessarie per l'espletamento delle funzioni in materia di Igiene e Sanità Pubblica Veterinaria.
- In particolare esplica le sue funzioni nell'ambito della *Sicurezza degli Alimenti e della Sanità Animale*:
 - Per la Ricerca e la Sorveglianza epidemiologica;
 - La Formazione degli operatori;
 - La Consulenza alle produzioni;
 - Diagnosi e Prevenzione delle malattie infettive.



IZS e fauna selvatica

Attività Istituzionale:

- Sorveglianza delle Zoonosi (DIRETTIVA 2003/99/CE DEL PARLAMENTO EUROPEO E DEL CONSIGLIO del 17 novembre 2003)
- REGOLAMENTO (CE) N. 2075/2005 DELLA COMMISSIONE del 5 dicembre 2005 che definisce norme specifiche applicabili ai controlli ufficiali relativi alla presenza di Trichine nelle carni;
- Ministero della Salute, Ordinanza 10 febbraio 2012: Norme sul divieto di utilizzo e di detenzione di esche o di bocconi avvelenati (G.U. Serie Generale, n. 58 del 09 marzo 2012);

Attività di consulenza:

- Identificazione delle cause di morte;
- Sorveglianza sanitaria sulla patologia propria e di interfaccia tra *Canis lupus* e *Canis familiaris*;

Coordinamento e divulgazione:

- Al termine delle indagini si mette a disposizione il reperto agli altri Enti interessati;
- Le risultanze salienti delle indagini vengono divulgate annualmente attraverso Riviste Internazionali e trasmesse all'Office International des Epizooties (OIE, World animal Health).



Does Wolf have a role in the spreading of *Trichinella britovi* in Italy?

Gavaudan S., Barchiesi F., Morandi F., Bartozzi B., Duranti A., Antognini E., Grelloni V., Forconi P., Salvi P., Dell'Orso M., Rossetti A., Perco F.

World Wildlife Disease Association (Lyon, 2012)

Online:
<http://spvet.it/indice-spv.html#561>

Does Wolf have a role in the spreading of *Trichinella britovi* in Italy?

Stefano Gavaudan 1,4, Francesco Barchiesi 1, Federico Morandi 1, Barbara Bartozzi 1, Anna Duranti 1, Elisabetta Antognini 1, Veronica Grelloni 1, Paolo Forconi 1, Paolo Salvi 2, Massimo Dell'Orso 3, Alessandro Rossetti 2, Franco Perco 2
 1 Istituto Zooprofilattico Sperimentale Umbria-Marche, Perugia (IT); 2 Parco Nazionale del Monte Subasio, Viterbo (IT); 3 CHRO5 Studio Funzionale, via Cardinale, 23, Macerata (IT); 4 Email: s.gavaudan@izum.it

INTRODUCTION
 In Italy *Trichinella* genus is endemic in Wildlife: two species are involved in two different sylvatic cycles: *T. zanzibaritidis* in Rabbits and *T. britovi* in Cervines. *T. zanzibaritidis* was found in Centre Italy in Little Owl (*Nyctaleus noctule*) (4) and recently in Wild Boar (*Sus scrofa*) (5) while *T. britovi* is often detected in scavengers like Red Fox (*Vulpes vulpes*) and Wolf (*Canis lupus*). In the Marche and Umbria Regions, both species have been previously reported. The Marche Region extends over an area of 3,034 km² (Population: 1,043,000; 170 inhabitants/km²) of the central Adriatic side, inside the Region, the Apennines divide the Marche from the Umbria Region (8,456 km²; Population: 900,000; 110 inhabitants/km²) with the highest point at Monte Velino (2,776 m). In the distant National Park, Mount of Sarnano *T. britovi* spores from wild boars are estimated living in about 1,200 km² in this area there is the lower human density of both Regions (18,85 inhabitants/km²).

T. zanzibaritidis is a cosmopolitan parasite of the animal *Trichinella* Region represents the reservoir for the species but also intermediate are multiple and zoonotic. The name of this species is due to the lack of a suitable host. This characteristic makes the larval detection within the infected fresh harder especially if *Trichinella* is used for once. Currently, according to the Regulation n. 207/2005, two air sampling, pig, wild boar and slaughtered forms, must be analysed at one of the diagnostic methods performed by ISO certified laboratories.

T. britovi is endemic in areas is endemic in wildlife northern limit of January (average 47°C), the cycle is rapid within the range of Celsius (7). In Italy the prevalence of *Trichinella* in wildlife is higher in mountain areas (more than 500m asl) and where human density is lower (average 73 inhabitants/km²) (2). In the Apennines, Red Fox and Wolf and other predators are involved in the cycle, the resistance is very temperature and to the cooking, about the transmission of *Trichinella* along the year by the scavenging behaviour (3, 6).

In Marche endemic cases caused by *T. britovi* occurred for the consumption of cured meat made from wild boar or the range pigs.

Public controls *Trichinella* by scavenging or carnivorism: consequently a correct management of waste is recommended where the cycle is endemic. When garbage and hunting residues are properly managed, Carnivora which is very low percentage (prevalence <0.20) of wild boar (7) and it is absent in signs. Control the management of sylvatic cycle is impossible, nevertheless the contribution of *Trichinella* free pork meat can be reached if a implemented an high standard of biosecurity in slaughter terms, in fact the ISO Regulation 207/2005 (8) provides that a Surveillance for *Trichinella* in Wildlife will be conducted to investigate the involved hosts and to monitoring the environmental variables affecting the cycle. Surveys should be carried out to prevent the transmission to the domestic animals and finally to avoid the zoonotic risk.

RESULTS
 Here we present the results of the Surveillance for *Trichinella* in Wildlife between the years 2008 and 2011 according to the ISO Regulation 207/2005 for the Regions Umbria and Marche. None of the test performed on slaughtered pigs and boars and reported data were found positive.

Wild Boar and Wild Boar
 2008-2011 (see table below)

Region	Year	Wild Boar	Wild Boar	Wild Boar
Umbria	2008	0	0	0
Umbria	2009	0	0	0
Umbria	2010	0	0	0
Umbria	2011	0	0	0
Marche	2008	0	0	0
Marche	2009	0	0	0
Marche	2010	0	0	0
Marche	2011	0	0	0

Wild Boar and Wild Boar
 2008-2011 (see table below)

Region	Year	Wild Boar	Wild Boar	Wild Boar
Umbria	2008	0	0	0
Umbria	2009	0	0	0
Umbria	2010	0	0	0
Umbria	2011	0	0	0
Marche	2008	0	0	0
Marche	2009	0	0	0
Marche	2010	0	0	0
Marche	2011	0	0	0

Wild Boar and Wild Boar
 2008-2011 (see table below)

Region	Year	Wild Boar	Wild Boar	Wild Boar
Umbria	2008	0	0	0
Umbria	2009	0	0	0
Umbria	2010	0	0	0
Umbria	2011	0	0	0
Marche	2008	0	0	0
Marche	2009	0	0	0
Marche	2010	0	0	0
Marche	2011	0	0	0

CONCLUSIONS
 This data confirm Wolf as a helpful indicator for the presence of *T. britovi* in Wildlife. Moreover, in our experience, this species was found positive more than Red Fox. In fact, out of 87 wolves, six were found infected by *T. britovi* (prevalence 6.8%) and none out of 603 foxes have been found infected. This survey suggests that in our environment, where the two species are sympatric, Wolf could be the main reservoir for *Trichinella* in the parks or in addition to Red Fox. However this survey needs further improvement because of the provenience of the dead foxes: many came from hilly areas (land hunting districts) and the most of wolves examined became nearby Parks or mountain areas.

Just two Wild Boars out of 42,780 examined were found infected (prevalence 0.002%) suggesting a good management of hunting and garbage dumps. Nevertheless, increase wild boar and wolf populations, as observed in the last years, could lead *Trichinella* outside the protected area, with new endemic foci. In our survey at least two new areas were found (see maps). This situation doesn't represent a risk itself because new ecosystems were not involved. It confirms the necessity of continuous monitoring of Wildlife, managing of hunting, as the means of bio-security in pig farming (both extensive and intensive), not only where the risks are expected.

REFERENCES
 1) Gavaudan S., Barchiesi F., Morandi F., Bartozzi B., Duranti A., Antognini E., Grelloni V., Forconi P., Salvi P., Dell'Orso M., Rossetti A., Perco F. (2012) Does Wolf have a role in the spreading of *Trichinella britovi* in Italy? *World Wildlife Disease Association* (Lyon, 2012).
 2) Gavaudan S., Barchiesi F., Morandi F., Bartozzi B., Duranti A., Antognini E., Grelloni V., Forconi P., Salvi P., Dell'Orso M., Rossetti A., Perco F. (2011) *Trichinella britovi* in Italy: a review of the sylvatic cycle. *Journal of Parasitology* 101: 1-10.
 3) Gavaudan S., Barchiesi F., Morandi F., Bartozzi B., Duranti A., Antognini E., Grelloni V., Forconi P., Salvi P., Dell'Orso M., Rossetti A., Perco F. (2010) *Trichinella britovi* in Italy: a review of the sylvatic cycle. *Journal of Parasitology* 100: 1-10.
 4) Gavaudan S., Barchiesi F., Morandi F., Bartozzi B., Duranti A., Antognini E., Grelloni V., Forconi P., Salvi P., Dell'Orso M., Rossetti A., Perco F. (2009) *Trichinella zanzibaritidis* in Italy: a review of the sylvatic cycle. *Journal of Parasitology* 99: 1-10.
 5) Gavaudan S., Barchiesi F., Morandi F., Bartozzi B., Duranti A., Antognini E., Grelloni V., Forconi P., Salvi P., Dell'Orso M., Rossetti A., Perco F. (2011) *Trichinella zanzibaritidis* in Italy: a review of the sylvatic cycle. *Journal of Parasitology* 101: 1-10.
 6) Gavaudan S., Barchiesi F., Morandi F., Bartozzi B., Duranti A., Antognini E., Grelloni V., Forconi P., Salvi P., Dell'Orso M., Rossetti A., Perco F. (2010) *Trichinella zanzibaritidis* in Italy: a review of the sylvatic cycle. *Journal of Parasitology* 100: 1-10.
 7) Gavaudan S., Barchiesi F., Morandi F., Bartozzi B., Duranti A., Antognini E., Grelloni V., Forconi P., Salvi P., Dell'Orso M., Rossetti A., Perco F. (2009) *Trichinella zanzibaritidis* in Italy: a review of the sylvatic cycle. *Journal of Parasitology* 99: 1-10.
 8) ISO Regulation 207/2005 (8) provides that a Surveillance for *Trichinella* in Wildlife will be conducted to investigate the involved hosts and to monitoring the environmental variables affecting the cycle. Surveys should be carried out to prevent the transmission to the domestic animals and finally to avoid the zoonotic risk.

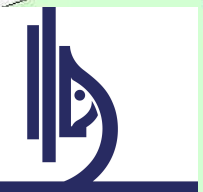
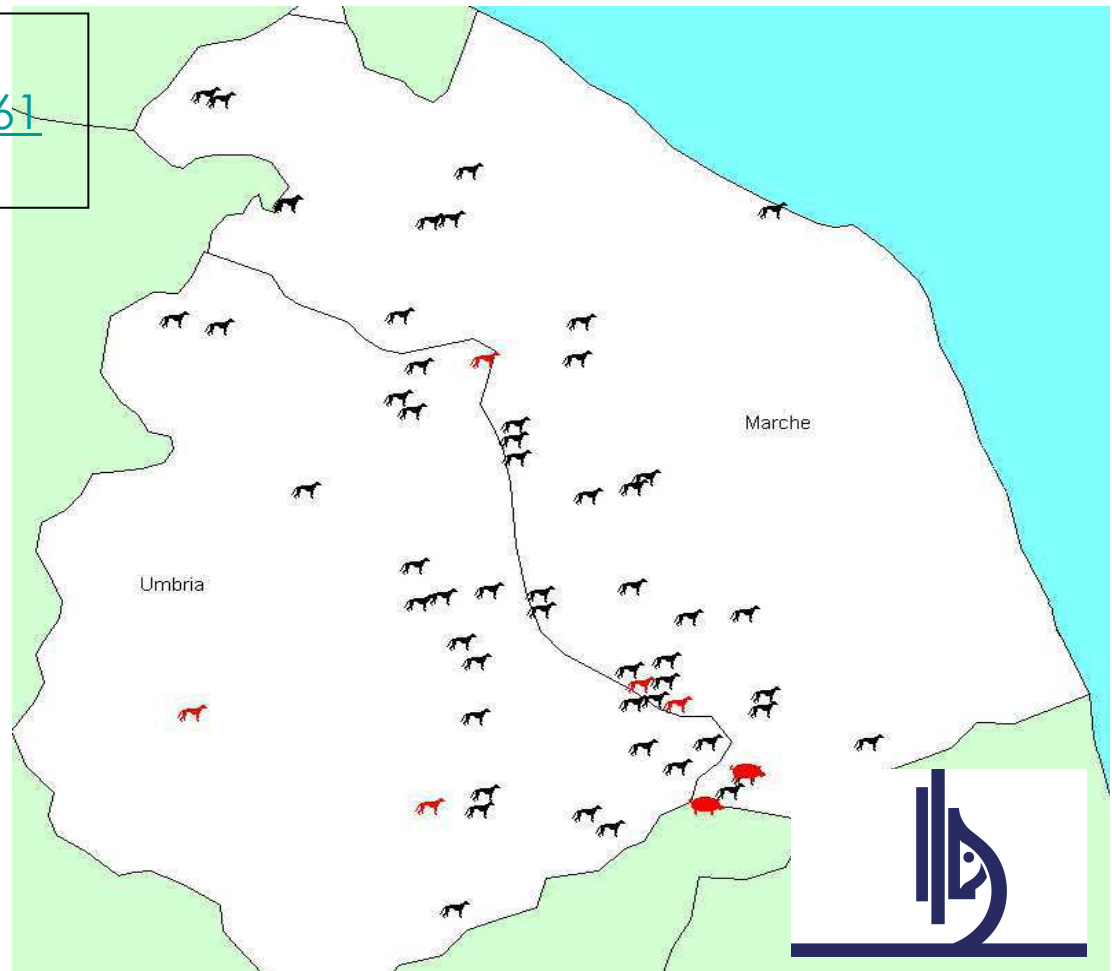


Table 1. Wildlife analyzed for Trichinella (2008-2011; Umbria and Marche, Italy)

Species	No. Tests	No. Positives	Trichinella sp.
Raptors	64	0	-
Corvidae	450	0	-
Wild rodents	11	0	-
Mustelids	9	0	-
Red Fox	603	0	-
Wolf	67	6 (8,9%)	T. britovi
Wild boar	62758	2 (0,003%)	T. britovi
Others	10	0	-
totals	63972	8	T. britovi

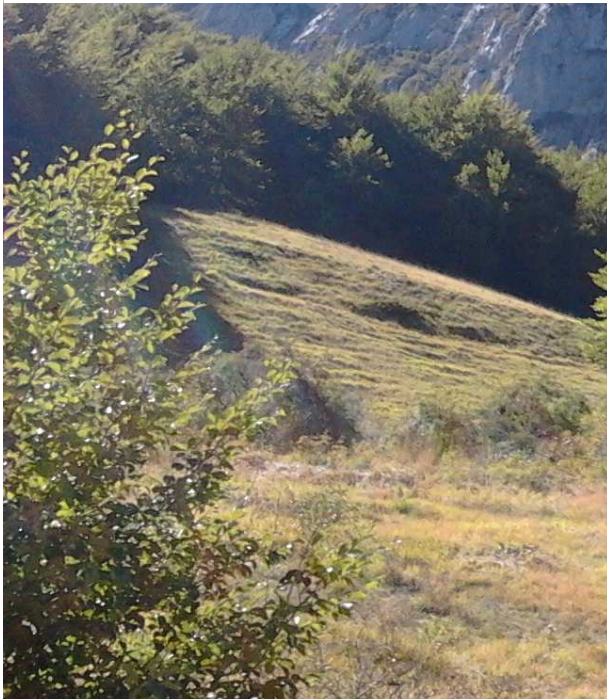


Table 3. Wolves analyzed for Trichinella; cause of death, age and no. of positives. (2008-2011; Umbria and Marche, Italy)

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+)