

## NEOSPORA CANINUM SEROLOGICAL SURVEY IN CATTLE FROM THE PIEDMONT REGION (NORTHWESTERN ITALY) \*

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**SUMMARY :** We report the results of three years of serological testing for *Neospora caninum* in dairy, beef and mixed production aptitude bovine herds from the whole Piedmont Region (Northwest of Italy). Serum samples, sent by large animal veterinary practitioners from herds with an history of abortions, were tested for the presence of antibodies to *N. caninum* detected by a commercially available ELISA-kit for bovine serum utilising a whole tachyzoite lysate (HerdCheck1 Anti-*Neospora*; IDEXX laboratories).

A total of 3 749 bovine blood sera were tested. 1 114 (29.7%) tested positive. The overall seroprevalence (at least one animal found positive) on 198 different herds tested was 67,7%. It was higher in beef cattle than in dairy cattle herds.

**Keywords:** *Neospora caninum*, cattle, seroprevalence.

**RESUME :** Pour évaluer la prévalence de l'infection par *Neospora caninum* dans les élevages bovins de l'Italie du Nord-Ouest et l'importance de la transmission verticale ou post-natale nous avons conduit une recherche sérologique. Nous avons testé les sérums des élevages bovins lait et viande ; 29.7% des sérums ont fourni une réponse positive.

La séroprévalence était plus élevée dans les élevages à viande que dans les élevages laitiers.

**Mots-clés :** *Neospora caninum*, bétail, séroprévalence.



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### I - INTRODUCTION

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The protozoan parasite *Neospora caninum* is a worldwide recognised cause of abortion in cattle in both dairy and beef cattle farms [Dubey, 2003].

It has been reported that both dairy and beef cattle seropositive to *N. caninum* are more

likely to abort than seronegative cows [Davison *et al.*, 1999; De Meerschman *et al.*, 2002], and up to 95% of calves from seropositive dams are infected congenitally even if clinically normal [Pare *et al.*, 1996].

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*N. caninum* infection can cause economic losses [Anderson *et al.*, 1991] due to abortion, milk losses and culling [Dubey *et al.*, 2007]. Serologic surveys indicate that the prevalence of *N. caninum* infection varies within and among herds, within a region, and among countries [Dubey and Lindsay, 1996 ; Dubey, 1999]. A number of studies have been carried on the overall prevalence of *N. caninum* in

bovine herds in various countries around the world .The prevalence has been found to vary considerably [Dubey *et al.*, 2007]; unfortunately, there are no data on *N.caninum* infection in cattle herds in the North-West of Italy. This paper reports the data collected in a three- year survey in dairy and beef cattle herds from the Piedmont Region (North West of Italy).

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## II - MATERIAL AND METHODS

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Three thousand seven hundred and forty-nine cattle sera samples were collected by field veterinarians from January 1, 2004 to December 31, 2006 (772 in 2004, 1521 in 2005, 1456 in 2006). The sera samples came from 198 different farms: 35 beef cattle, 68 dairy cattle and 95 mixed had reported at least one abortion in the year of sampling. Each sample collected in plain Vacutainer® tubes was centrifuged and the serum separated, frozen and stored at -20°C until tested. No

hemolytic sera were tested. The serum samples were tested for the presence of antibodies to *N. caninum* detected by a commercially available ELISA-kit for bovine serum (HerdCheck Anti-Neospora; IDEXX laboratories) following the manufacturer's recommended procedure.

Statistical analysis of data was carried out with EPIINFO (Ver.6) and differences were considered as significant when  $p \leq 0.05$ .

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## III - RESULTS

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One thousand one hundred and fourteen sera out of 3 749 tested were found positive with the ELISA test. Data regarding herd performance were reported in table 1. The difference among dairy and both beef and mixed herds is significant ( $\chi^2 = 58.37$  - P value = 0,0000 and  $\chi^2 = 38.28$  - P value = 0.0000). No difference among the different provinces

was observed (table 2). Out of 198 tested herds, 134 (67.7%) resulted seropositive (herd with at least one positive animal) for Neosporosis. No difference was observed comparing beef, dairy and mixed production herds with herd prevalence on infection of 65.71%, 64.71% and 70.53% respectively.

Table 1

Comparison of serology results obtained from different production aptitude herds

Production aptitudes	Negative	Positive	Total	%	$\chi^2$	P value
Beef	347	238	585	40.7%	58.37	0.000000
Dairy	1 407	439	1 846	23.8%		
Production aptitudes					$\chi^2$	P value
Dairy	1 407	439	1 846	23.8%	38.28	0.000000
Mixed	881	437	1 318	33.2%		

**Table 2**  
**Seroprevalence of single animals in various regional districts**

Regional districts	Negative	Positive	Total	Percentages	$\chi^2$	P value
AL	82	27	109	24.8%	3.68	0.596
AT	10	5	15	33.3%		
CN	755	315	1 070	29.4%		
NO	25	9	34	26.5%		
TO	1 725	748	2 473	30.2%		
VC	38	10	48	20.8%		
Total	2 635	1 114	3 749	29.7%		

#### IV - DISCUSSION

In dairy herds, seroprevalence varies from 2 - 3% up to 65 -70% while in beef herds it ranges from 1,8% up to 79% [Dubey *et al.*, 2007]. As regards Italy, an epidemiological survey of *N. caninum* in dairy cattle carried in the Sardinia island in the West Mediterranean, revealed a total farm prevalence of 55% [Varcasia *et al.*, 2006]. A cross-sectional serological survey from cattle in the Southern Italian Apennines demonstrated a herd seroprevalence of 77.8%, while 30.8% of cattle were found to have antibodies to *N. caninum* [Rinaldi *et al.*, 2005]. A serosurvey carried on 1 377 water buffalo serum samples from 50 farms in Southern Italy demonstrated a 82% herd prevalence, while prevalence in tested buffaloes was 34.6% [Guarino *et al.*, 2000]. *N.caninum* infection has been also reported in our study area from free-ranging wild ruminants, i.e. chamois (*Rupicapra rupicapra*), roe deer (*Capreolus capreolus*) and red deer (*Cervus elaphus*) [Ferroglia and Rossi, 2001], and Alpine ibex (*Capra ibex*) [Ferroglia *et al.*, 2001], from wild brown hares [Ferroglia and Trisciuglio, 2003]. In our study area the seroprevalence in dogs has also been investigated [Packham *et al.*, 1998]. In rural dogs, positive results, using a Neospora Agglutination Test (NAT) at 1/40, 1/80, 1/160 dilution were 36.4%, 19.5%, 9.9% respectively. In urban dogs, the corresponding figures were 20.2%, 10.6% and 4.8% respectively [Ferroglia

*et al.*, 2005]. Antibodies to *Neospora caninum* were also determined in serum samples from 282 stray cats in North-western Italy: Sera were tested by NAT. The seroprevalence found was 24.8% at 1:80, 12.8% at 1:160 and 5,3% at 1:320 dilution [Ferroglia *et al.*, 2007].

The overall seroprevalence in our study was 29.7%, and we found 67.7% of herds with at least a positive animal.

In a serosurvey carried out among dogs living in the study area, seroprevalence was significantly higher in rural than in urban dogs, It has been suggested that post-natal exposure to foetuses or other infected material can be the source of infection in rural dogs [Ferroglia *et al.*, 2007].

The high seroprevalence observed in beef herds and in mixed aptitude herds may be due to the differences in the breeding system. Dairy cattle were housed indoor, permanently while beef herds usually graze on pasture and are thus more exposed to contact with oocysts eliminated by dogs.

These data confirm a quite diffuse presence of *N. caninum* infection among herds with abortion problems. Our results are consistent with those of similar surveys carried out in other countries and regions.

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