**Neospora caninum Antibodies and its Consequences for Reproductive Characteristics in Wandering Sows from Senegal, West Africa**


1Department of Surgery Reproduction, Inter-States School of Veterinary Sciences and Medicine of Dakar, P.O. Box 5077, Dakar, Senegal
2Serology Laboratory of the Department of Reproductive Pathology of Nantes National Veterinary School, Atlanpele-La Chantrerie, P.O. Box 40706 44307, Nantes Cedex 03, France
3Polytechnic University of Bobo Dioulasso-01, P.O. Box 1091, Bobo-Dioulasso, 01-Burkina, Faso

**Abstract:** The aim of this study was to assay *Neospora caninum* antibodies and assess their consequences in terms of reproductive characteristics in wandering sows from Senegal, West Africa. Sera of 60 sows were assayed for antibodies against *N. caninum*. The associations between serostatus and reproductive characteristics were assessed over a period of 3 years (2006-2008). The 38.3% of sera were positive to *N. caninum* antibodies. Some reproductive disorders as age of sow at first birth, annual number of deliveries and stillbirths were significantly associated with serostatus of *N. caninum* (p<0.05). Results of this preliminary study indicate a higher prevalence of *N. caninum* in wandering sows from Senegal and there appeared to be an association between reproductive disorders and seropositivity. Thus, neosporosis may explain the lower reproductive performance in species from Africa. This has to be taken in account in epidemiology and impact of this new disease in African sows.

**Key words:** Wandering sows, *Neospora caninum*, reproductive characteristics, Senegal

**INTRODUCTION**

Neosporosis is a worldwide protozoan disease of marine and land mammal species, responsible for substantial reproductive disorders like abortion, neonatal mortality and stillbirth (Hall et al., 2005; Dubey et al., 2007). This protozoan has been misdiagnosed as *Toxoplasma gondii* and is now well described as a specific *Neospora caninum* (Dubey et al., 1988). Many studies have been undertaken to understand the physiopathology of the disease on the foetal death (Almeria et al., 2003; Buxton et al., 1998; Dubey et al., 2006; Williams et al., 2000). The impact of the reproductive disorders has been evaluated on the economic losses in cattle (Reichel and Ellis, 2008).

For other species like domestic pigs (*Sus scrofa f. domestica*), there is now a great interest to investigate and evaluate the impact of this protozoosis on reproductive performance. In West Africa, pig reproduction is very important for breeding and need to evaluate the prevalence of *N. caninum* and understand the consequences on the reproduction performance.

The aim of this study was to assay *N. caninum* antibodies and assess their consequences on reproductive characteristics in wandering sows from Senegal.

**Corresponding Author:** Dr. Alain Richi Kanga-Waladjo, Department of Surgery Reproduction, Inter-States School of Veterinary Sciences and Medicine of Dakar, P.O. Box 5077, Dakar Fann, Senegal
MATERIALS AND METHODS

The study was carried out at Kaolack (Latitude 14°08'N, Longitude 16°04'W), located in the Central-western region of Senegal in West Africa. It’s in a tropical area with 2 seasons: dry from November to June and raining from July to October with an average rainfall of 650±50 mm.

Sixty local sows (Sus scrofa f. domestica) aged from 5 to 26 months were used for this study. The sows were identified and reared in a traditional manner with table scraps as feeds and drinks from the river. The animals were under veterinary control and any clinical signs of specific disease or pathology were registered.

The study was performed during 3 years (2006-2008) by recording the reproductive performances and parameters.

Sero logical Sampling

Blood samples were collected by puncture of the auricular vein using vacutainer tubes without anticoagulant, stored for 1 to 2 h at room temperature and then centrifuged at 1500 x g for 10 min. The sera obtained were stored at -20°C. They were assayed using competitive ELISA Multi-species test (VMRD Inc., Pullman, WA 99163, USA) for N. caninum antibodies as previously described and tested by Bazler et al. (2001).

All sera were subjected to the same procedure at the Serology Laboratory of the Department of Reproductive Pathology of Nantes National Veterinary School in France.

Reproductive Characteristics

Reproductive parameters were evaluated by annual number of deliveries, age of first service and age of first birth. All parameters were registered for each sow identified. The reproductive performances were defined from the number of piglets and number of stillbirths obtained annually per each sow.

Statistical Analysis

The serology results and reproduction characteristics were analyzed by the Chi-square test, using the R-Commander software program (R version 2.6.2, Copyright (C) 2008). The correlation between seropositivity and age of sows or reproductive characteristics was considered statistically significant at p<0.05 (Ancelle, 2006).

RESULTS

Sera analysis of 60 wandering sows indicated 58.3% of seropositivity against N. caninum antibodies (Table 1). The age of first service was more than 8 months in 61.7% of sows. Among infected females, 77.1% had an age at first birth greater than or equal to 12 months. In general, 82.9% of sows farrowed 1.7 times a year. The serostatus of the sows had an influence on age at first farrowing and on the annual number of deliveries (p<0.05) (Table 2).

The number of piglet per sow was less than 5 in 57.1% of females infected by N. caninum. More than two stillborn piglets were recorded in 62.8% of infected females. The stillbirth incidence was influenced by the serostatus of the sows (p>0.05) (Table 2).

| Table 1: Seroprevalence of N. caninum antibodies among different age* groups of wandering sows in Senegal |
|---|---|---|---|---|
| Age (Months) | Sero positive No. | Sero negative No. | Total | p-value |
| <10 | 15 (42.9%) | 7 (28%) | 22 | |
| 10-24 | 13 (37.1%) | 10 (40%) | 23 | |
| >24 | 7 (20%) | 8 (32%) | 15 | |
| Total (%) | 35 (58.3%) | 25 (41.7%) | 60 | >0.05 |

*Age of sows in January 2006
Table 3: Reproductive parameters and performance in pregnant sows in Senegal

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<thead>
<tr>
<th>Reproductive parameters</th>
<th>Reproductive performance</th>
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<tr>
<td></td>
<td>First service (Months)</td>
</tr>
<tr>
<td>N. caninum antibodies</td>
<td>&lt;6</td>
</tr>
<tr>
<td>Abortion</td>
<td>17 (37.1%)</td>
</tr>
<tr>
<td>Nigrovir</td>
<td>16 (50.0%)</td>
</tr>
<tr>
<td>Total</td>
<td>22 (37.1%)</td>
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DISCUSSION

*Neospora caninum* antibodies were found in sera sows from Senegal in West Africa. In another study, *N. caninum* was observed in 18.1% of wild boars (*Sus scrofa*) in the Czech Republic (Barcova et al., 2006). In domestic pig (*Sus scrofa domestica*) breeding farms, *N. caninum* antibodies were observed in 3% of sows (Daunyaya et al., 2004; Wyss et al., 2000) and 8.8% of aborted sows (Helmick et al., 2002). The higher seroprevalence (58.3%) in this study was probably related to the management of local sows such as wandering and drinking from rivers and using table scraps. In this mode of breeding, animals wander daily to research food and water to drink. Thus, they have a high probability of being in contact with parasitic forms of this protozoan which maintain its horizontal transmission. Ould-Amrrouche et al. (1999) noted that, the use of ponds rather than well or public water supply for drinking water was found to be a risk factor for *N. caninum* infection in dairy cattle. *N. caninum* antibodies were highlighted in wandering dogs (17.1%) from Dakar, in the western region of Senegal (Kamga-Waladji, personal observations). The infection by *Neospora* oocysts shed by wander dogs or other definitive hosts (Dubey et al., 2007) may explain the transmission to these wandering sows.

The serostatus of the sows had an influence on age at first farrowing and on the annual number of deliveries. Furthermore, the stillbirth incidence was influenced by the serostatus of the sows. It's the first report of *N. caninum* antibodies detected in wandering sows in Senegal.

Although, the number of animals studied was small, results of this preliminary study indicate a higher prevalence of *N. caninum* in wandering sows in Senegal and there appeared to be an association between reproductive characteristics and *N. caninum* seropositivity. Further epidemiological studies are needed to better assess the impact of *N. caninum* on reproductive disorders in wandering and farms sows.

ACKNOWLEDGMENTS

The authors thank all of the farmers for their collaboration on this study. We are grateful to Professors Daniel Tainturier, head of the Department of Reproductive Pathology of Nantes National Veterinary School (France) for providing technical assistance during the study.

REFERENCES


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