SEROLOGICAL INVESTIGATION ON THE SPREAD OF TOXOPLASMA GONDII IN ROE DEER (CAPREOLUS CAPREOLUS) EMILIA-ROMAGNA

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Introduction

The population of roe deer (Capreolus capreolus) in Emilia-Romagna has steadily increased in recent years and has become very dense. The presence of Toxoplasma in wild ruminants and other wild species has been known since the early 1960s, and deer has been described as intermediate hosts of Toxoplasma gondii. This paper presents the results of a sero-prevalence study conducted in order to verify and quantify the spread of T. gondii in deer populations in the Apennines region of Emilia-Romagna. It also evaluated the effectiveness of a multi-species Elisa test produced by IDVET, as an alternative method to sero-agglutination, which is very slow.

Materials and methods

Sera from deer were collected between January 2008 and July 2009 as part of the monitoring plan set up by the Emilia-Romagna region to assess the health status of wild populations. Samples were analyzed for detection of antibodies against Toxoplasma gondii by ELISA (multi-species commercial kit from ID-Vet). The positives were confirmed by indirect immunofluorescence (OIE method for sheep and goats) using the Biomerieux® slides and anti-caprine IgG antibodies produced by the Institute Zooprofilattico Sperimentale of Lombardia and Emilia Romagna. Antibody titers ≥ 1:40 were considered positive. The prevalence data was analyzed in function of the province, sex and age (3 age groups: <11 months, 12-23 months, > 23 months) to detect any risk factors (test chi-square).

Results

248 deer sera were examined, with 63 positive results, for an overall prevalence of 25.4% (95% CI 20.1% -31.3%). All the ELISA positive samples also tested positive for IFI. The prevalence in the provinces was respectively 25.3% in Bologna (95% CI: 16.0 to 36.7), 40% in Forli-Cesena (95% CI 5.3 to 85.3), 21 9% in Modena (95% CI 9.3 to 40.0), 22.5% in Ravenna (95% CI: 13.5 to 34.0), 29.2% in Reggio Emilia (95% CI 18.6 to 41.8). The differences were not significant in relation to the province and sex (p>0.05), while levels of sero-prevalence differed significantly between age groups (p<0.01), subjects over 23 months had the highest seroprevalence (<12m: 14.3%; 13m-23m: 9.1%;> 23m: 32.06%).

<table>
<thead>
<tr>
<th>Provincia di prelievo</th>
<th>Sieroprevalenza (%)</th>
<th>IC 95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bologna</td>
<td>25.3</td>
<td>16.0 - 36.7</td>
</tr>
<tr>
<td>Modena</td>
<td>21.9</td>
<td>9.3 - 40.0</td>
</tr>
<tr>
<td>Ravenna</td>
<td>22.5</td>
<td>13.5 - 34.0</td>
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<tr>
<td>Reggio Emilia</td>
<td>29.2</td>
<td>18.6 - 41.8</td>
</tr>
<tr>
<td>Forli Cesena</td>
<td>40.0</td>
<td>5.3 - 85.3</td>
</tr>
<tr>
<td>Tot</td>
<td>25.4</td>
<td>20.1 - 31.3</td>
</tr>
</tbody>
</table>

Table1: Sero-prevalence by province

The prevalence found in this study can be called medium-high compared to that shown in some mountain districts. The study illustrates the widespread exposure of deer to this parasite in the region. The study shows that the highest percentage of positive findings were found in adult classes, as well as the need to conduct further studies on risk factors linked to toxoplasmosis transmission. The multi-species IDVET Toxoplasmosis ELISA was found to be specific and easy to perform, and is a good alternative to agglutination, used previously in similar studies.

Conclusion

Figure 1: Indirect Immunofluorescence (Cut-off 1:40). Positive samples.

Figure 2: ELISA

Figure 3: Positives by sex class ($\chi^2>0.05$)

Figure 4: positives by age class ($\chi^2<0.01$)