Paratuberculosis: susceptibility and epidemiological role of Iberian ibex (*Capra pyrenaica*)

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INTRODUCTION

Paratuberculosis:
• Caused by *Mycobacterium avium* subsp. *paratuberculosis*
• Worldwide distribution
• Prevalence unknown in small ruminants
• Shared disease between domestic ruminants and wildlife
• OIE (World Organization for Animal Health)
Infectious chronic enteritis

Loss of weight

Decrease of body condition

Diarrhoea

Decrease of fertility and milk production
Three different strains:

- Type I or "sheep"
- Type II or "cattle"
- Type III or "intermediate"

Mainly faecal-oral transmission

Contaminated pastures (livestock) → principal source of infection for wildlife.
OBJECTIVES

• Presence/absence of MAP in the Iberian ibex of Puertos de Tortosa y Beceite (PT&B) Natural Park

• Spatial and temporal distribution

• Potencial role of Iberian ibex in the epidemiology of MAP infection
MATERIALS AND METHODS

From 2007 to 2009
- 91 ileocecal valve samples (VIC)

From 2007 to 2017
- 346 serum samples
MATERIALS AND METHODS

- Ileocecal valve samples
- Serum samples
- Spatial and statistical study

Methods:
- Classic PCR
- Sequencing of DNA
- Indirect ELISA

Variables:
- Age
- Density
- Livestock
- Aggregation
### RESULTS

- No lesions in VIC

<table>
<thead>
<tr>
<th></th>
<th>ELISA indirect (n=346)</th>
<th>Classic PCR (n=91)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% positives (+/analyzed; IC 95%)</td>
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</tr>
<tr>
<td>2007</td>
<td>12,2 (5/41; 2,2 – 22,2)</td>
<td>6,3 (2/32; -2,2 – 14,2)</td>
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<tr>
<td>2008</td>
<td>4,4 (1/23; -4,0 – 12,8)</td>
<td>14,3 (2/14; -4,2 – 32,2)</td>
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<td>2009</td>
<td>13,7 (7/51; 4,5 – 23,5)</td>
<td>35,6 (16/45; 21,6 – 49,6)</td>
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<td>2010</td>
<td>15,8 (3/19; -0,6 – 32,2)</td>
<td>-</td>
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<tr>
<td>2011</td>
<td>2,9 (2/69; -1,1 – 6,9)</td>
<td>-</td>
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<tr>
<td>2012</td>
<td>6,4 (3/47; -0,6 – 13,4)</td>
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<td>2013</td>
<td>14,3 (2/14; -0,1 – 42,9)</td>
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<tr>
<td>2014</td>
<td>25 (2/8; -5,0 – 55,0)</td>
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<tr>
<td>2015</td>
<td>7,9 (3/38; -0,7 – 16,5)</td>
<td>-</td>
</tr>
<tr>
<td>2016</td>
<td>13,3 (4/30; -2,8 – 5,4)</td>
<td>-</td>
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<tr>
<td>2017</td>
<td>0 (0/6; 0 – 0)</td>
<td>-</td>
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<tr>
<td>Total</td>
<td>9,3 (32/346; 6,2 – 12,2)</td>
<td>22,0 (20/91; 13,5 – 30,5)</td>
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</tbody>
</table>
Low correlation between the 2 test

<table>
<thead>
<tr>
<th></th>
<th>Nº of samples analyzed</th>
<th>% ELISA positives (n/total)</th>
<th>Confidence interval of ELISA (95%)</th>
<th>% PCR positives (n/total)</th>
<th>Confidence interval of PCR (95%)</th>
<th>ELISA (+) and PCR (+)</th>
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</thead>
<tbody>
<tr>
<td>2007</td>
<td>32</td>
<td>15,6 (5/32)</td>
<td>3,0 – 28,2</td>
<td>6,3 (2/32)</td>
<td>-2,2 – 14,2</td>
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<td>2008</td>
<td>14</td>
<td>7,1 (1/14)</td>
<td>-6,4 – 20,6</td>
<td>14,3 (2/14)</td>
<td>-4,2 – 32,2</td>
<td>0</td>
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<td>2009</td>
<td>45</td>
<td>13,3 (6/45)</td>
<td>3,4 – 23,2</td>
<td>35,6 (16/45)</td>
<td>21,6 – 49,6</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>91</td>
<td>13,2 (12/91)</td>
<td>6,2 – 20,2</td>
<td>22,0 (20/91)</td>
<td>13,5 – 30,5</td>
<td>4</td>
</tr>
</tbody>
</table>

Sequencing of DNA: 99-100% homology with the IS900 insertion sequence.
No spatial pattern.
DISCUSSION

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• Preliminary statistical analysis suggested the role of livestock as source of infection

• PTB present in livestock, but no clinical cases in Iberian ibex
CONCLUSIONS

→ MAP is present in the Iberian Ibex of the study area

→ MAP appears to be endemic in the Iberian Ibex populations

→ MAP excretion by Iberian Ibex unlikely to be significant

→ Further research needed to confirm the poor role of Iberian ibex in the epidemiology of PTB
Thanks for your attention