Prevalence of zoonotic pathogens in common vole (Microtus arvalis) during a population outbreak

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Introduction & aims

The common vole (Microtus arvalis), considered a rodent pest when overabundant in agricultural areas, was traditionally absent from the agricultural plains of Castilla-y-León, NW Spain (Fig. 1). However, it rapidly invaded agricultural land, where regular outbreaks have caused crop damages and conflict with farmers, besides the problems concerning public health due to rodents-borne diseases. There is scarce information on zoonotic pathogens circulating in common vole populations and coexisting wildlife, and consequently on the risk that sudden demographic changes pose to human health (Fig. 2). We aim to determine the prevalence of different zoonotic pathogens in common voles.

Methodology

Spleen samples collected from common voles, wood mouse (Apodemus sylvaticus) and greater white-toothed shrew (Crocidura russula) were analysed for zoonotic pathogens by PCR (Coxiella burnetii, Leishmania spp. and Borrelia spp.). Wild rodents included in this study were captured in 2014 from a population experiencing demographic explosion in 3 different populations (Fig. 1).

Results

Prevalence of different pathogens.

<table>
<thead>
<tr>
<th>Pathogen</th>
<th>M. arvalis</th>
<th>A. sylvaticus</th>
<th>C. russula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coxiella burnetii</td>
<td>12.2%(31)</td>
<td>0.0%(0)</td>
<td>0.0%(0)</td>
</tr>
<tr>
<td>Leishmania spp.</td>
<td>1.2%(3)</td>
<td>0.0%(0)</td>
<td>0.0%(0)</td>
</tr>
<tr>
<td>Borrelia spp.</td>
<td>0.0%(0)</td>
<td>0.0%(0)</td>
<td>0.0%(0)</td>
</tr>
<tr>
<td>Spleens analyzed</td>
<td>92.3%(253)</td>
<td>6.9%(19)</td>
<td>1.1%(3)</td>
</tr>
</tbody>
</table>

Discussion

Coxiella burnetii prevalence was slightly higher than that found in the same population 2 years before (8.0%), suggesting that perhaps increasing vole density increases C. burnetii transmission and therefore the risk of transmission to other animals and humans. Future risk factor analyses on pathogen prevalence data would clarify if density-dependent effects modulate the rate of C. burnetii transmission in common vole populations.

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References