repercussions for human health? Given that 95%–99% of humans possibly exposed to such a reservoir are Duffy negative, and therefore resistant to the parasite, these would appear to be slight. However, as humans encroach more frequently into ape habitats, the chances of humans encountering the parasite will increase. In the short term, the risks are probably limited to Duffy-positive persons who enter areas where apes are present, such as tourists and migrant workers.

Richard Leighton Culleton and Pedro Eduardo Ferreira
Author affiliations: Nagasaki University, Nagasaki, Japan (R.L. Culleton, P.E. Ferreira); University of Algarve, Faro, Portugal (P.E. Ferreira); and Karolinska Institutet, Stockholm, Sweden (P.E. Ferreira)

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Address for correspondence: Richard Leighton Culleton, Malaria Unit, Institute of Tropical Medicine, Nagasaki University, 1-12-4 Sakamoto, Nagasaki 852-8523, Japan; email: richard@nagasaki-u.ac.jp

Rickettsia parkeri and Candidatus Rickettsia andeanae in Gulf Coast Ticks, Mississippi, USA

To the Editor: Rickettsia parkeri, a spotted fever group Rickettsia (SFGR) bacterium, is transmitted by Amblyomma maculatum, the Gulf Coast tick (1). The prevalence of R. parkeri in Gulf Coast ticks has been reported as <42% in the United States, which is higher than reported rates of R. rickettsii (the cause of Rocky Mountain spotted fever) in Dermacentor species ticks. Misdiagnosis among SFGR infections is not uncommon, and R. parkeri rickettsiosis can cause symptoms similar to those for mild Rocky Mountain spotted fever (1). We evaluated infection rates of R. parkeri and Candidatus Rickettsia andeanae, a recently identified but incompletely characterized SFGR, in Gulf Coast ticks in Mississippi, USA.

During May–September of 2008–2010, we collected adult Gulf Coast ticks from vegetation at 10 sites in Mississippi. We extracted genomic DNA from the ticks using the illustra tissue and cells genomicPrep Mini Spin Kit (GE Healthcare Life Sciences, Piscataway, NJ, USA). We tested amplifiable tick DNA by PCR of the tick mitochondrial 16S rRNA gene (2). We tested for molecular evidence of any SFGR species by nested PCR of rompA (rickettsial outer membrane protein A gene) (3). Samples positive for SFGR were subsequently tested by using species-specific rompA PCR for R. parkeri (3) and Candidatus R. andeanae (4). All PCRs included 1) a positive control of DNA from cultured R. parkeri—(Tate’s Hell strain) or Candidatus R. andeanae–infected Gulf Coast ticks and 2) a negative control of water (nontemplate). PCR products were purified by using Montage PCR Centrifugal Filter Devices (Millipore, Bedford, MA, USA) and sequenced by using Eurofins MWG Operon (Huntsville, AL, USA). We generated consensus sequences using ClustalW2 (www.ebi.ac.uk/Tools/msa/clustalw2/) alignment and identified the sequences using GenBank BLAST searches (www.ebi.ac.uk/Tools/clustalw2/).

Proportions of ticks infected with SFGR, by region and year, were compared separately by using Fisher exact test followed by pairwise comparisons with a Bonferroni
**LETTERS**

Table. PCR results for adult *Rickettsia parkeri*– and *Candidatus* *Rickettsia andeanae*–infected Gulf Coast ticks (*Amblyomma maculatum*) collected from 10 sites in Mississippi, USA, 2008–2010*†

<table>
<thead>
<tr>
<th>Location (no. collection sites)</th>
<th>No. ticks</th>
<th>No. (%; 95% CI) SFG rompA</th>
<th>No. (%; 95% CI) <em>R. parkeri</em> only</th>
<th>No. (%; 95% CI) Candidatus <em>R. andeanae</em> only</th>
<th>Expected no. (%) co-infected ticks</th>
<th>No. (%; 95% CI) co-infected ticks</th>
</tr>
</thead>
<tbody>
<tr>
<td>North (4)</td>
<td>257</td>
<td>49 (19.1; 14.5–24.4)†</td>
<td>48 (18.7; 14.1–24.4)†</td>
<td>0§</td>
<td>0.19 (0.07)</td>
<td>1 (0.4; 0–2.1)†</td>
</tr>
<tr>
<td>Central (1)</td>
<td>38</td>
<td>4 (10.5; NA)</td>
<td>1 (2.6; NA)</td>
<td>2 (5.3; NA)</td>
<td>0.16 (0.42)</td>
<td>1 (2.6; NA)</td>
</tr>
<tr>
<td>South (5)</td>
<td>403</td>
<td>75 (18.6; 14.9–22.8)†</td>
<td>57 (14.1; 10.9–17.9)†</td>
<td>8 (2.0; 0.9–3.9)§</td>
<td>2.99 (0.74)</td>
<td>10 (2.5; 1.2–4.5)§</td>
</tr>
<tr>
<td>Total (10)</td>
<td>698</td>
<td>128 (18.3; NA)</td>
<td>106 (15.2; NA)</td>
<td>10 (1.4; NA)</td>
<td>3.65 (0.52)</td>
<td>12 (1.7; NA)</td>
</tr>
</tbody>
</table>

*The estimated value of co-infection caused by chance alone (E) was calculated by using the formula $E = (a + b)(a + c) / (a + b + c + d)$ (5), where $a = \text{no. ticks infected with both } *R.\text{parkeri, b = no. ticks infected only with } *R.\text{parkeri, c = no. ticks infected only with } \text{Candidatus } *R.\text{andeanae, and d = no. ticks not infected with either } *R.\text{parkeri or } \text{Candidatus } *R.\text{andeanae.}$

†Significantly higher than expected from chance alone. The biologic role of co-infections of Gulf Coast ticks with *R. parkeri* and *Candidatus R. andeanae* remains to be determined.

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Flavia A.G. Ferrari, Jerome Goddard, Christopher D. Paddock, and Andrea S. Varela-Stokes

Author affiliations: Mississippi State University, Mississippi State, Mississippi, USA (F.A.G. Ferrari, J. Goddard, A.S. Varela-Stokes); and Centers for Disease Control and Prevention, Atlanta, Georgia, USA (C.D. Paddock)

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Technical Appendix

Technical Appendix Figure. Distribution of Gulf Coast ticks and cases of rickettsiosis. Solid circles indicate confirmed cases of Rickettsia parkeri rickettsiosis, and open circles indicate probable cases of R. parkeri rickettsiosis noted by Paddock et al. (7) and Cragun et al. (2). A) Gray area indicates the most established distribution of Gulf Coast ticks (Amblyomma maculatum); asterisks (*) indicate documented collection of these ticks in incidental reports (may or may not reflect permanent populations). B) Gray shading indicates Mississippi counties where Goddard and Paddock reported the occurrence of Gulf Coast ticks and locations of previously reported cases of R. parkeri rickettsiosis in Mississippi (3). X indicates tick collection sites for this study. Map adapted with permission from Teel et al. (4).

References

