
Contemporary evolution of immunity during range expansion of two invasive rodents in Senegal

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Abstract

Biological invasions provide unique opportunities for studying adaptation over contemporary time scales. As spatial spread may be related to changes in parasite communities, several hypotheses (such as the evolution of increased competitive ability (EICA) or EICA-refined hypotheses), suggest immune changes in invasive species along invasion gradients. Although native hosts may be subject to similar changes in parasite selection pressures, their immune responses have been rarely investigated in invasion contexts. In this study, we evaluated immune changes for invasive house mice (*Mus musculus domesticus*), invasive black rats (*Rattus rattus*), and native rodents (*Mastomys* sp.) along well-characterised invasion gradients in Senegal. We focused on antibody-mediated (natural antibodies and complement) and inflammatory (haptoglobin) responses. One invasion route was considered for each invasive species, and environmental conditions were recorded. Natural-antibody mediated responses increased between sites of long-established invasion and recently invaded sites only in house mice. Both invasive species invested more in their inflammatory responses along the invasion gradient. The immune responses of native species did not change following the arrival of invaders. These results strongly suggest that infection risks are greater on invasion fronts and that invasive species, particularly house mice, are able to adjust their immune phenotypes during invasion. On the contrary, the inability of native rodents to adapt their immune phenotypes might be a factor explaining their rapid elimination by invasive rodents.

Keywords: Biological invasions, rodents, ecological immunology, inflammation, antibody, mediated responses, environment.

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