Response to Human Induced Changes

Peri-urban black rats host a rich assembly of ticks with no clear consequences for rat condition

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Zoonotic diseases have rapidly emerged as public health threats, alongside human modifications to the environment and ecological communities. Urban adapted human commensal species may support ectoparasite communities within and near urban areas, and in turn play a role in zoonotic disease emergence and transmission. The black rat *Rattus rattus* is globally distributed, and has been implicated in human disease for centuries; however its role in supporting ectoparasite communities in the cities that it has spread to around the world has not been fully explored. We examined the ticks parasitizing *Rattus rattus* in a remnant bush area within Sydney, Australia in order to explore the role of introduced rats in the ecology of ticks, and the relationship between *Rattus rattus* and ticks by testing rat characteristics as predictors of tick abundance. Here we show that six species of native Australian tick parasitize *Rattus rattus* in urban Australia. The majority of ticks parasitizing *Rattus rattus* are *Ixodes holocyclus*, a tick associated with significant impacts to companion animals, and some human health concerns. Two other species of *Ixodes*, *Ixodes hirsti* and *Ixodes tasmani*, were also common. Surprisingly, we found that ticks were more abundant on *Rattus rattus* in better condition. Our study shows that *Rattus rattus* supports a rich assembly of ticks in a remnant forest in urban Australia, and that as the *Rattus rattus* in best condition have the most ticks, tick parasitism at the level observed does not appear to negatively impact *Rattus rattus*. Urban human commensals, such as *Rattus rattus*, may play be important hosts for ticks in human modified environments, and further study should investigate the roles of these species in both tick and disease ecology.

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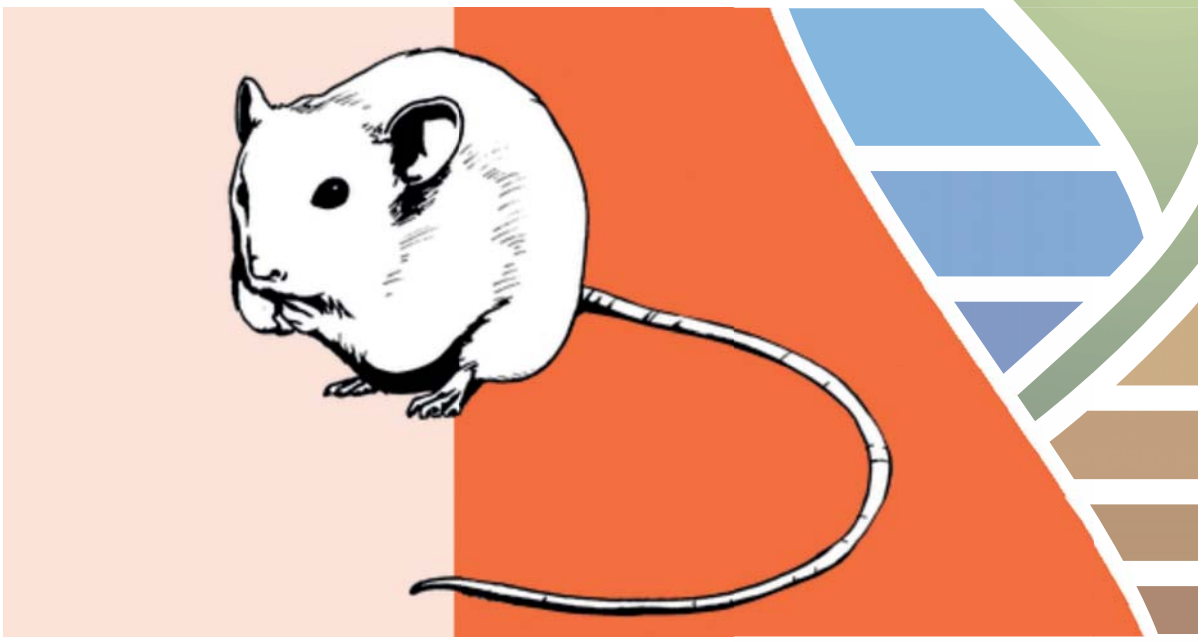

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