



A prickly case of coexistence? Or a blunt case of competition?

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The Galápagos Rice rats

Originally, the Galápagos Islands were home to 12 endemic rat species (right) but, following the introduction and spread of the Black rat, *Rattus rattus*, 8 of these fell extinct, apparently from competitive exclusion . . .

In 1997, however, the Santiago Galápagos Rice rat, *Nesoryzomys swarthi* (right), was rediscovered surviving alongside *Rattus* for over 400 years, raising the question:

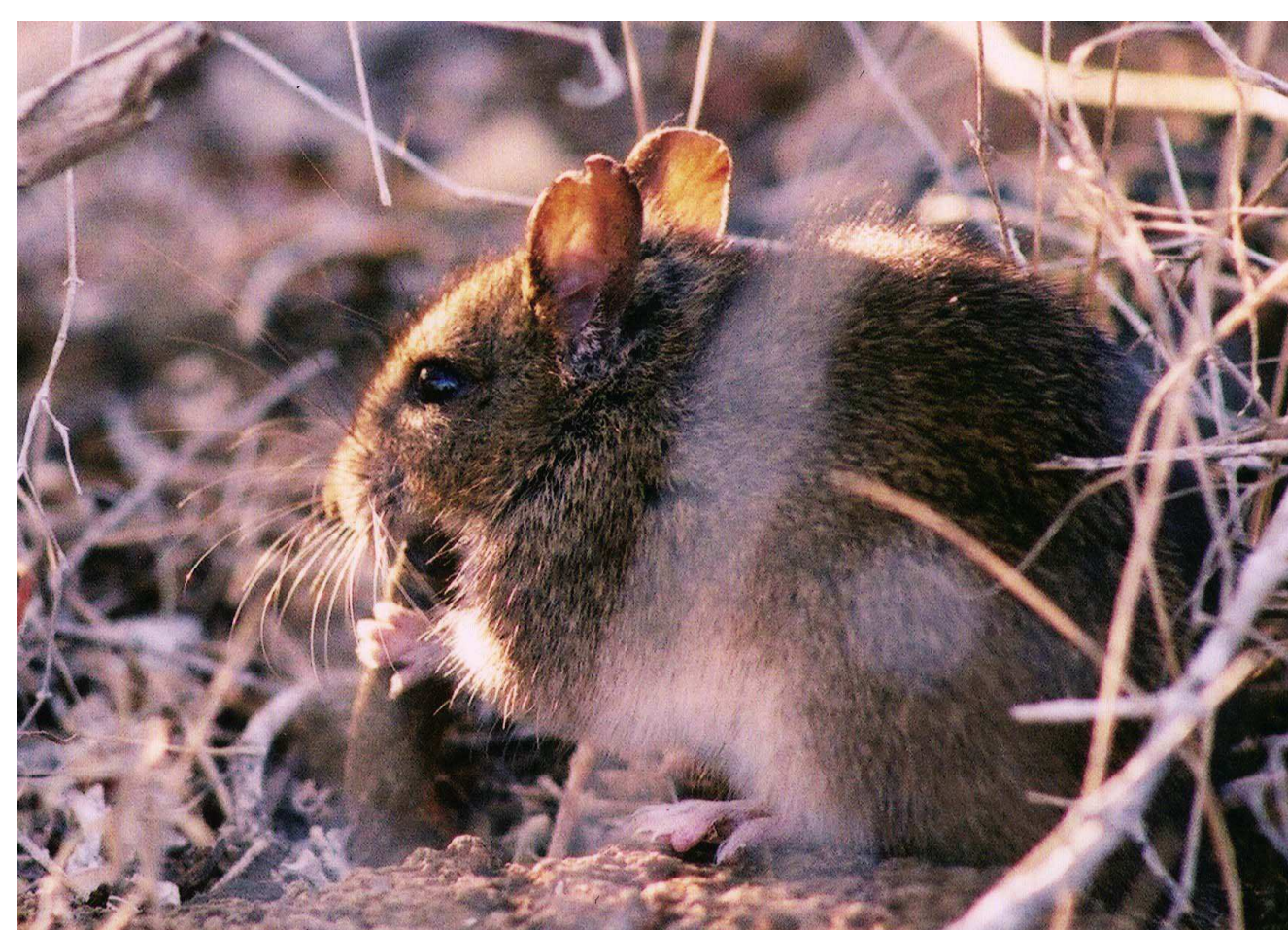
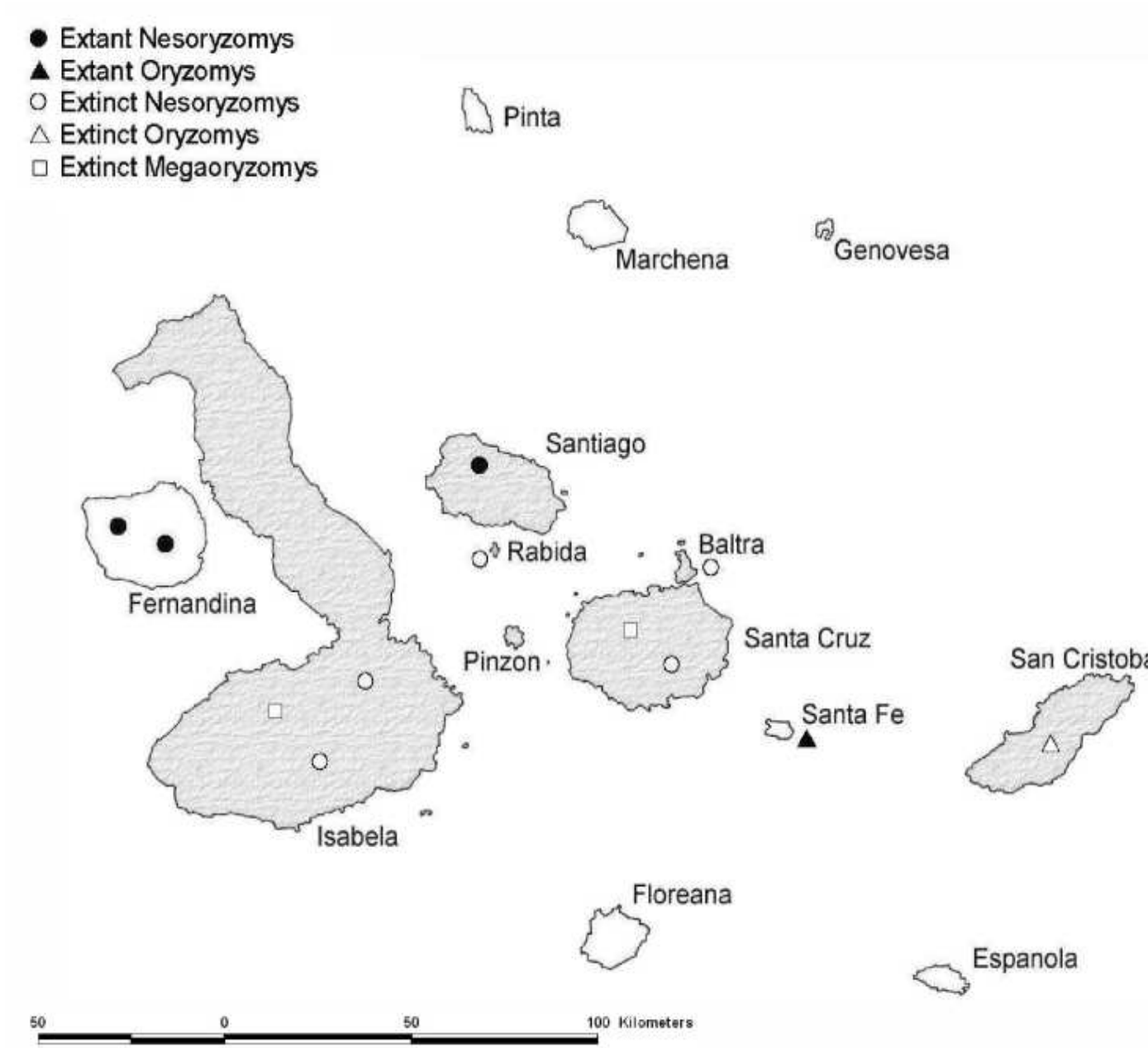
How do they coexist?

Previous research

Nothing was known about *Nesoryzomys* until recent Wild-CRU research revealed:

- *Rattus* and *Nesoryzomys* compete;
- *Rattus* are dominant to *Nesoryzomys*;
- both species are active throughout the night

The aim of this work was to determine the mechanism(s) underpinning their unlikely coexistence, particularly with regards to their dietary habits.



Foraging habits

Using spool-and-line tracking (right; inset) and random measures of local food availability, 100 *Nesoryzomys* and 35 *Rattus* revealed what foods they selected under normal foraging conditions, allowing me to address the following questions:

Do the species prefer the same foods?

Individual cafeteria trials revealed that both species prefer the same foods; fleshy fruits of local bushes, and although not preferred, *Nesoryzomys*, but not *Rattus*, ate cactus foods.

Do the species forage for the same foods?

Analysis of the spool-and-line tracking data revealed that despite preferring fleshy fruits, *Nesoryzomys* foraged for cactus foods (right; Og). *Rattus* foraged for its preferred fleshy fruits and did not visit cactus foods more frequently than at random.

Season and sex variation

Season and sex specific analyses revealed that breeding female *Nesoryzomys* foraged for fleshy fruits, favoured by *Rattus*, and so were more susceptible to aggressive encounters with *Rattus* than males that foraged for cactus foods. During the non-breeding season both sexes foraged for cactus foods despite preferring seeds that were preferred by *Rattus*.

Faeces reingestion or coprophagy

Seasonal drought causes a food/water shortage on Santiago that *Nesoryzomys* overcomes by consuming cactus foods (right; fruits) and, importantly, by reingesting its faeces, particularly during drought and in areas where there are abundant cactus fruits.

Rattus does not practice coprophagy and its population plummets during drought, suggesting that coprophagy affords *Nesoryzomys* a survival advantage.

In conclusion, through 3m years of coevolution with endemic cacti *Nesoryzomys* has evolved the capacity to use it as a competition refuge from *Rattus* and a resource refuge during drought. As a consequence of these findings, cactus presence has become a key selection criterion for proposed *Nesoryzomys* translocation sites (right).

