

What are the effects of non-native mammals on frugivory dynamics?

“Non-native mammals negatively affect native frugivory in the Eastern Caribbean islands”

- Seokmin Kim, Fabio Tarazona-Tubens, Max Vollstädt, Fernando Gonçalves, Emmeli Agerskov Claré, Andreas Krogh Norrild, Hanna Welzel, Tianying Zhang, Mark Hulme, Christopher Kaiser-Bunbury, Mauro Galetti, Benno Simmons, Bo Dalsgaard, Christopher Searcy

in Review: Biological Invasions



Plant-frugivore interactions



PC: Laís Lautenschlager

Plant-frugivore interactions

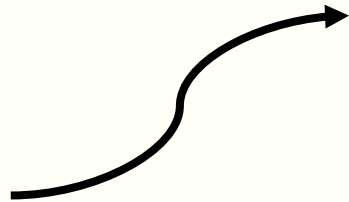
- Seed dispersal



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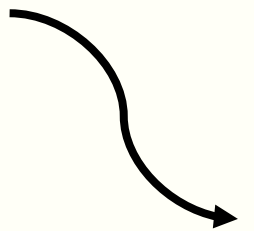
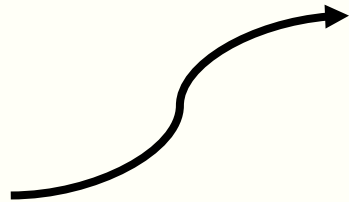
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CENSORED

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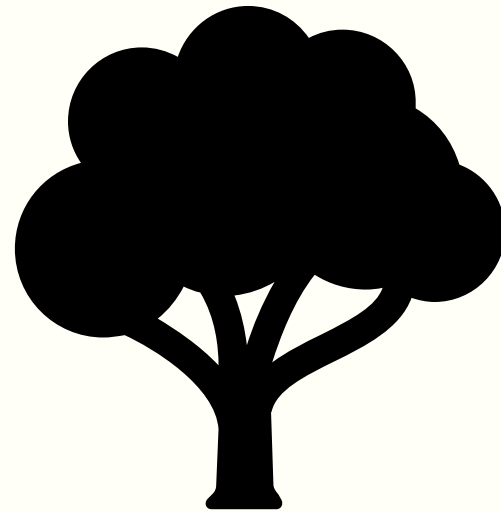
- Seed dispersal
- Benefits 90% of tropical woody plants (Onstein et al., 2017)



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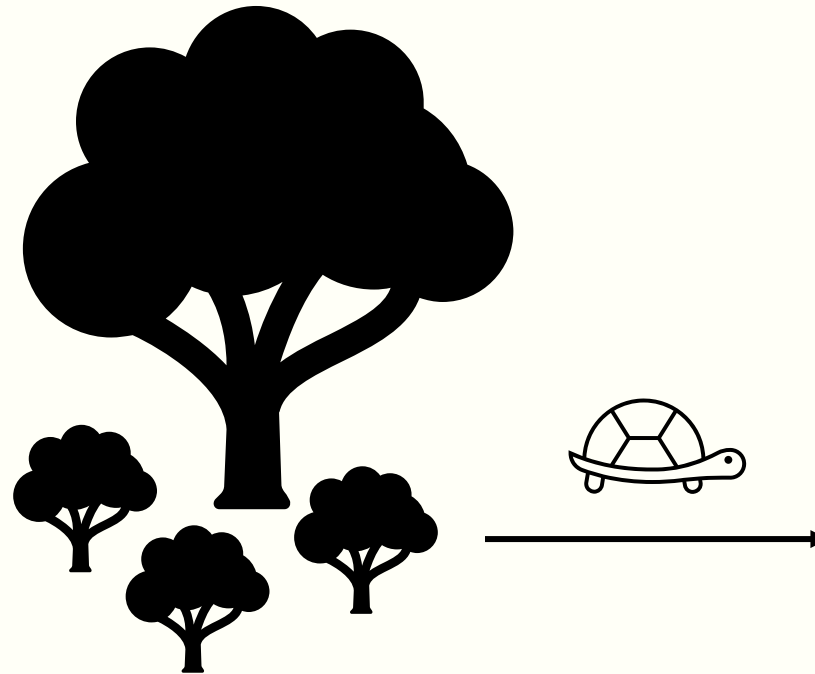
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Plant-frugivore interactions



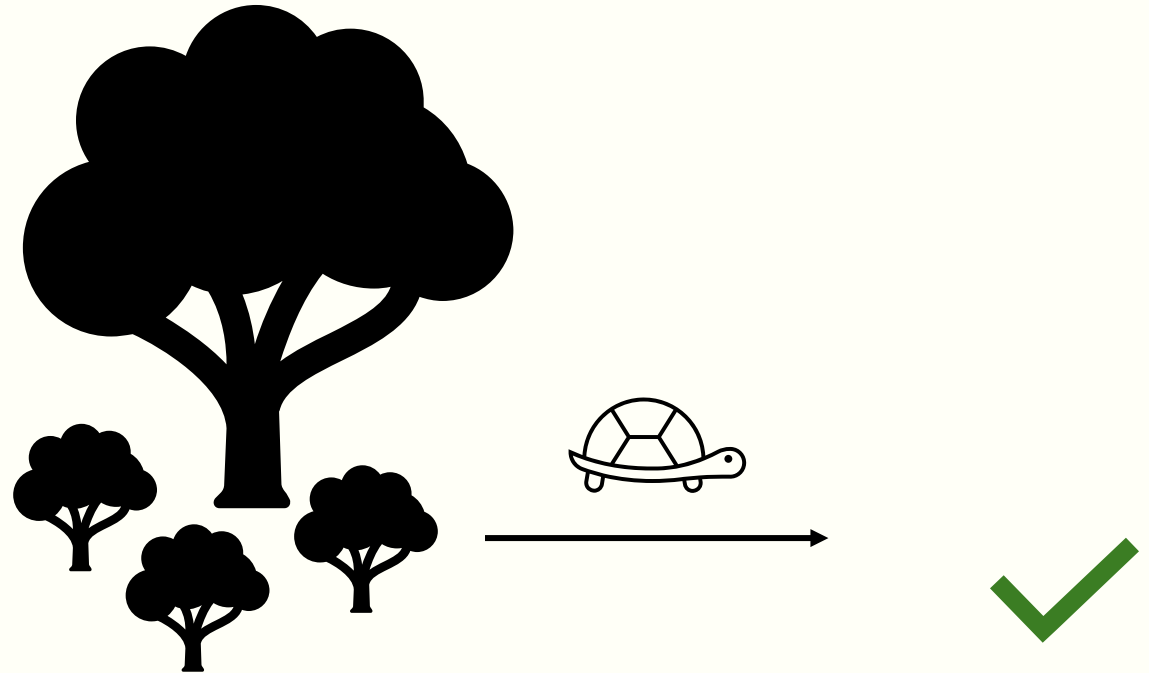
Plant-frugivore interactions

- 1) Remove seeds away from high density area close to the parent plant



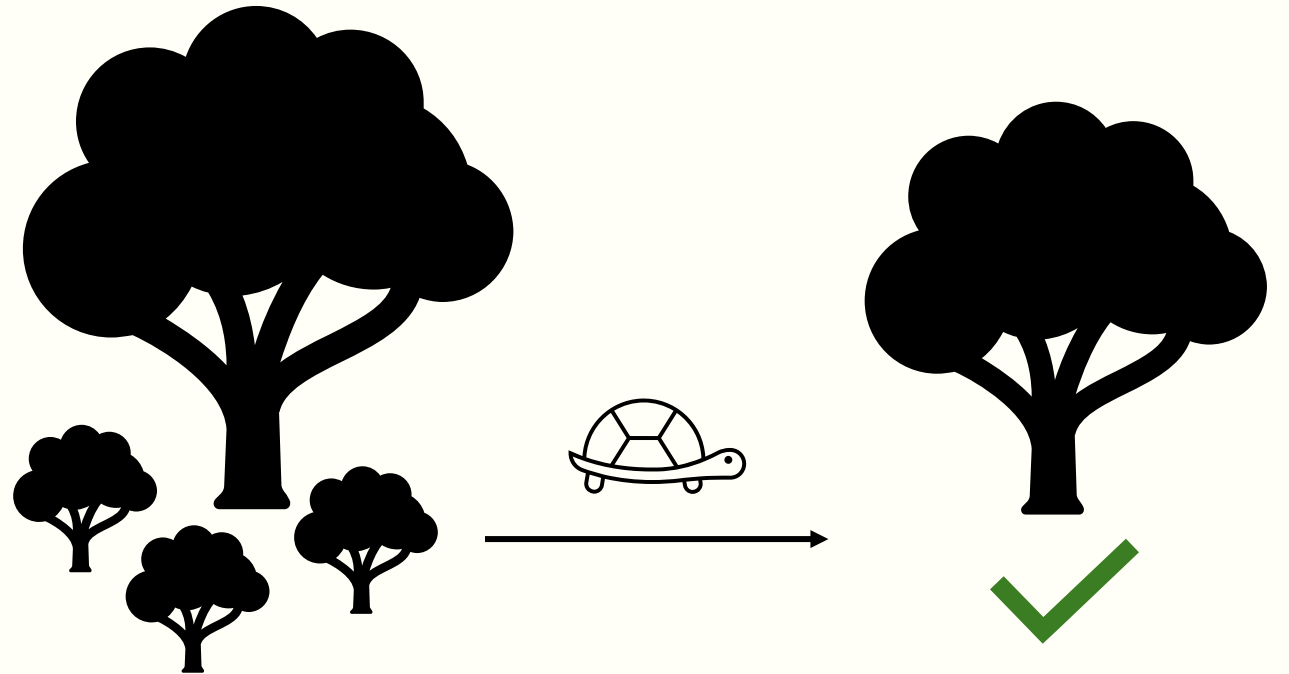
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- 2) Deposit seeds in favorable locations



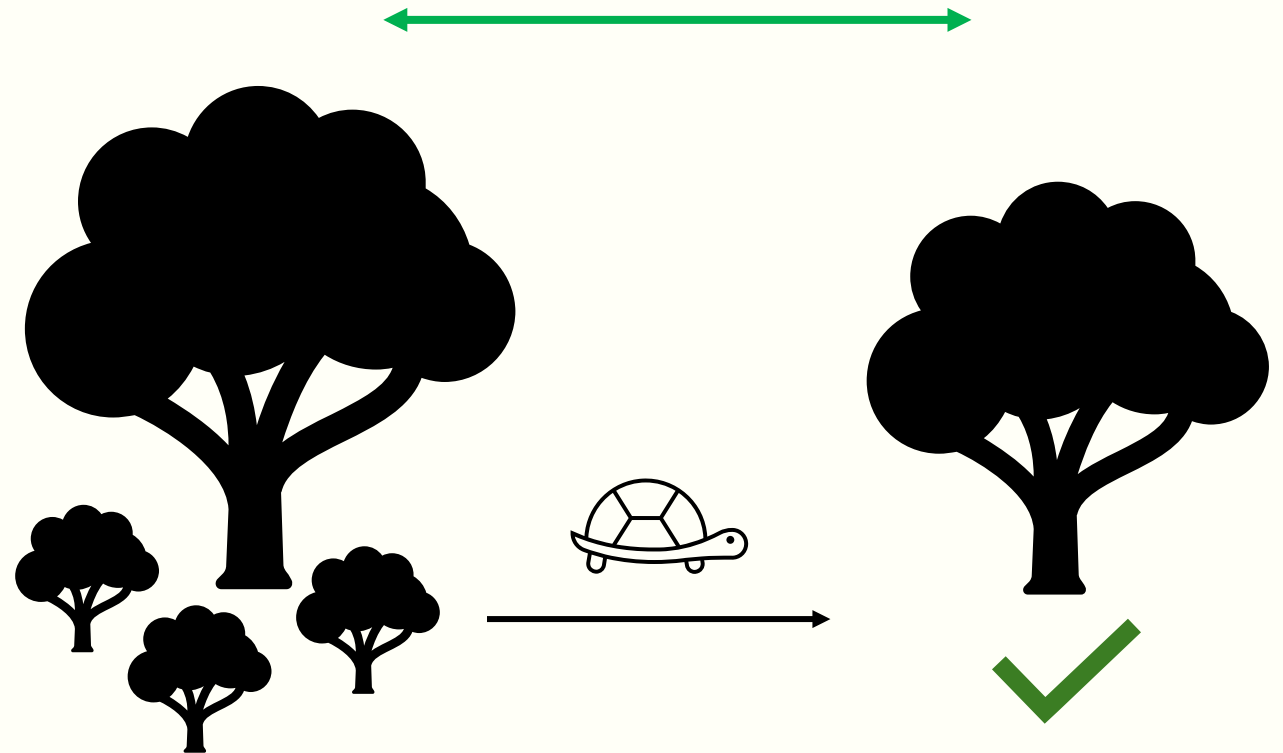
Plant-frugivore interactions

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- 3) Enhance germination rates



Plant-frugivore interactions

- 1) Remove seeds away from high density area close to the parent plant
- 2) Deposit seeds in favorable locations
- 3) Enhance germination rates
- 4) Promote gene flow



Biological invasions

- Disturbs important ecological processes

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- Loss of native interactions

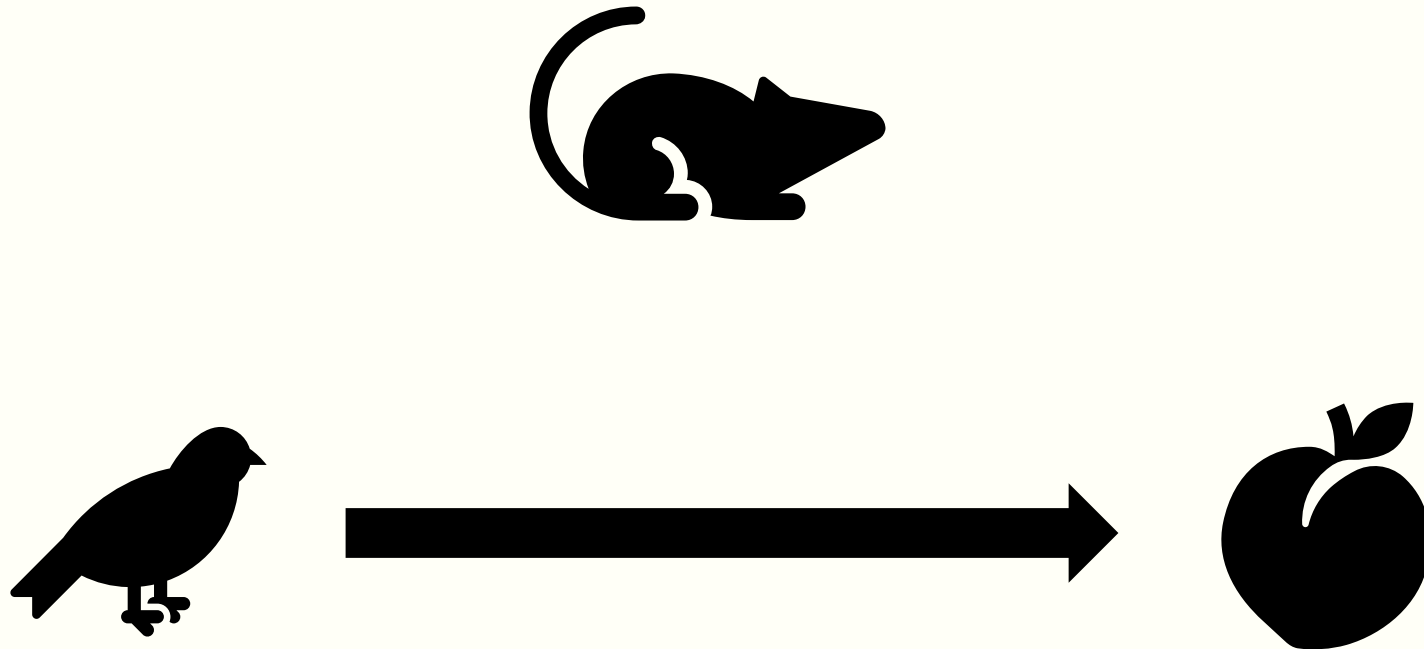
Biological invasions

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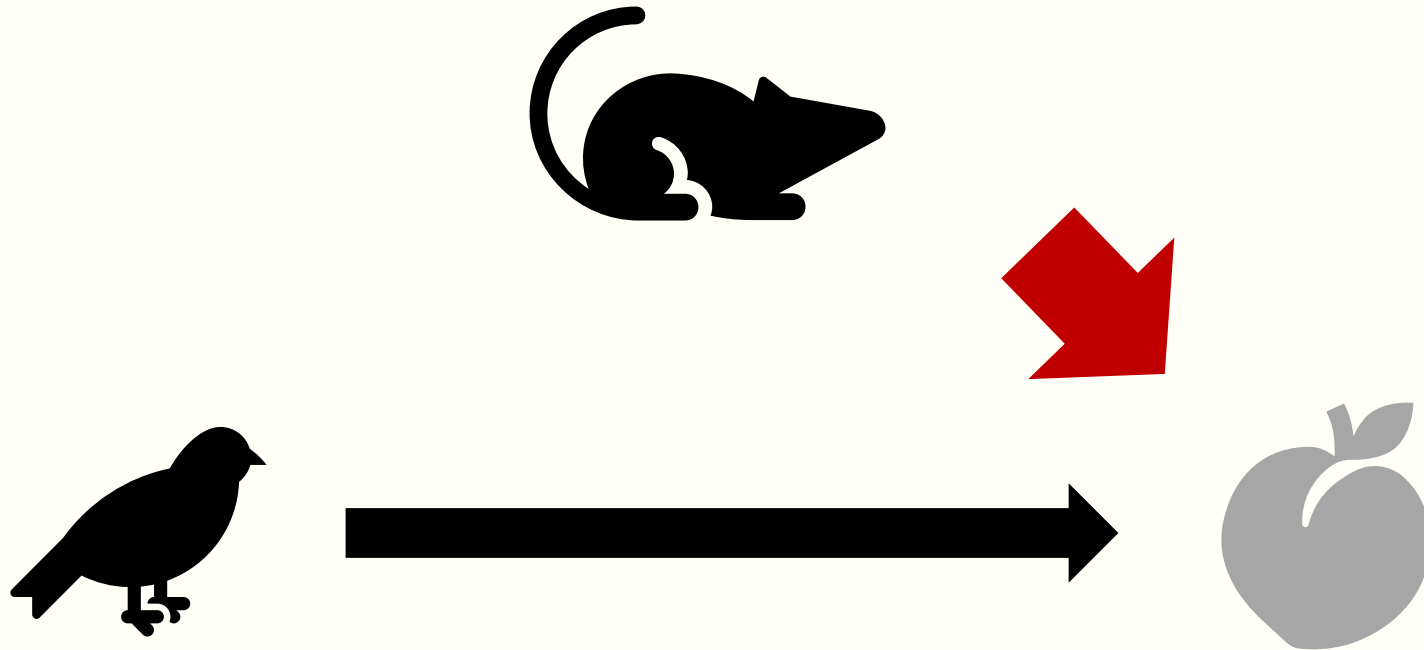
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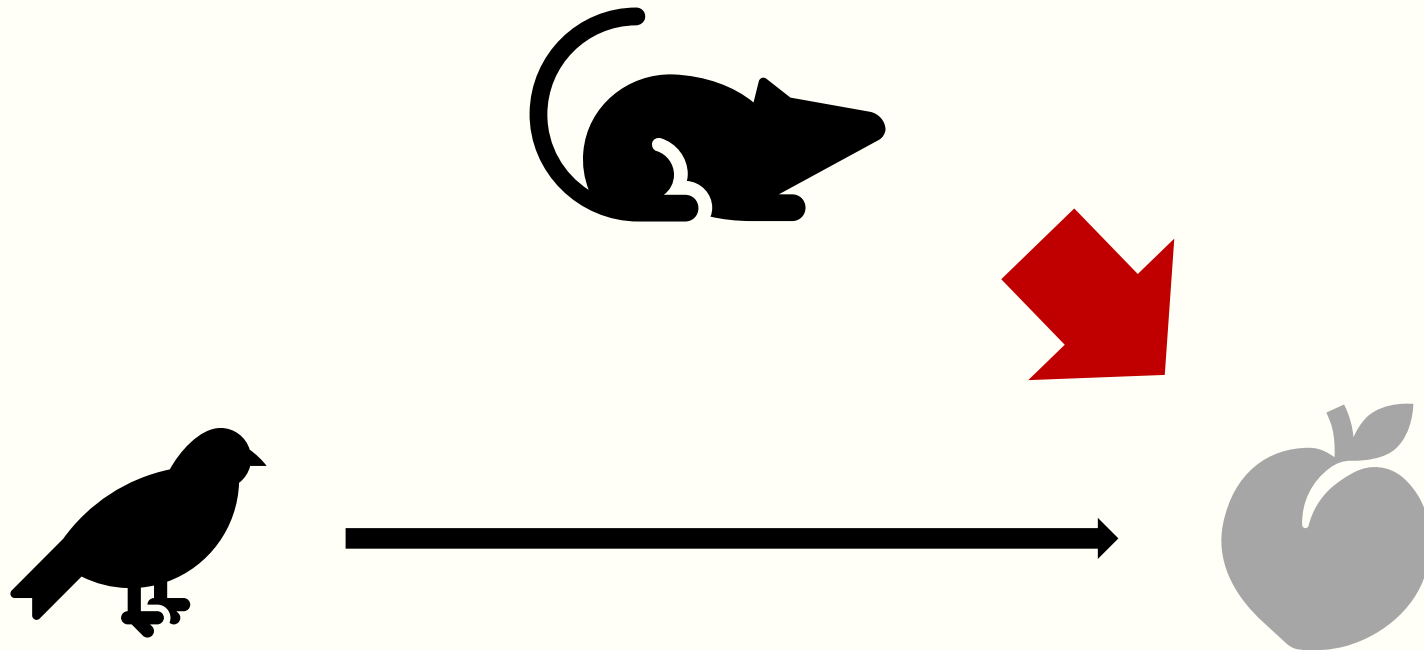
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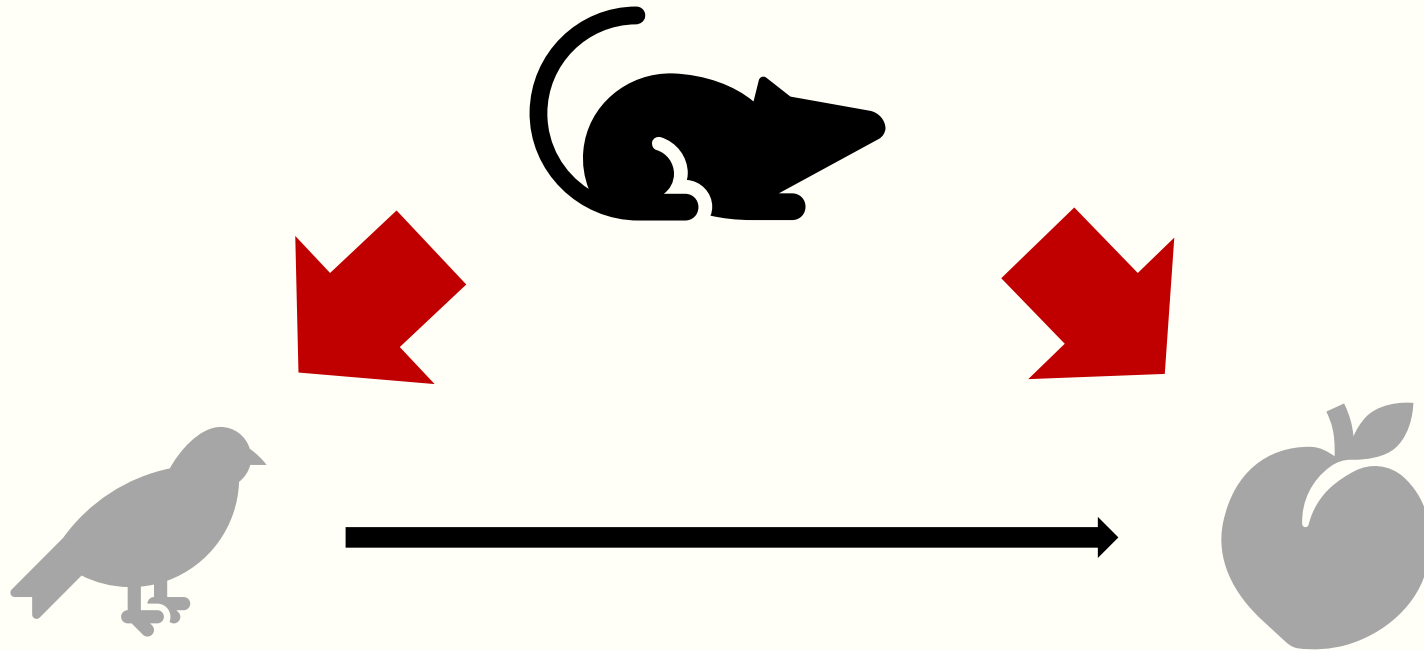
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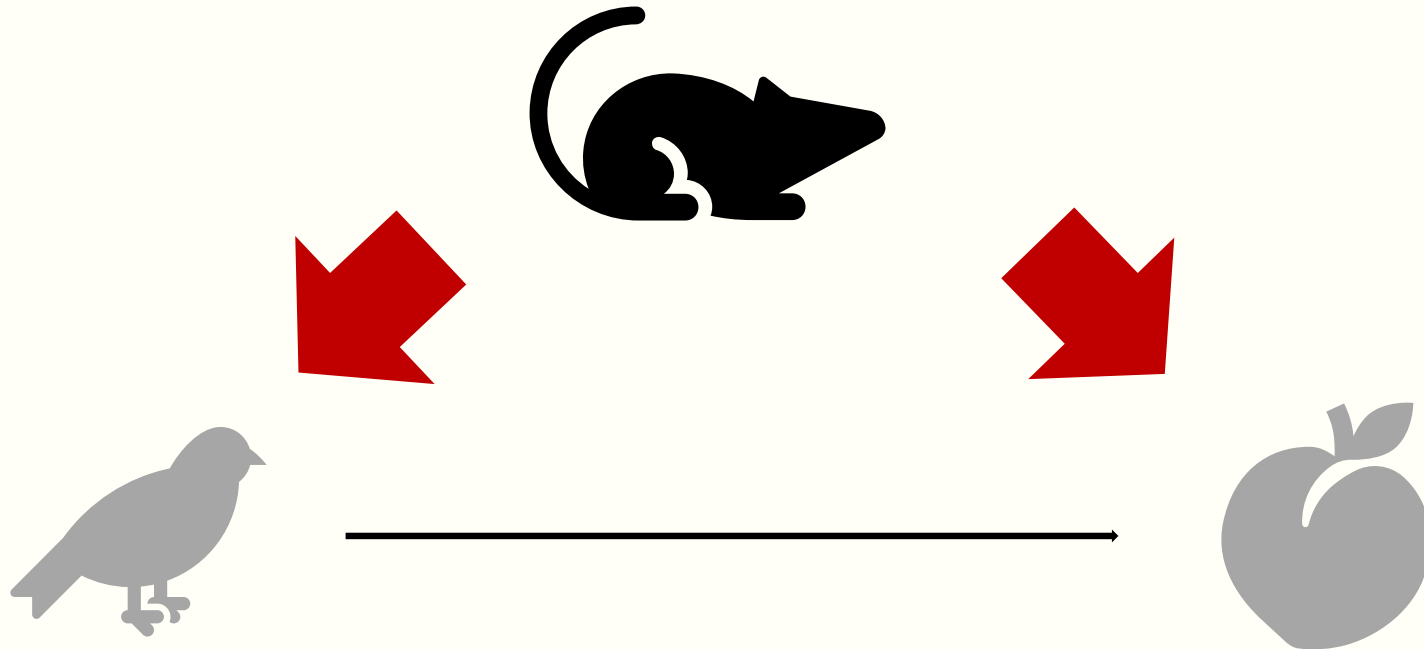
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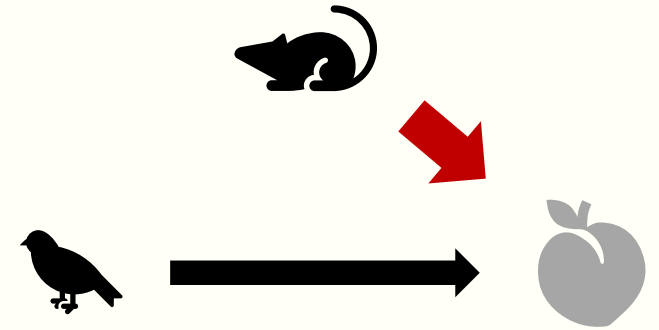


Non-native mammals

Non-native mammals (esp rats!)

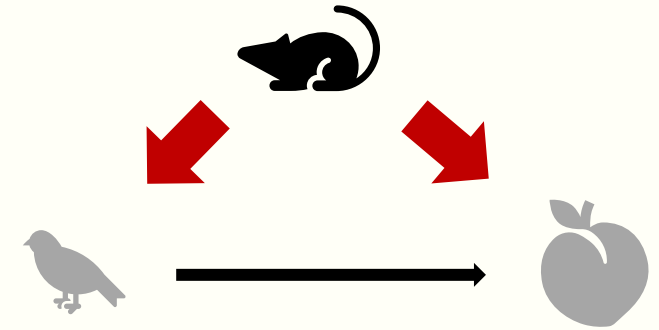
Non-native mammals (esp rats!)

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- Directly harming plants
- Suppression of native frugivorous animals



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- Decreases in native frugivory rates

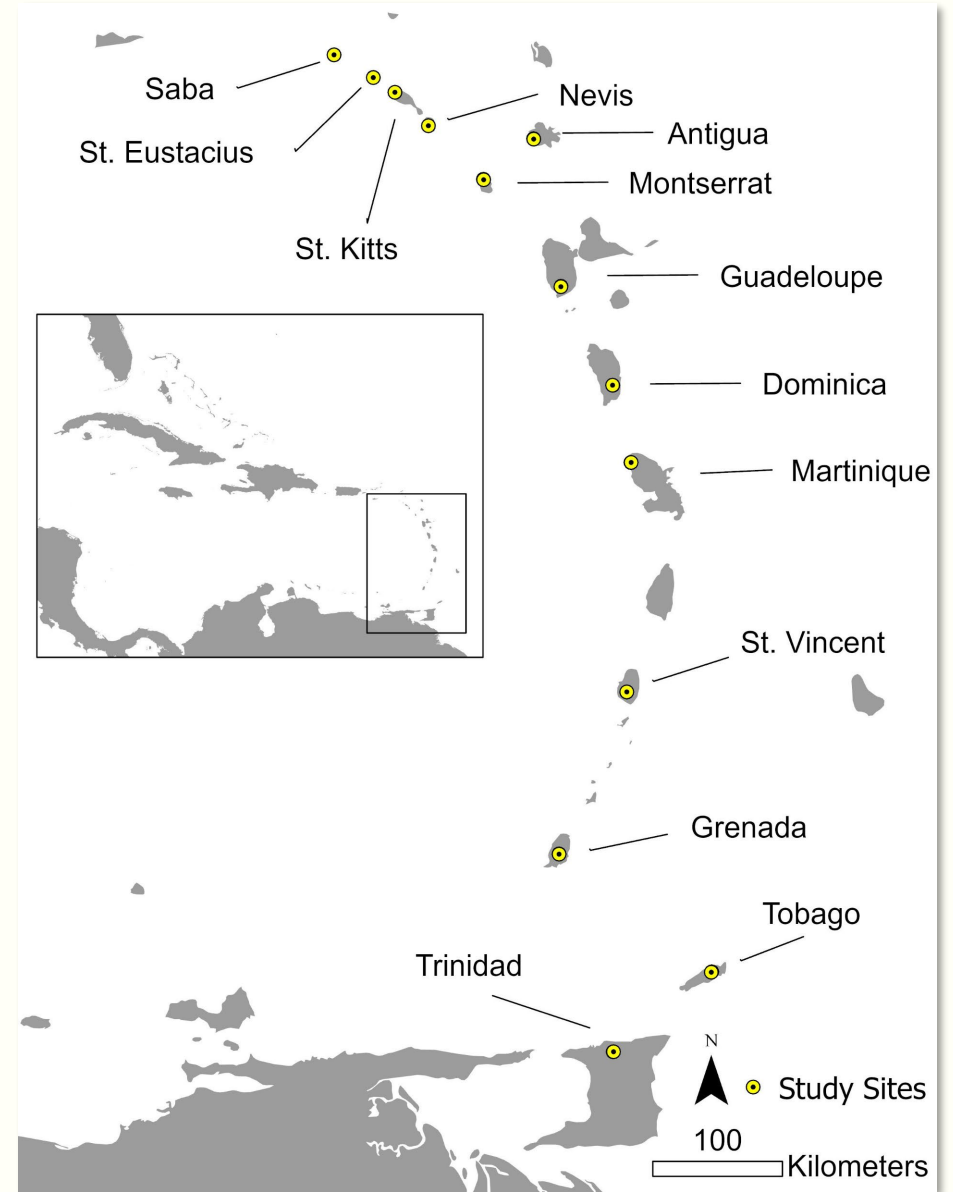


What are the effects of non-native mammals on plant-frugivore interactions in the Eastern Caribbean?

- Decreases in native frugivory rates
- Dominates local plant-frugivore interactions

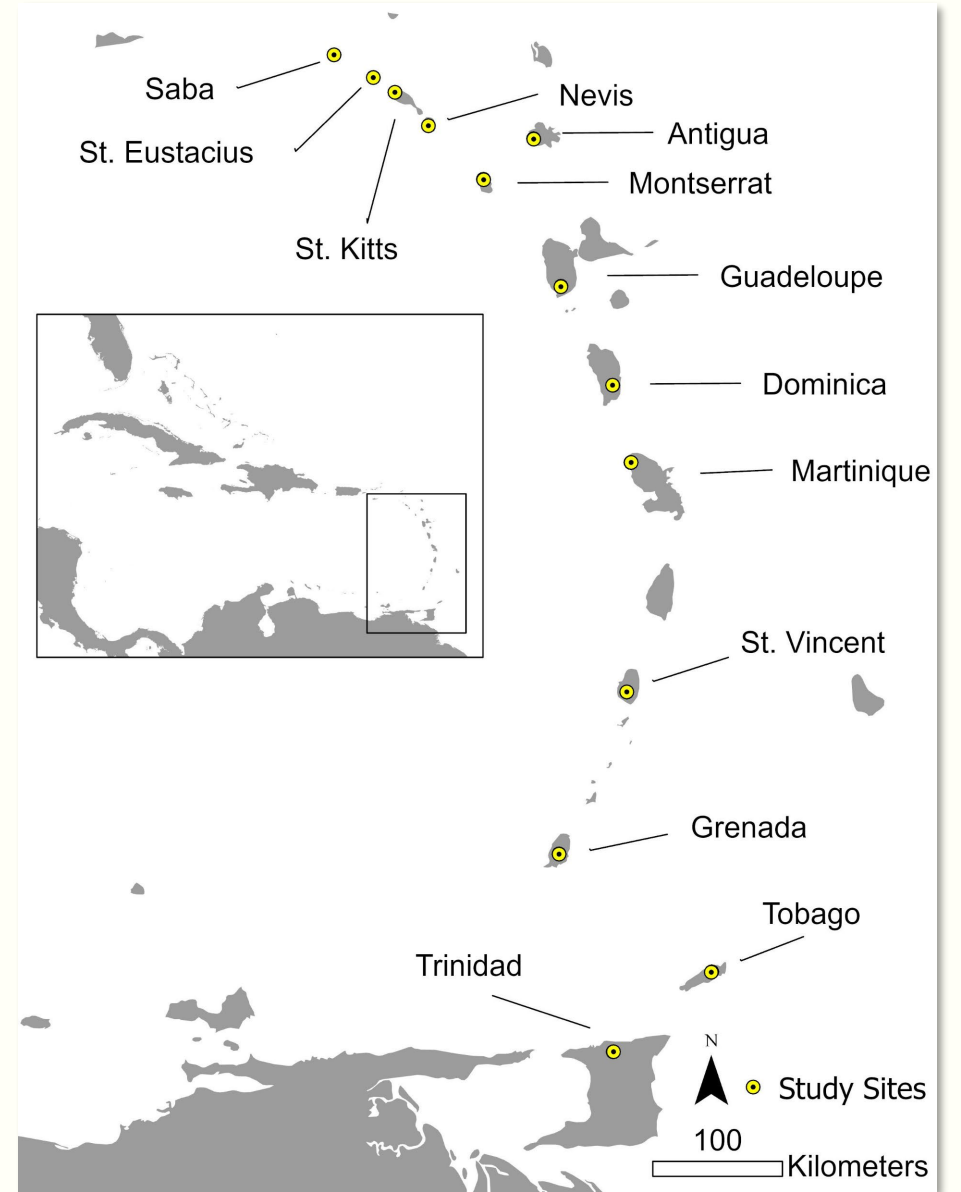


Eastern Caribbean



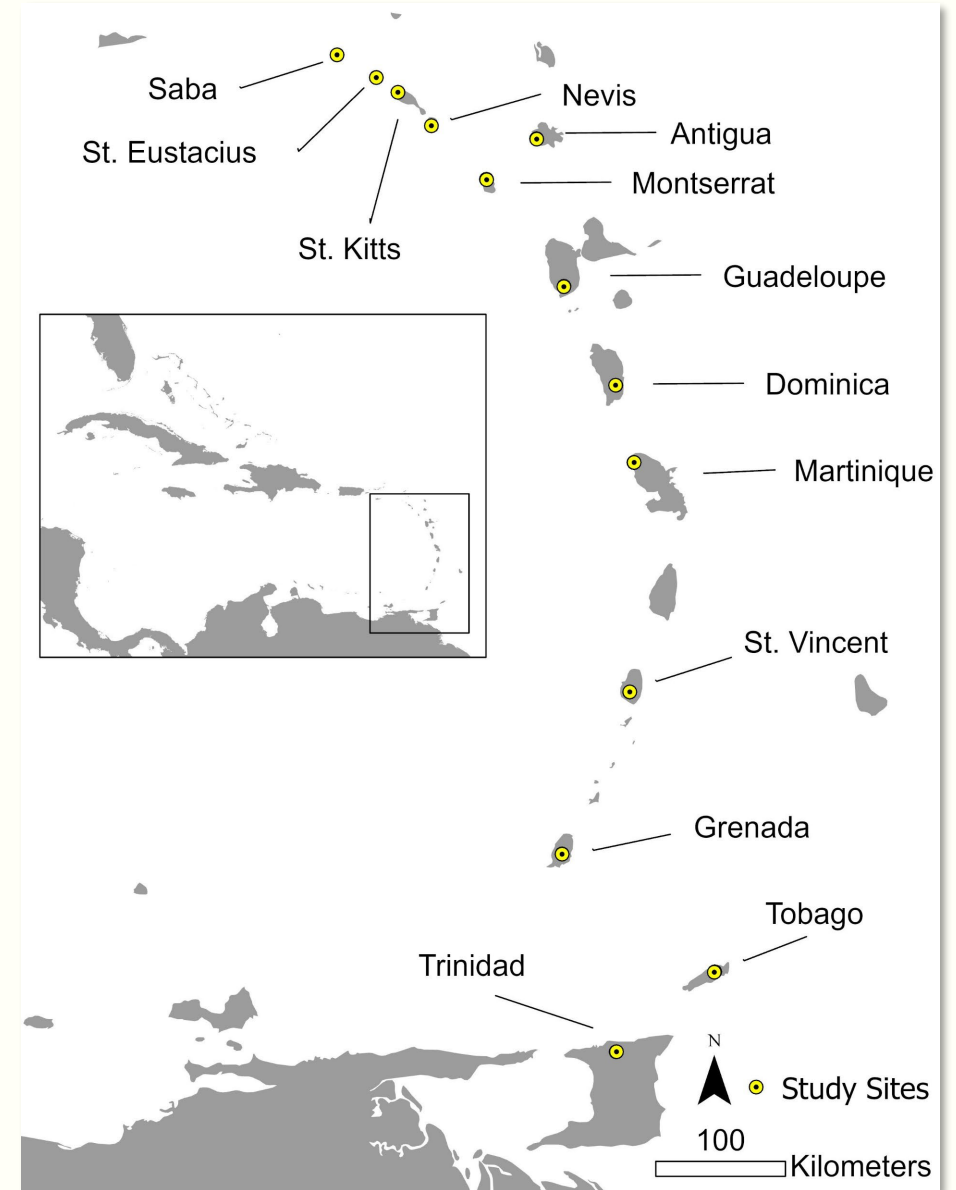
Eastern Caribbean

- Volcanic origin



Eastern Caribbean

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- Highland (>500m) focus



Methods – artificial fruits



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- Mimics real fruits and provides a standardized way to assess frugivore dynamics



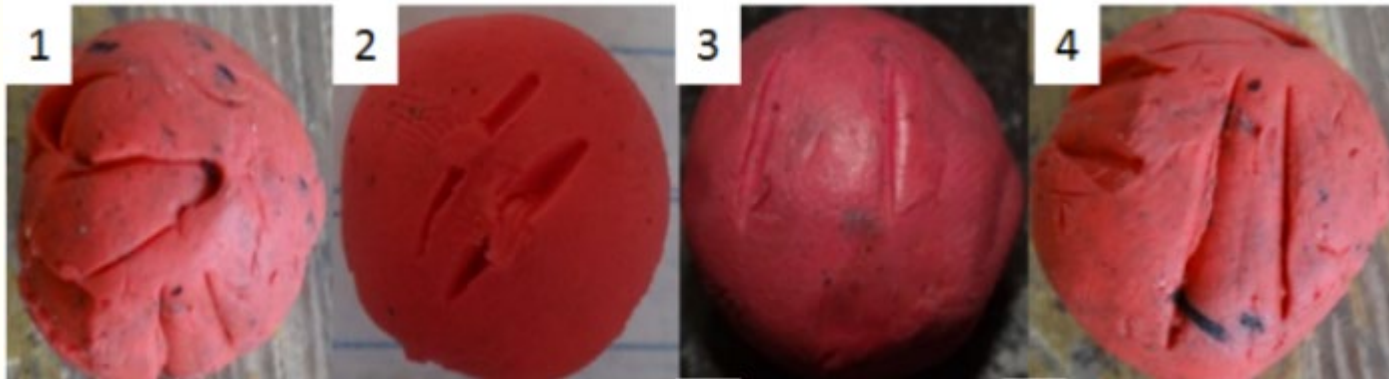
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P.C.: Mauro Galetti and Rafael Souza



Methods – artificial fruits

- 15 artificial fruits x 12 plants
- Two 1-hectare plots (360 fruits per island)
- Checked after 72 hours



Methods – camera traps



Methods – analysis

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Methods – analysis

- Two metrics: frugivory rates (plasticine fruits) and frugivore activity (camera traps)
- Do avian frugivory rates decrease with increases in non-native mammal activity?
 - Linear mixed-effects regression
- What is the relative strength of non-native mammal activity in predicting total frugivory rates?
 - Model selection approach (Biotic, biogeographic, local, and socio-economic characteristics)

Results

- 80% of all frugivorous activity from camera traps were non-native mammals



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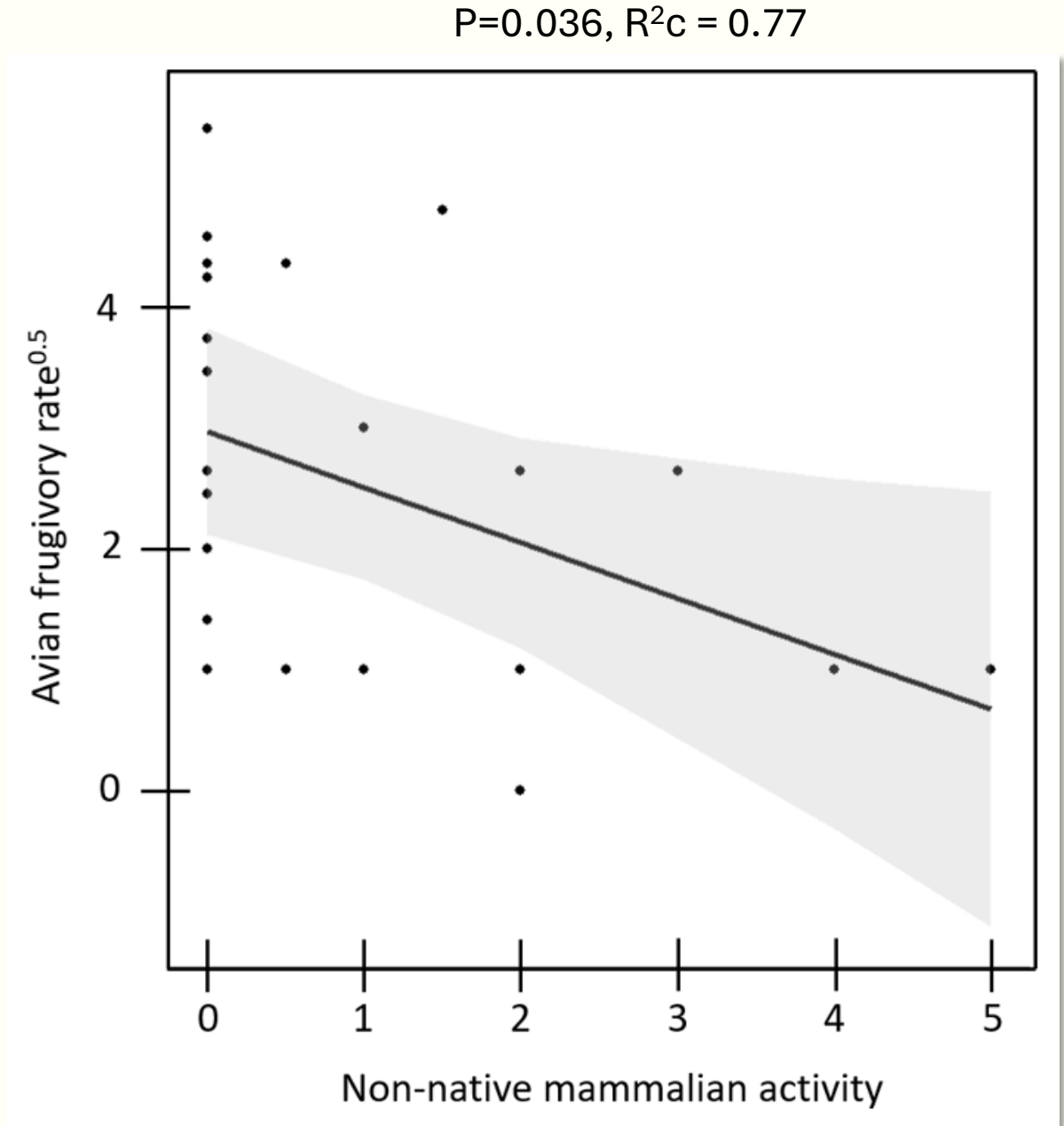
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 - Thrashers
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 - Puppy!



Results

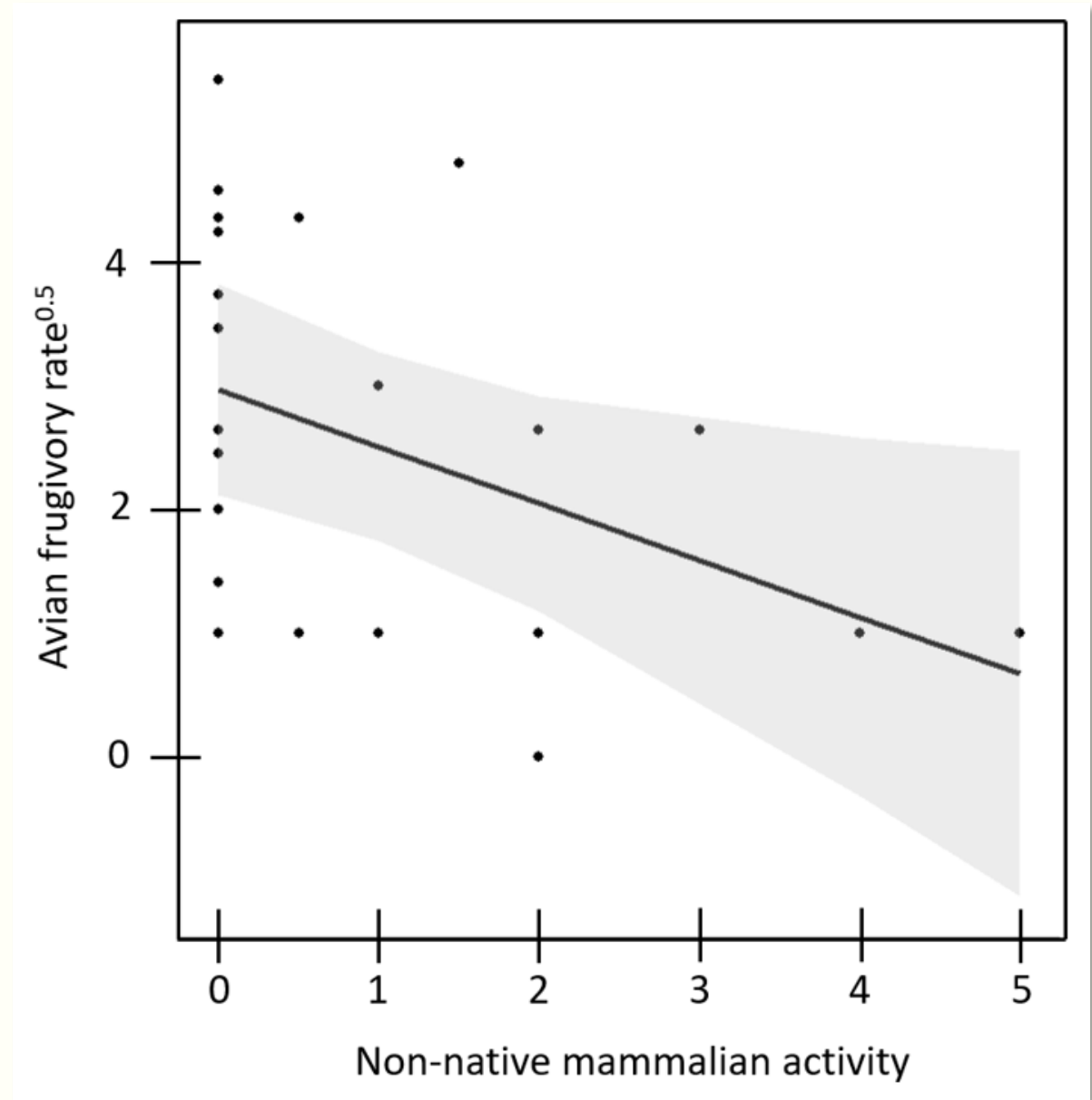
- Increased non-native mammal activity leads to declines in native bird interactions



Results

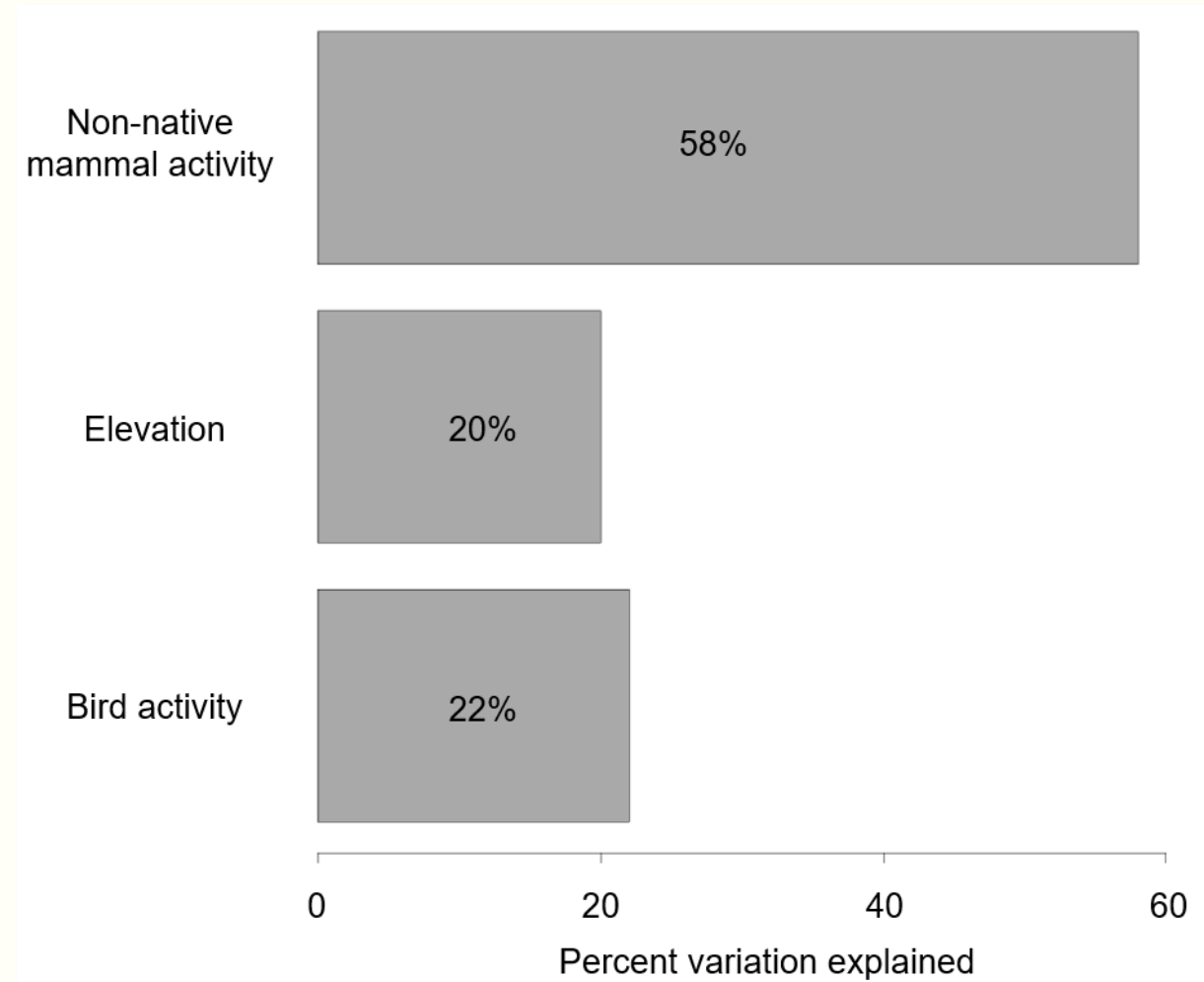
- Increased non-native mammal activity leads to declines in native bird interactions
- Non-native mammal activity best explains total frugivory rates.

$P=0.036$, $R^2_c = 0.77$



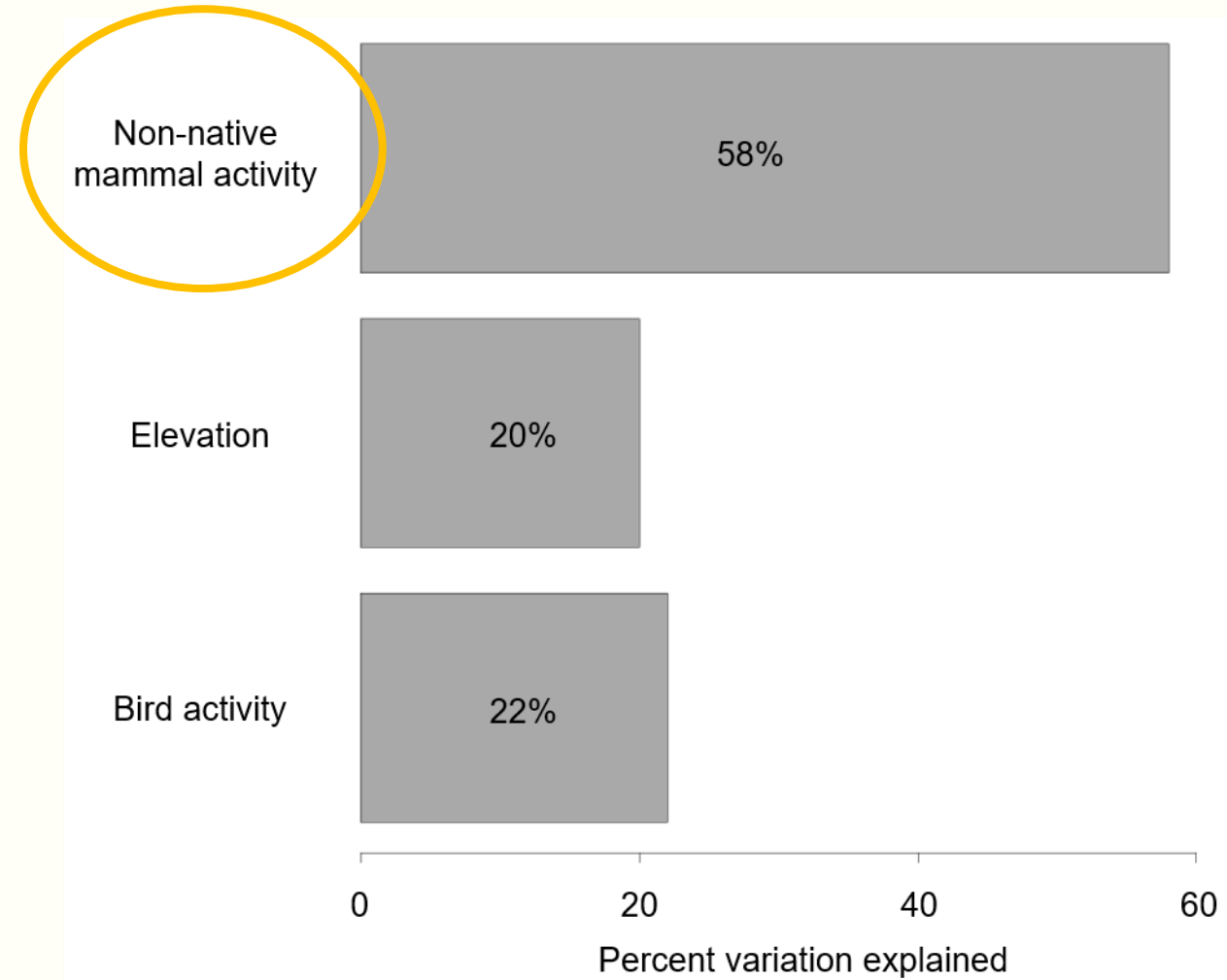
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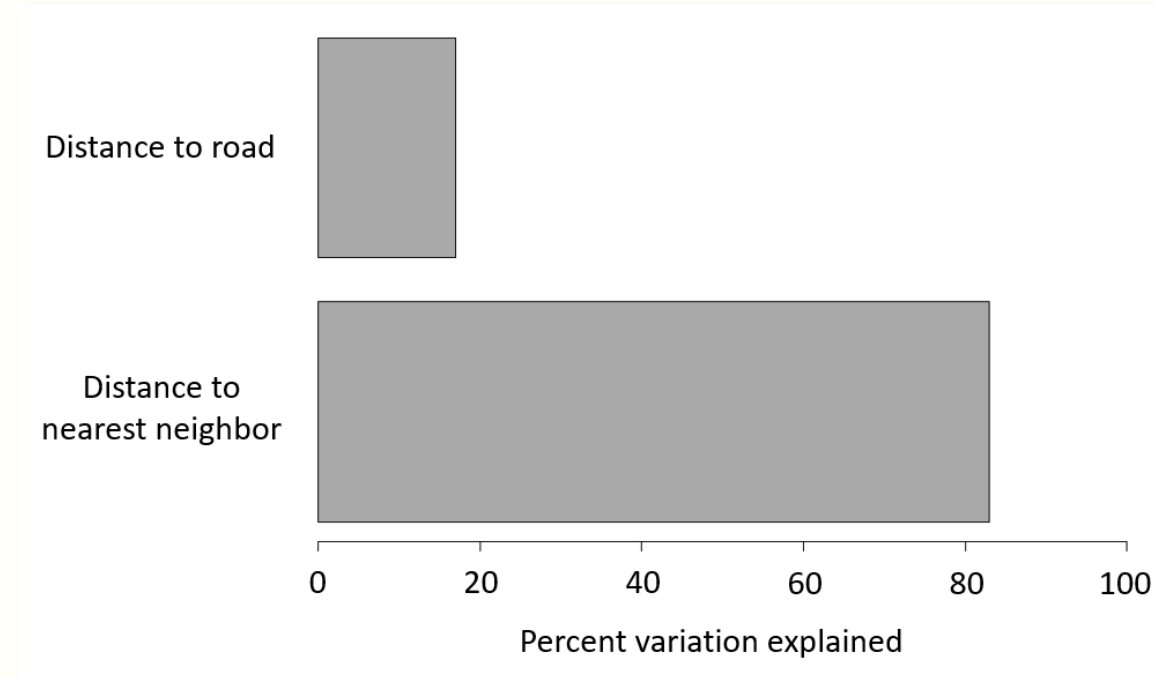
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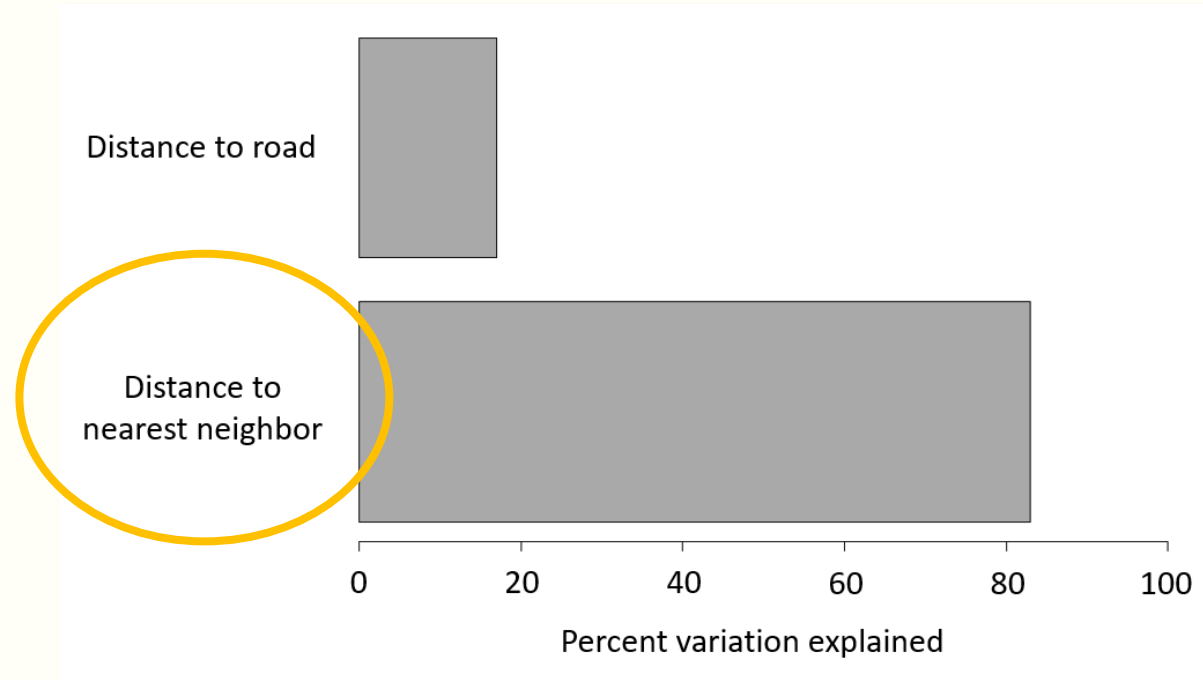
Results

- Increased non-native mammal activity leads to declines in native bird interactions
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- Distance to nearest island best explains non-native mammal activity levels



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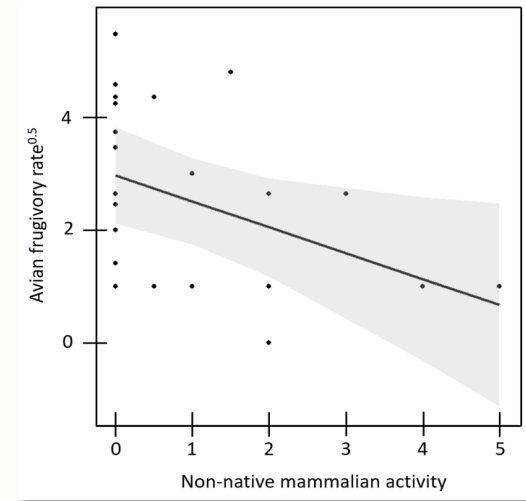
Discussion

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- Rats are everywhere

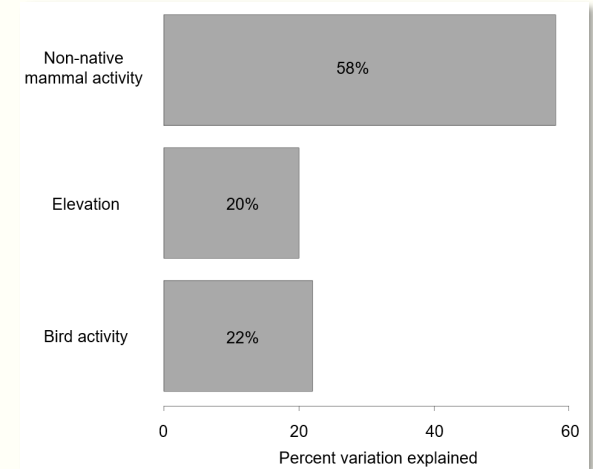
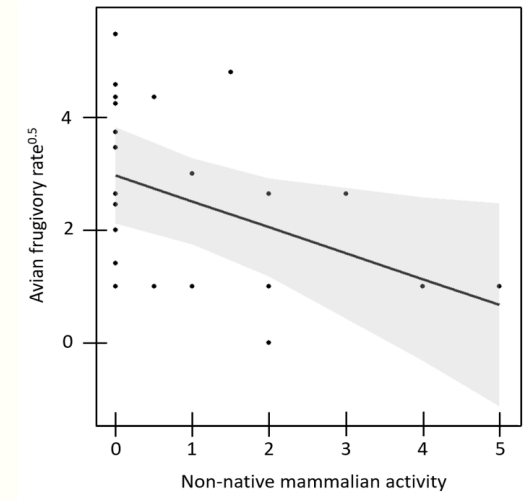
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- Rats are everywhere
- Non-native mammals (esp. rats) are suppressing native frugivory interactions.



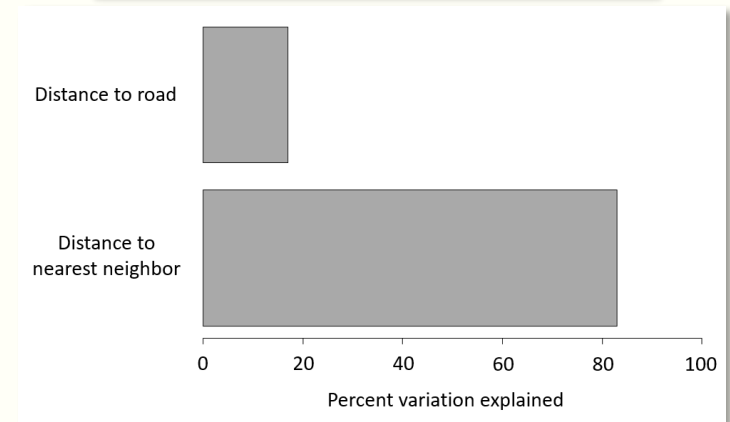
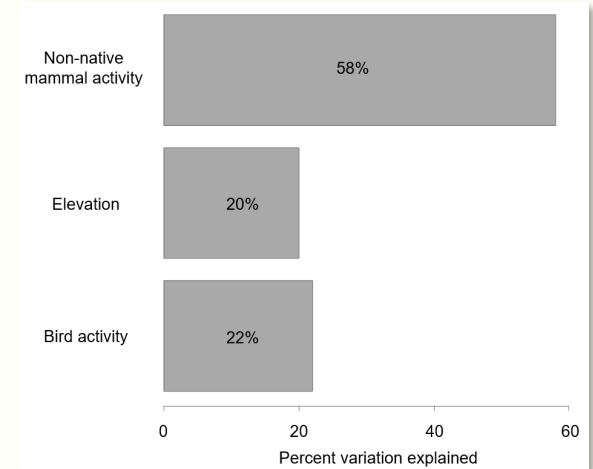
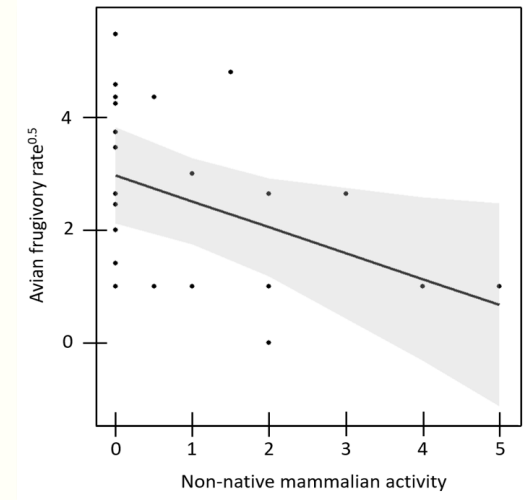
Discussion

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- Non-native mammals are dominating frugivory dynamics of the region.



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- Non-native mammals are dominating frugivory dynamics of the region.
- Island connectivity is associated with non-native mammal activity

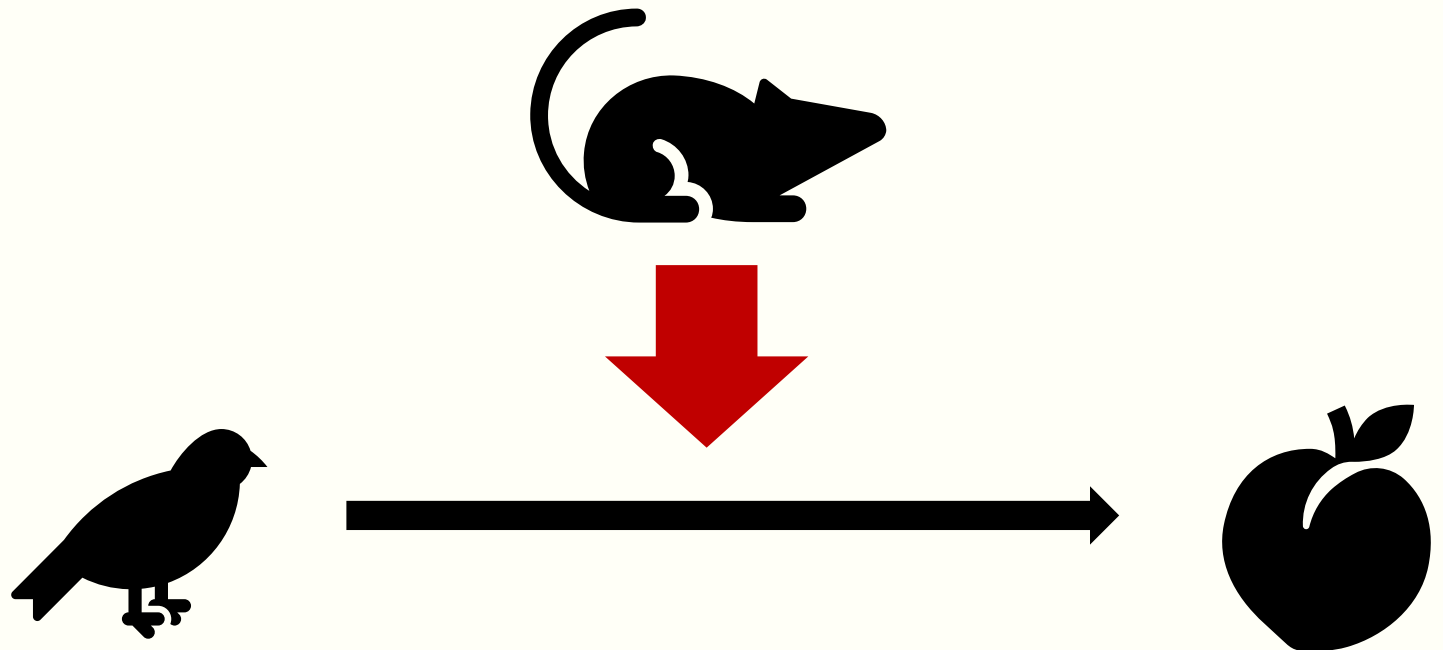


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- Bodes poorly for the region

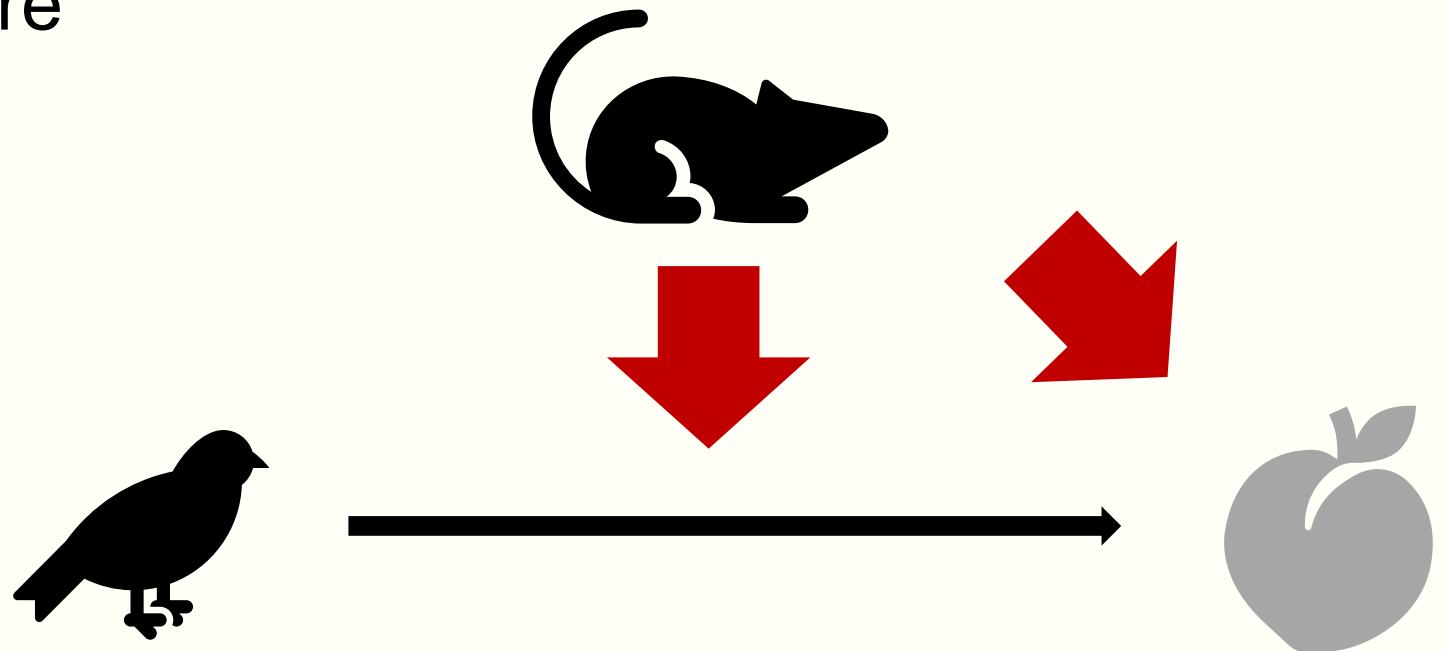
Discussion

- Bodes poorly for the region
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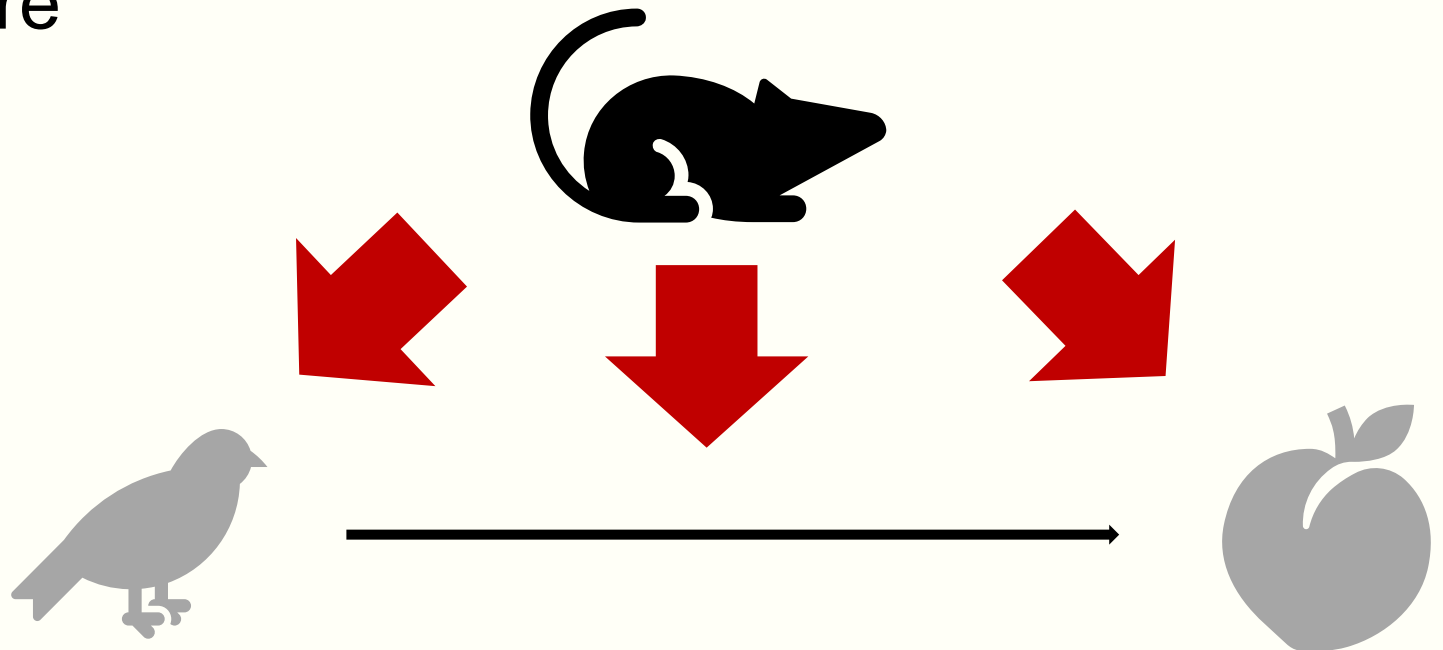
Discussion

- Bodes poorly for the region
- Suppressing native frugivore interactions
- Most common frugivore



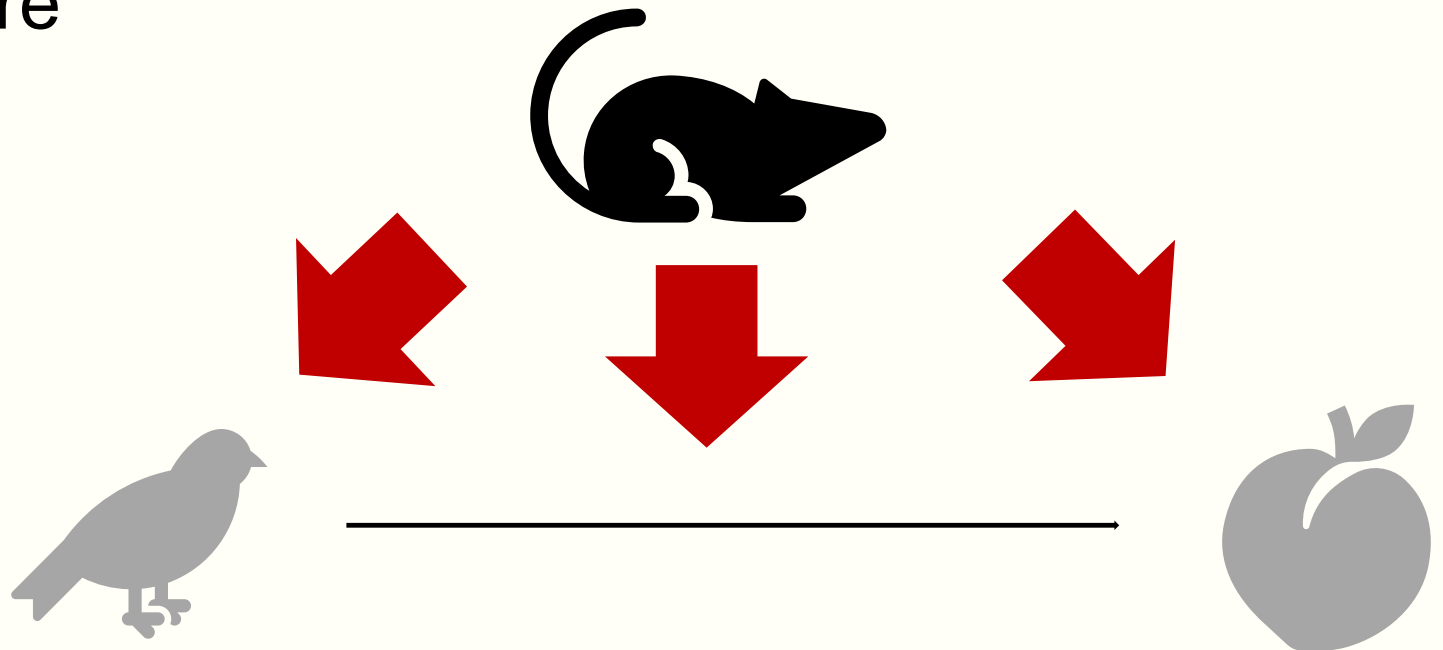
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Discussion

- Bodes poorly for the region
- Suppressing native frugivore interactions
- Most common frugivore
 - Seed predation



Thank you!

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