

Survival of gray and black Eastern Gray Squirrels translocated across an urbanization gradient

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Rodger Sherman ✓

@rodger



1. did you attend a college with squirrels on campus
2. did people assert that your school's squirrels were, in some way, different from most squirrels

1:26 PM · Dec 18, 2018 · Twitter for iPhone

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Melanism in the EGS: genetics

“melanic”

Wild Type (E^+/E^+)



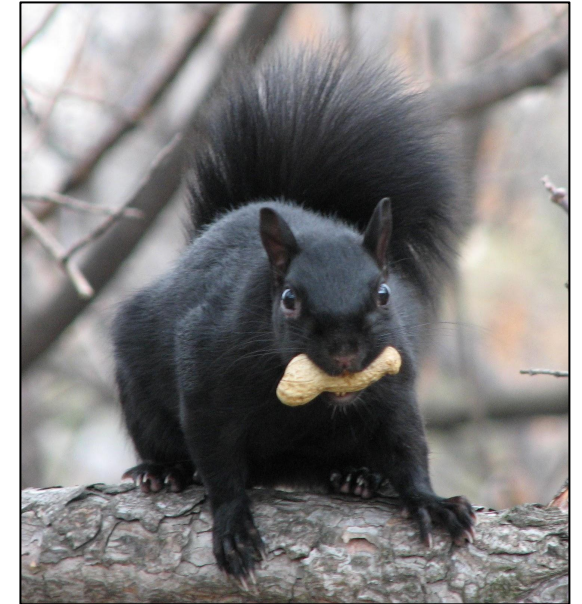
https://en.wikipedia.org/wiki/Eastern_gray_squirrel#/media...

Brown Black (E^+/E^B)



https://www.jungledragon.com/image/36439/melanistic_squirrel.html

Jet Black (E^B/E^B)

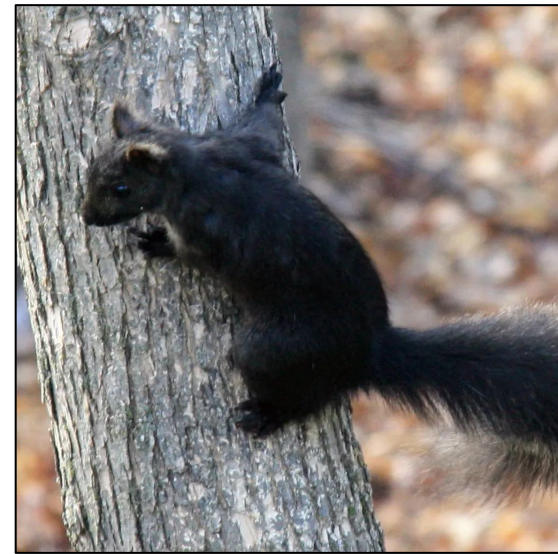


https://commons.wikimedia.org/wiki/File:Eastern_Grey_Squirrel-black.jpg

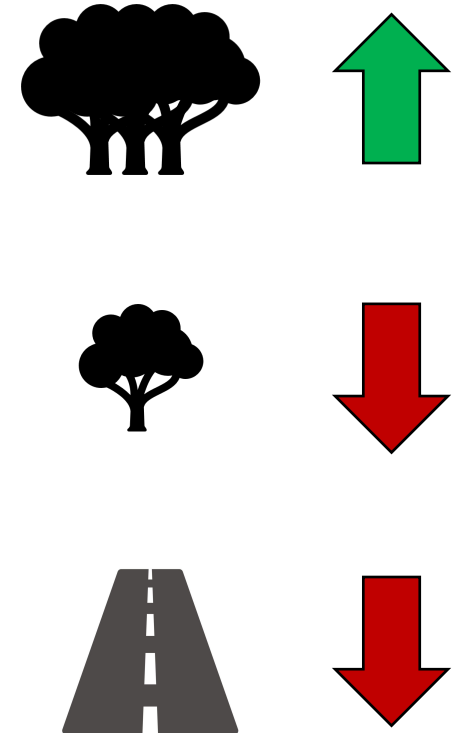
Ecological implications of melanism understudied



Cold
Tolerance



Crypsis



Melanism was once common and widespread



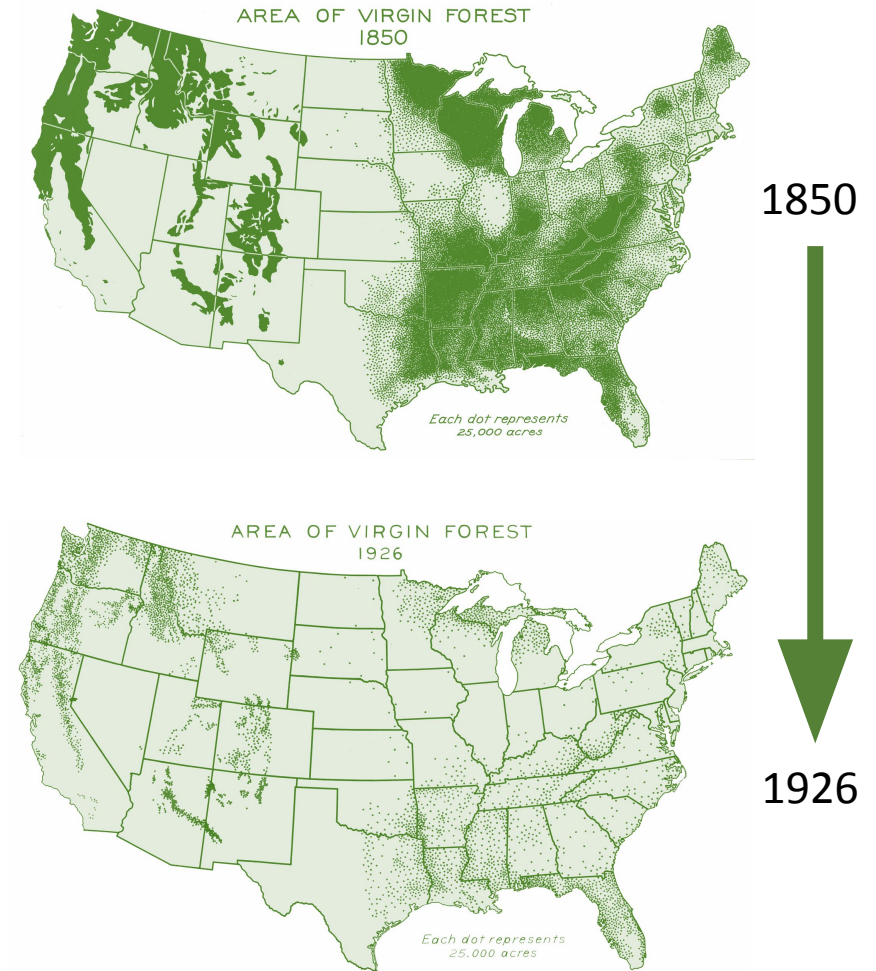
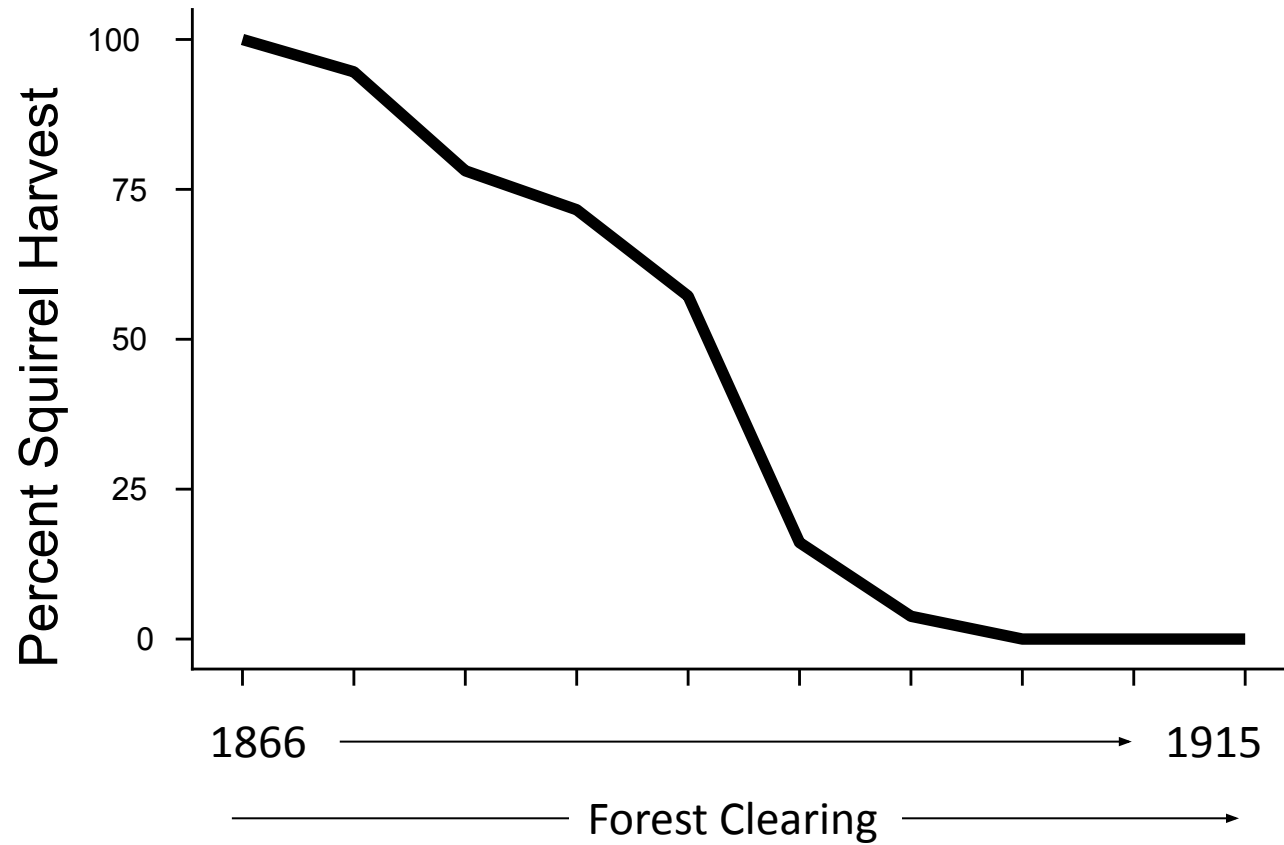
*“It is well ascertained fact that the **Black Squirrel** disappears before the Northern gray squirrel...
- Audubon and Bachman (1948)*

*“It is stated by close observers that in some neighborhoods where the **Black Squirrel** formerly abounded, the Northern gray squirrel now exclusively occupies its place.” - Audubon and Bachman (1948)*

*“While predominating formerly in certain regions, the **black phase** of the gray squirrel, for some unknown reason, becomes rare or disappears with the advance of civilization.” - Shorger (1949)*

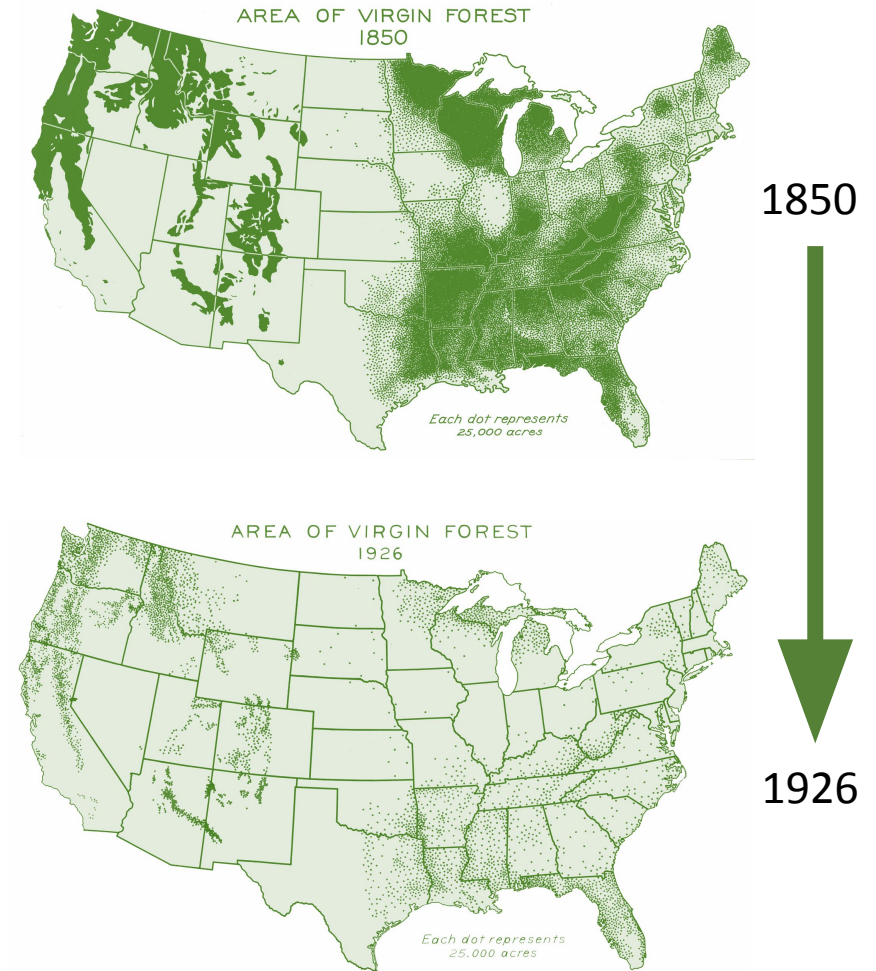
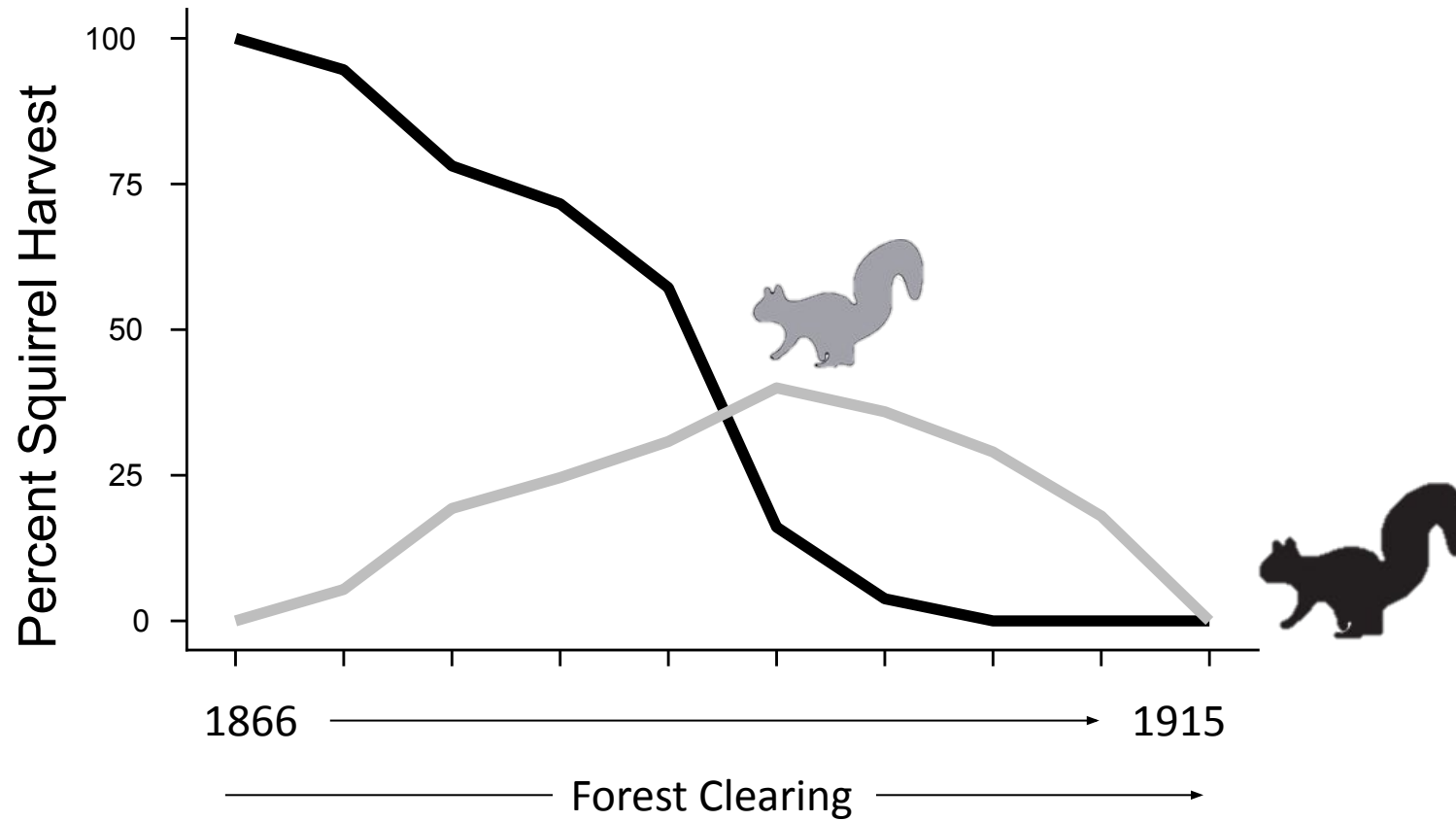
Melanism declined with with deforestation (causal?)

Eaton County, Michigan (n = 6,673)

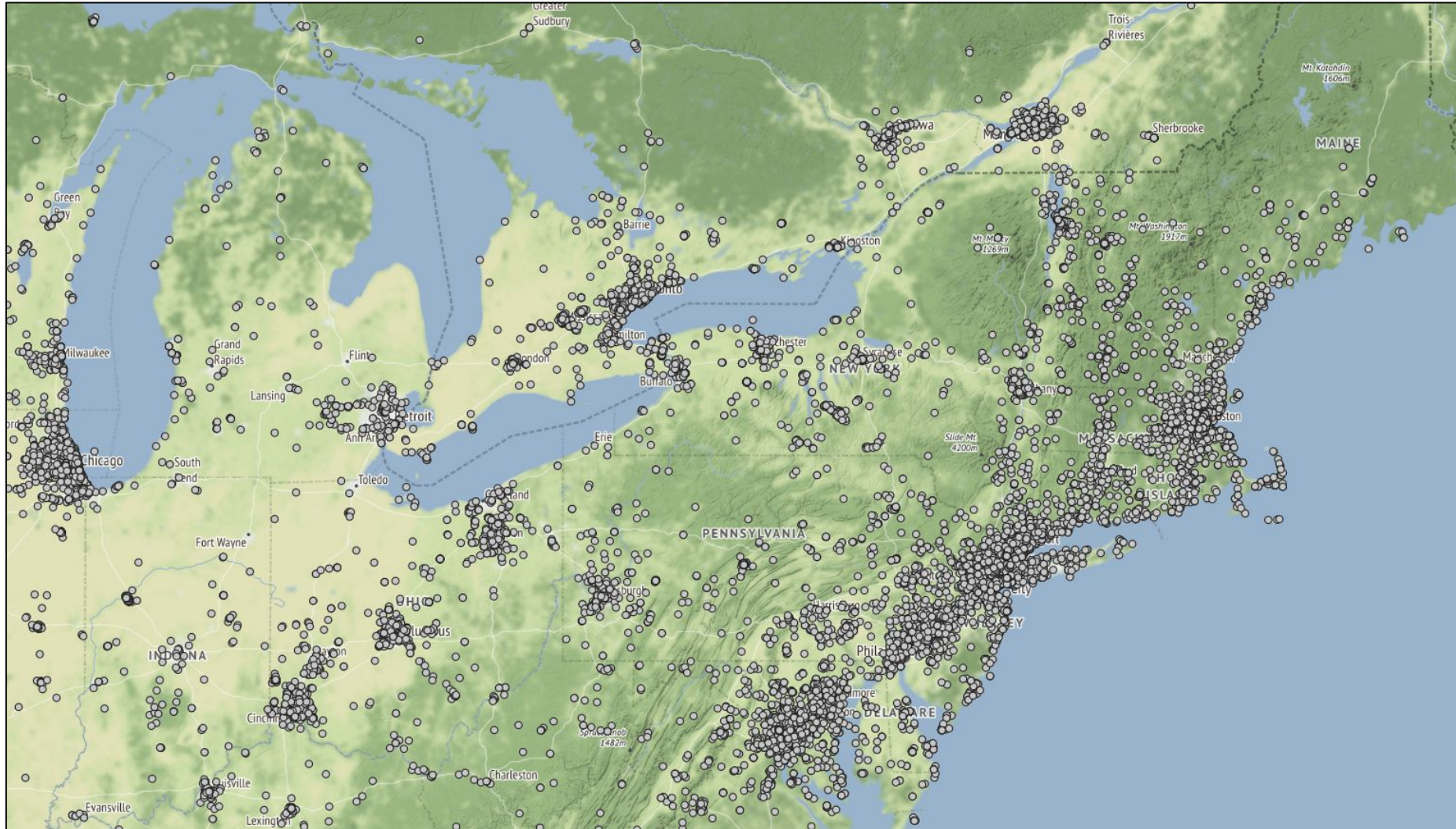


Melanism declined with with deforestation (causal?)

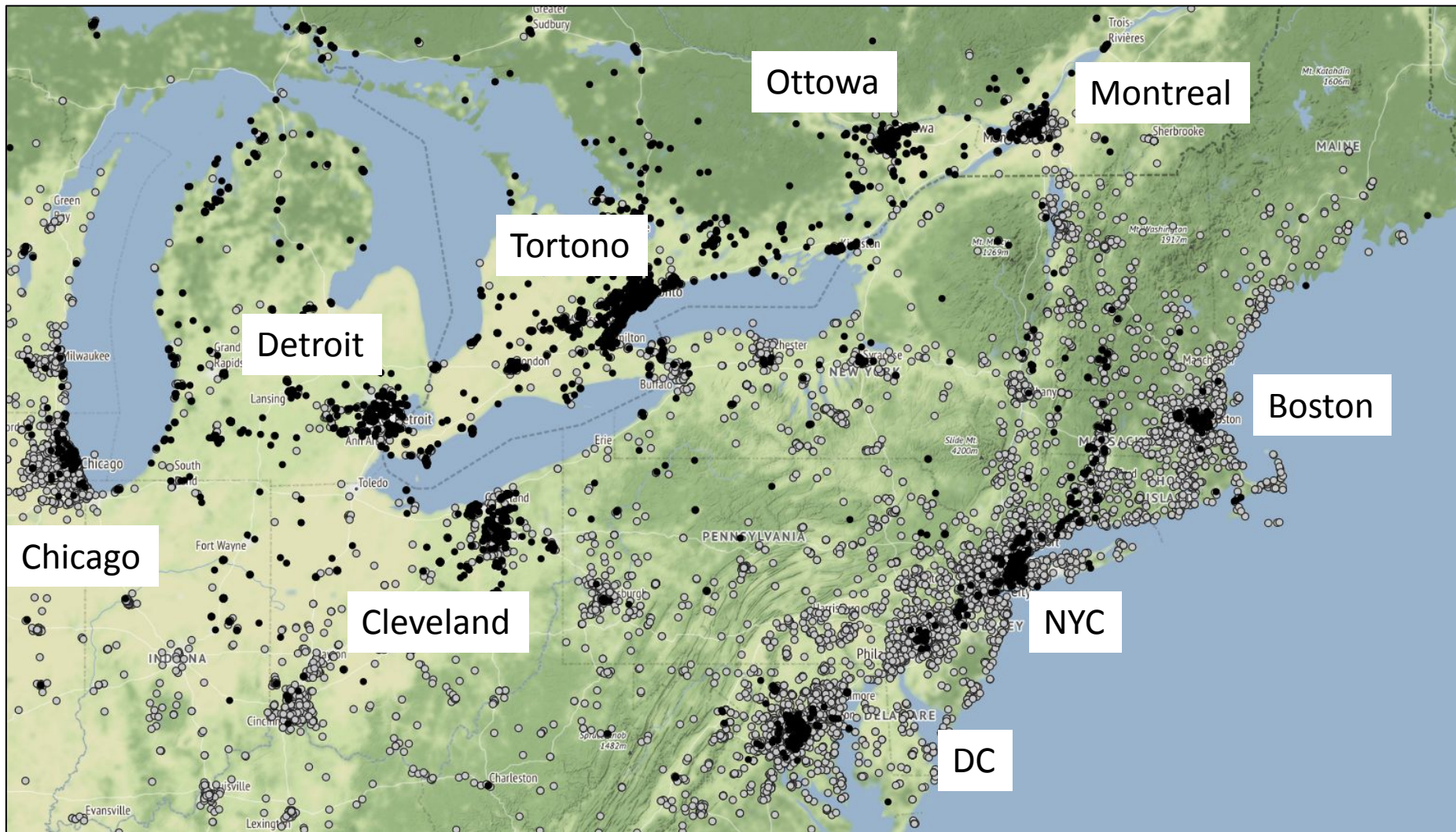
Eaton County, Michigan (n = 6,673)



Eastern Gray Squirrel: iNaturalist

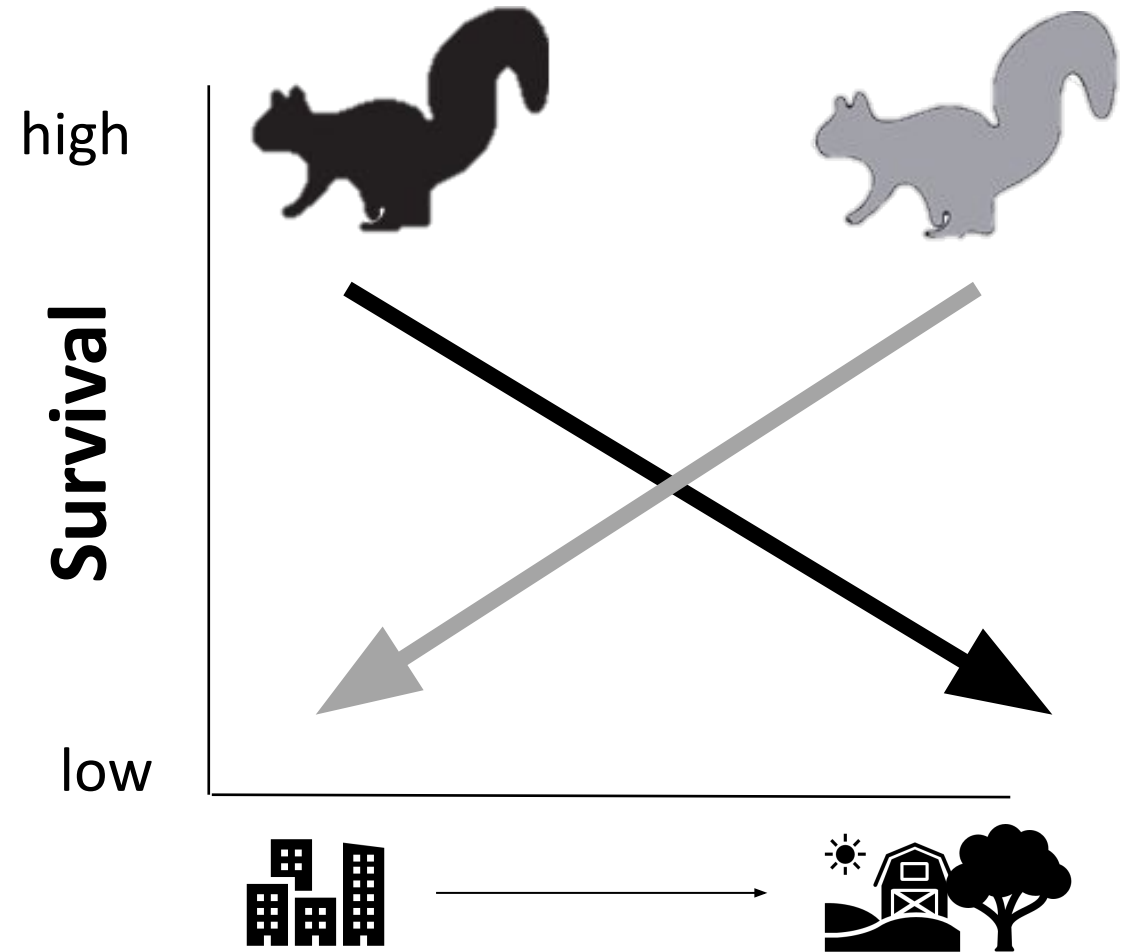


Melanism today: mostly cities

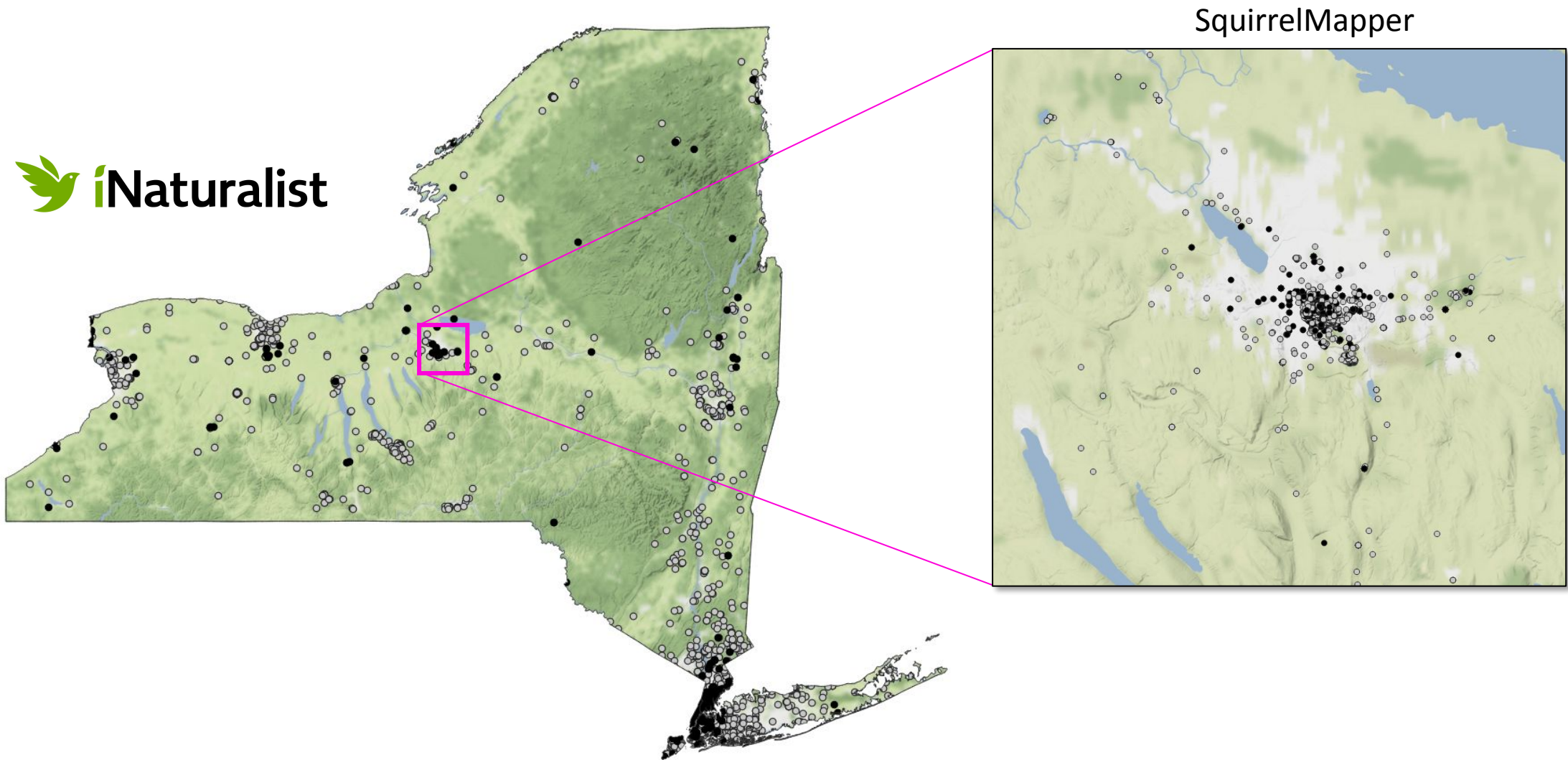


Questions and Hypotheses

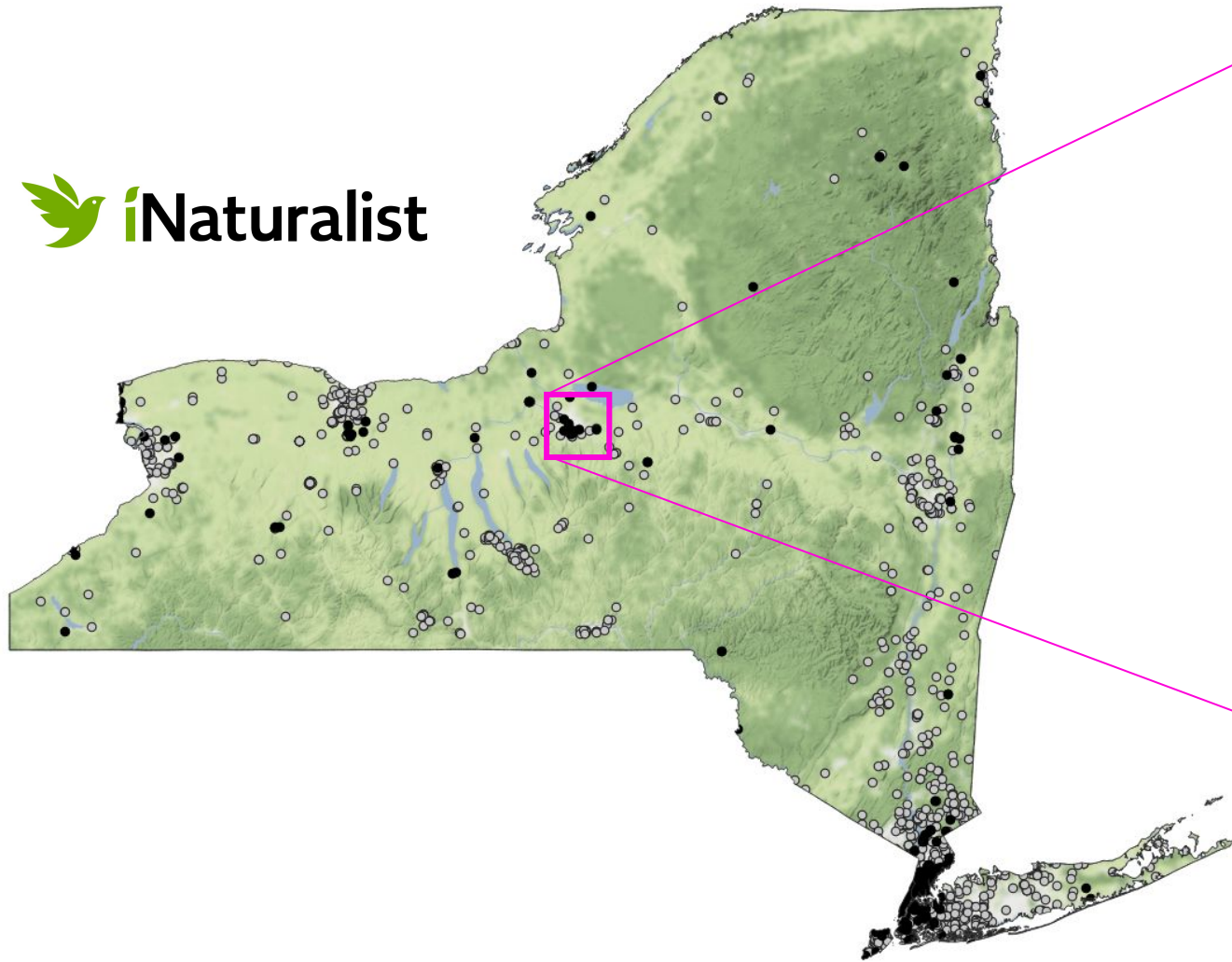
- **Hypothesis:** Divergent natural selection drives morph distribution
- **Question:** Does survival differ between the morphs in urban and rural environments?
- **Predictions:** Survival is greater for melanics in cities, and lower in rural forests



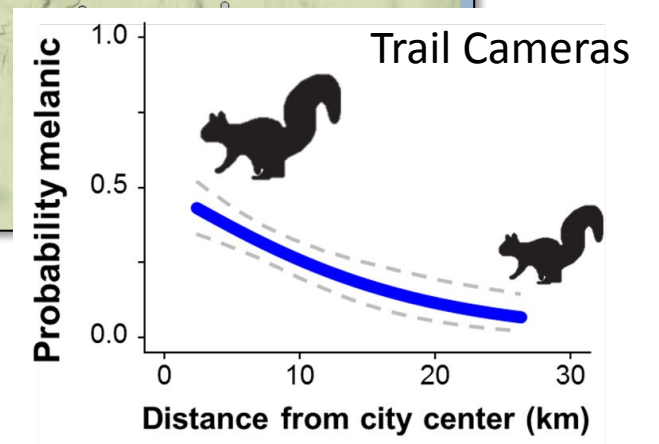
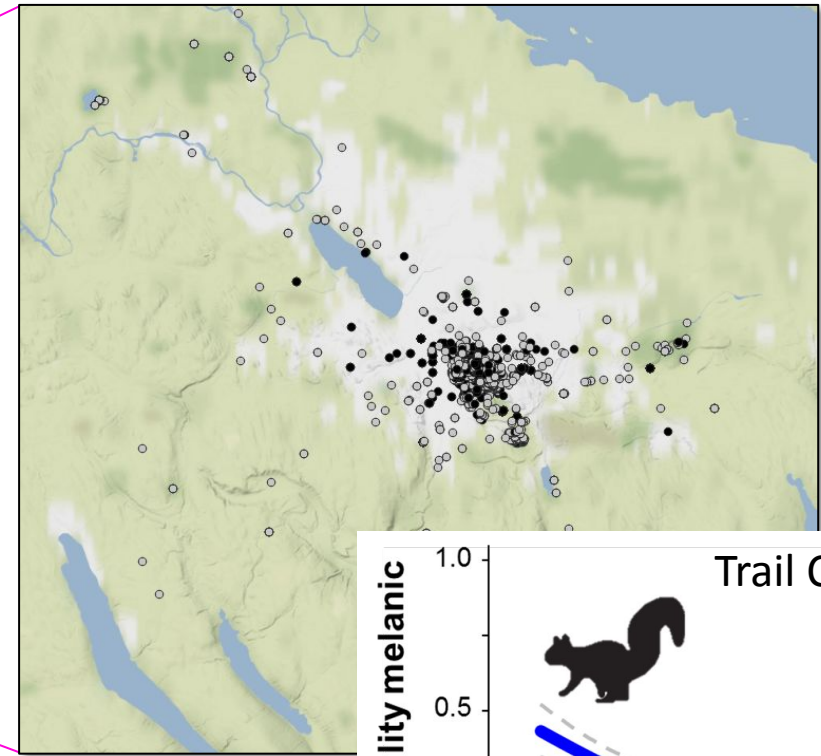
Study Site: Syracuse, NY



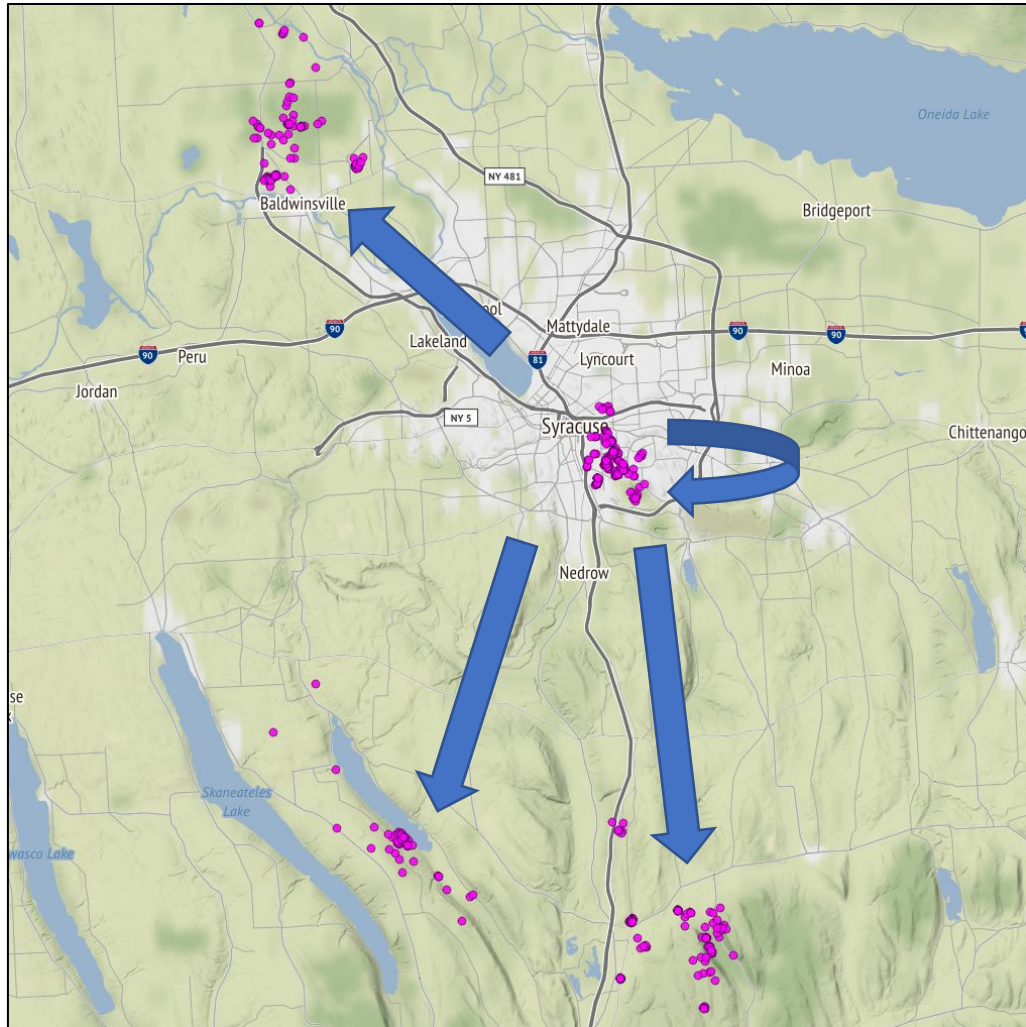
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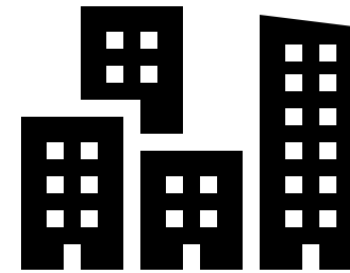
SquirrelMapper



Methods: translocation experiment



~30 urban



~30 rural



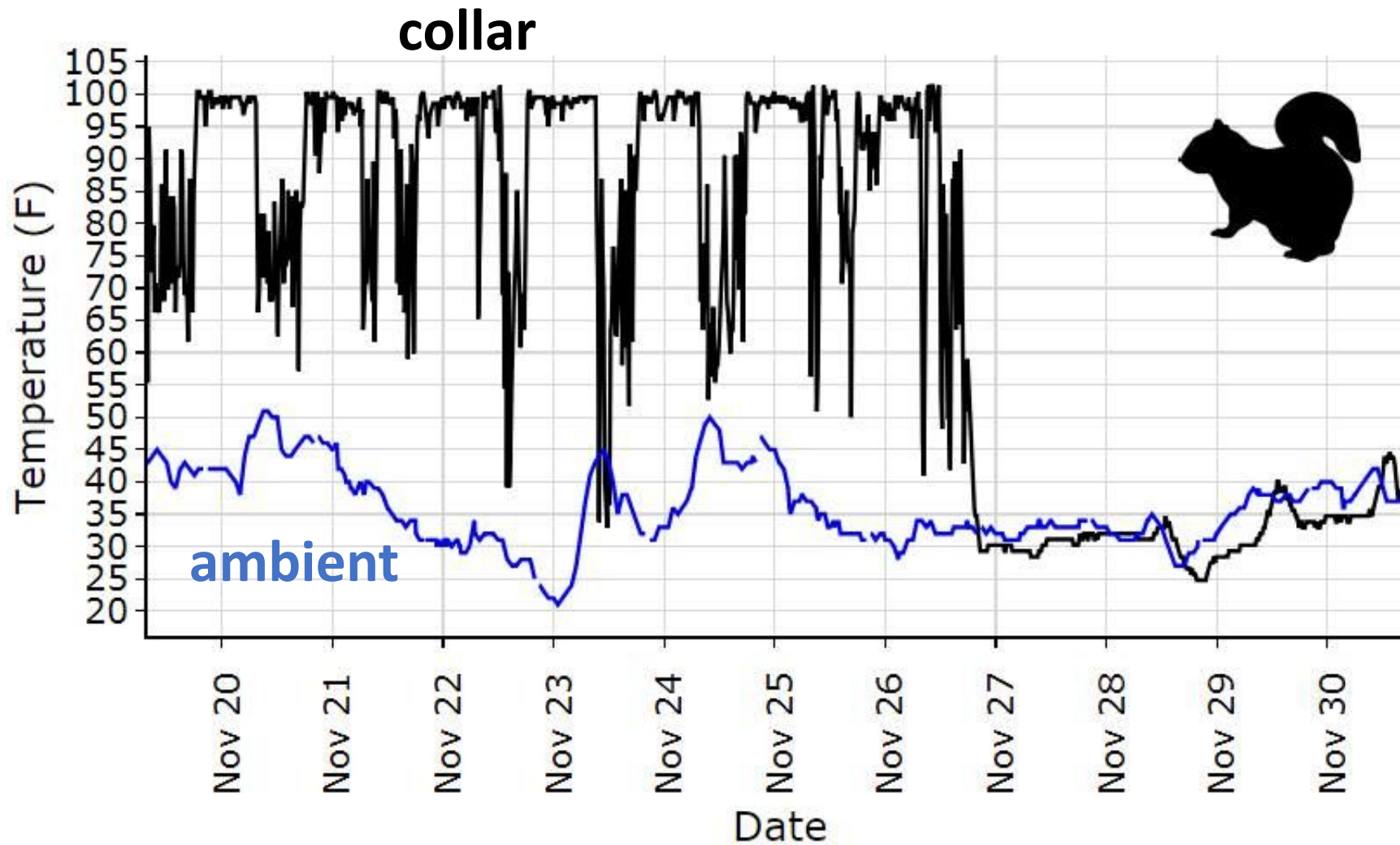
Methods: catch and collar



Methods: release and radio-telemetry



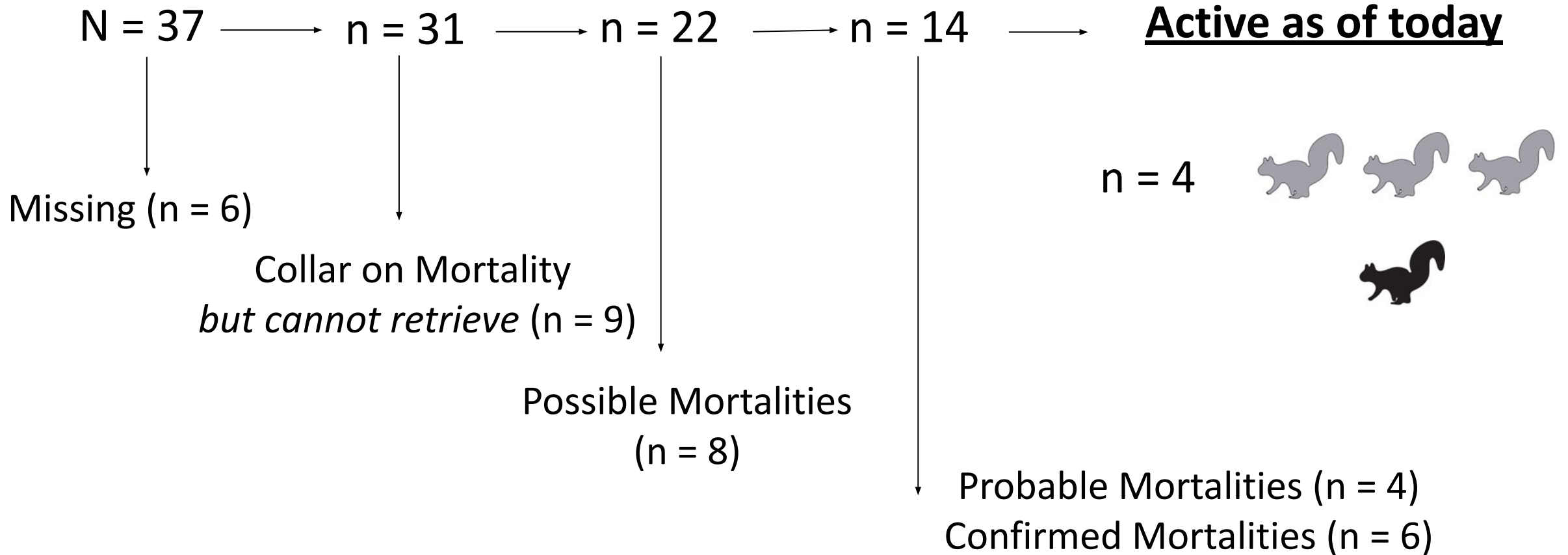
Methods: survival assessment



Results: Rural Survival



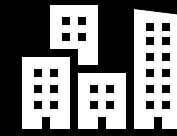
Translocated



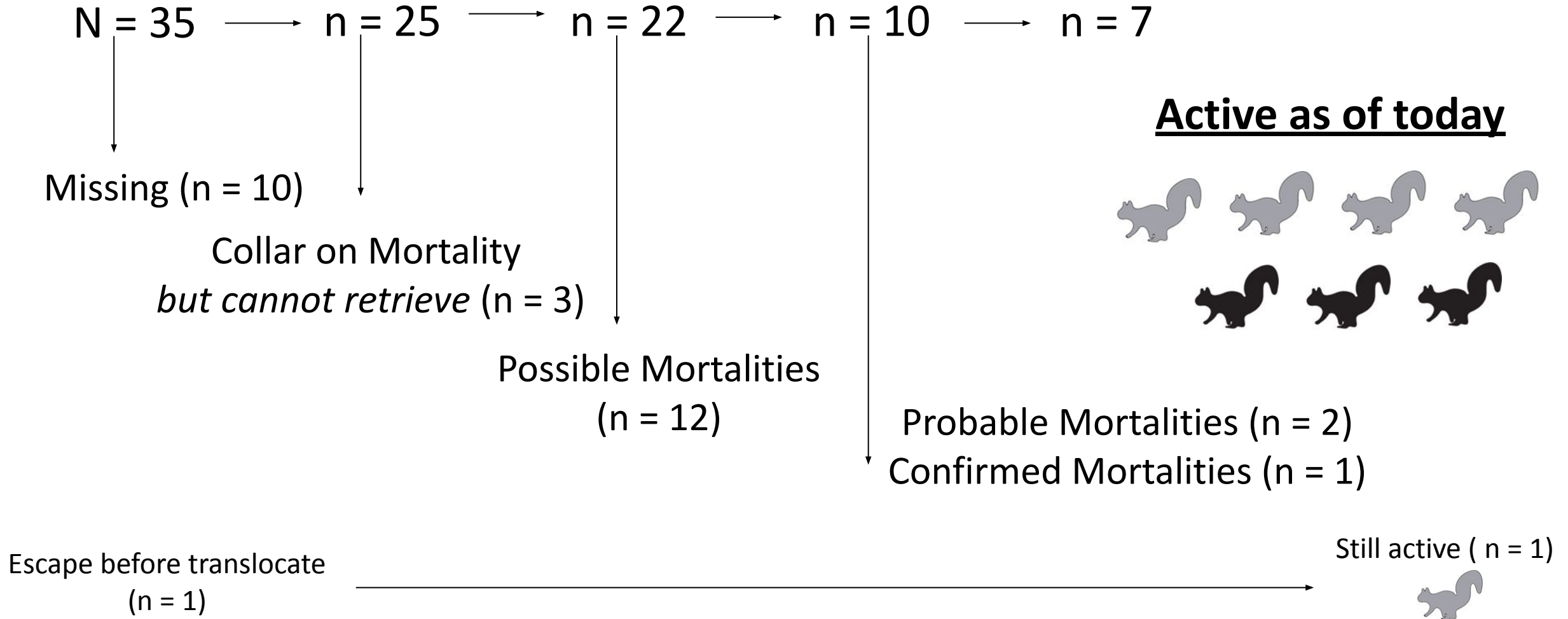
Results: Rural Survival



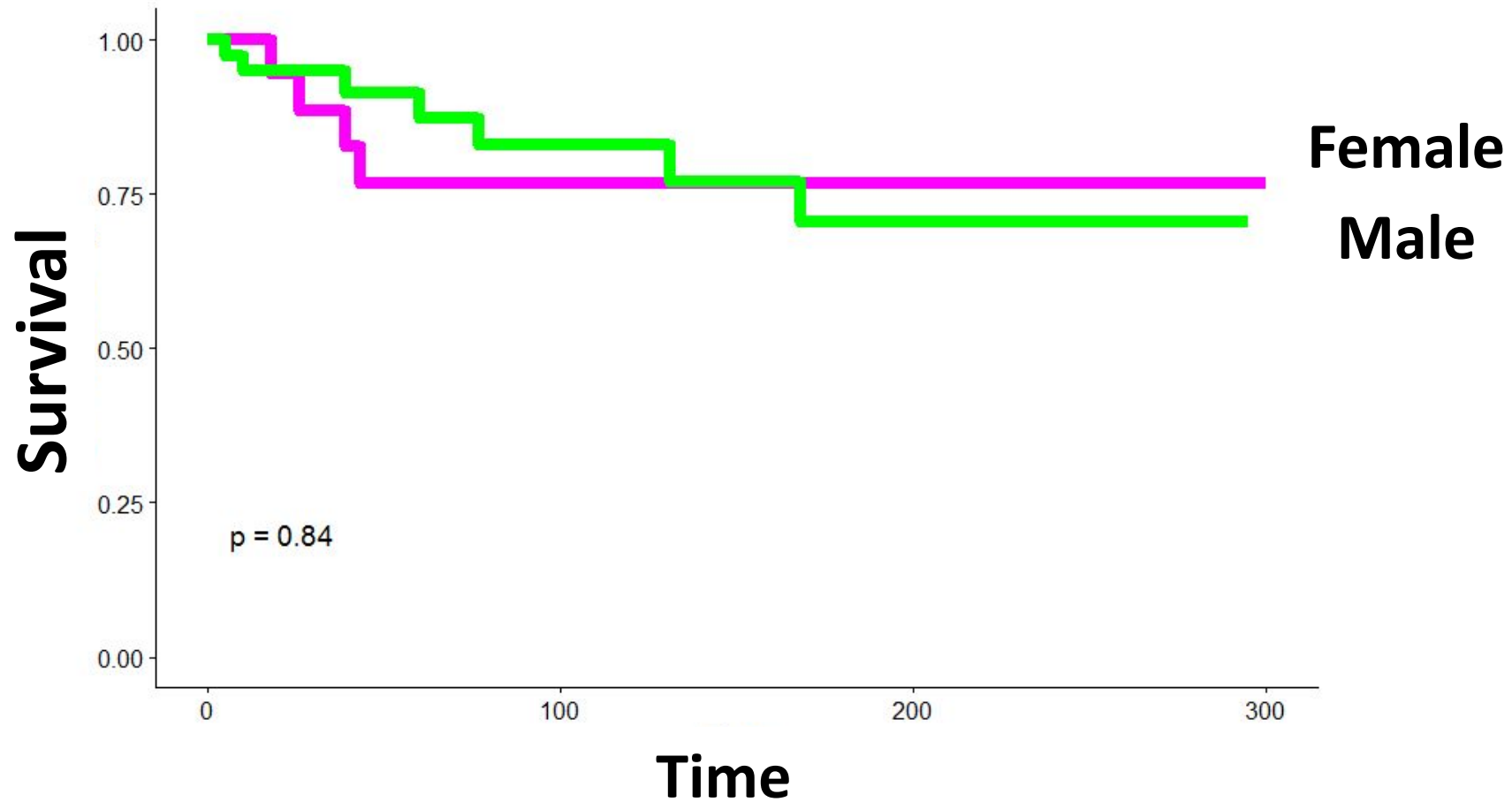
Results: Urban Survival



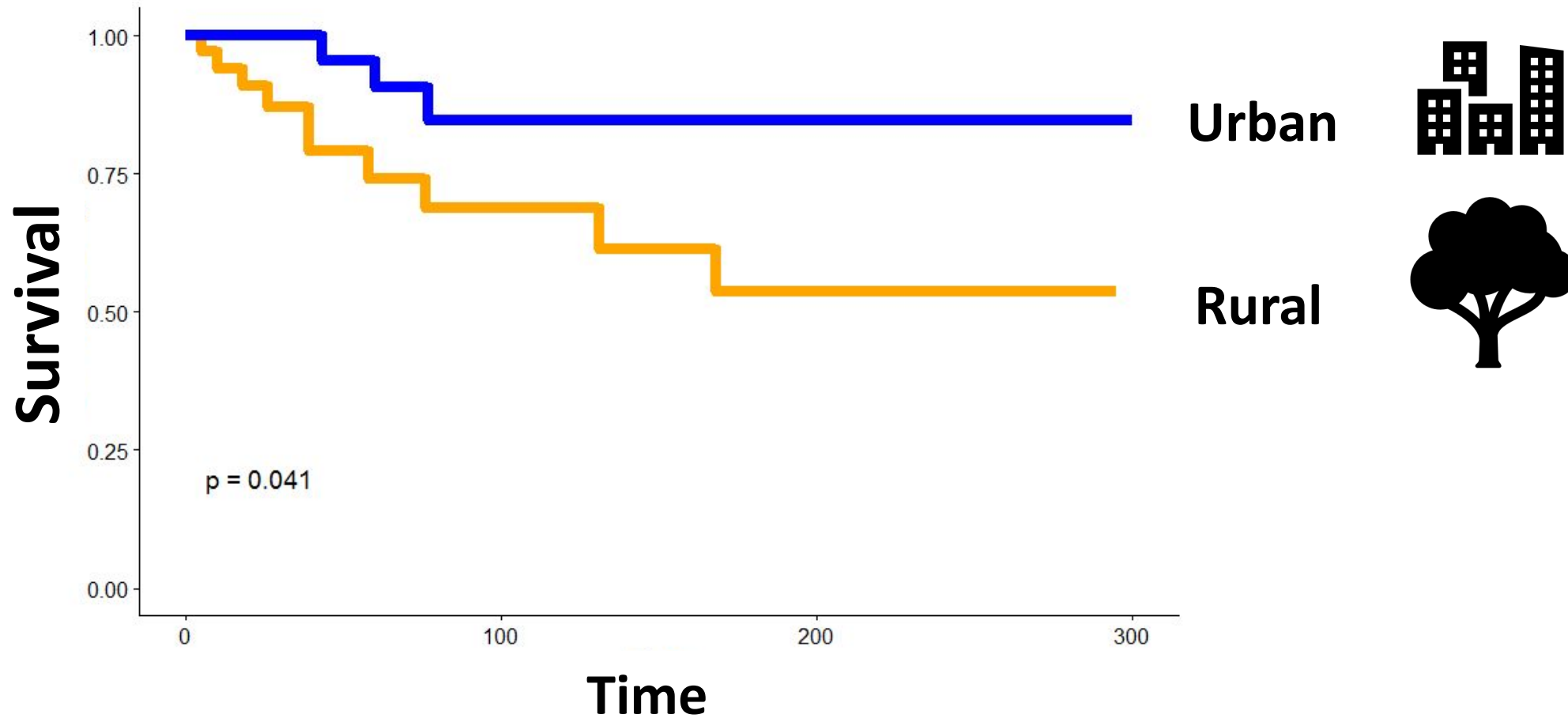
Translocated



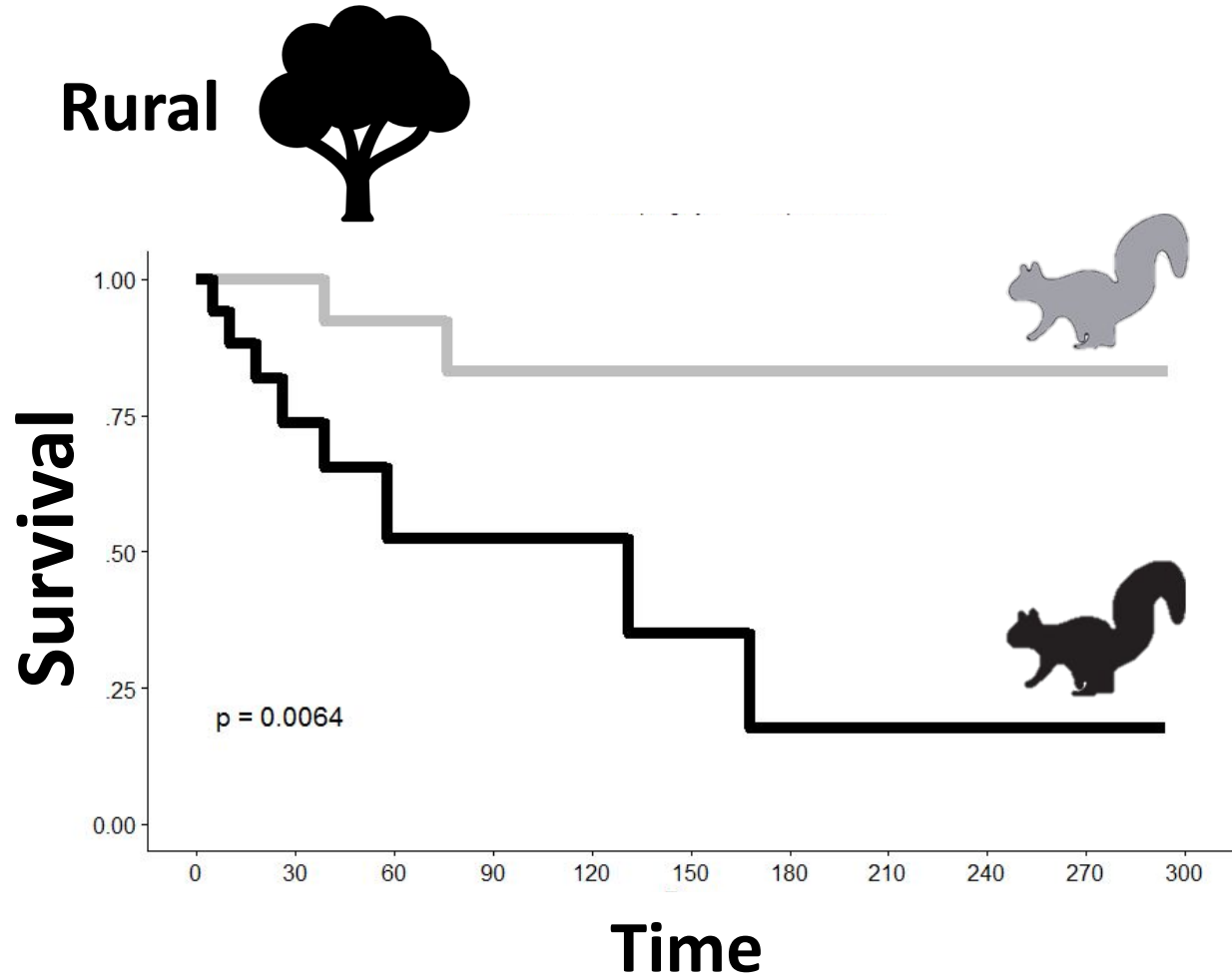
Results: no difference in sex



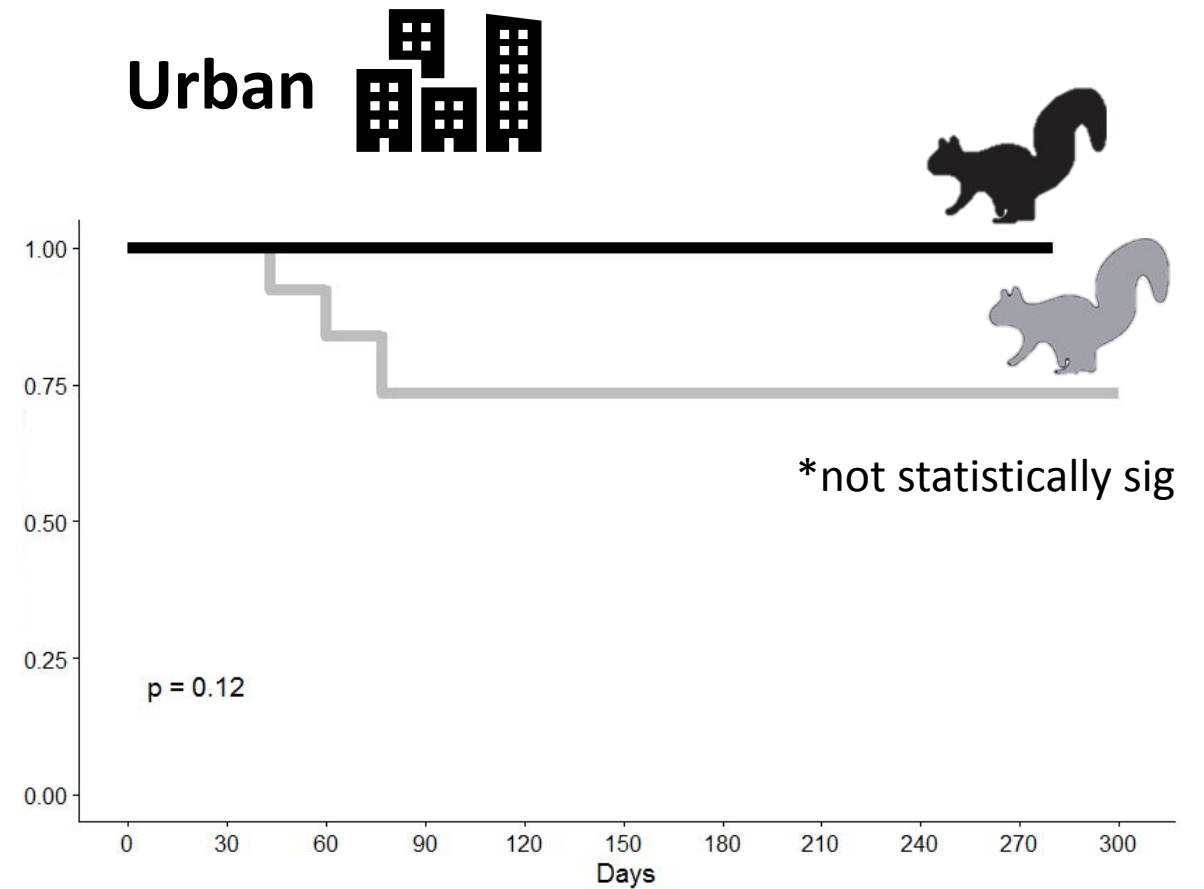
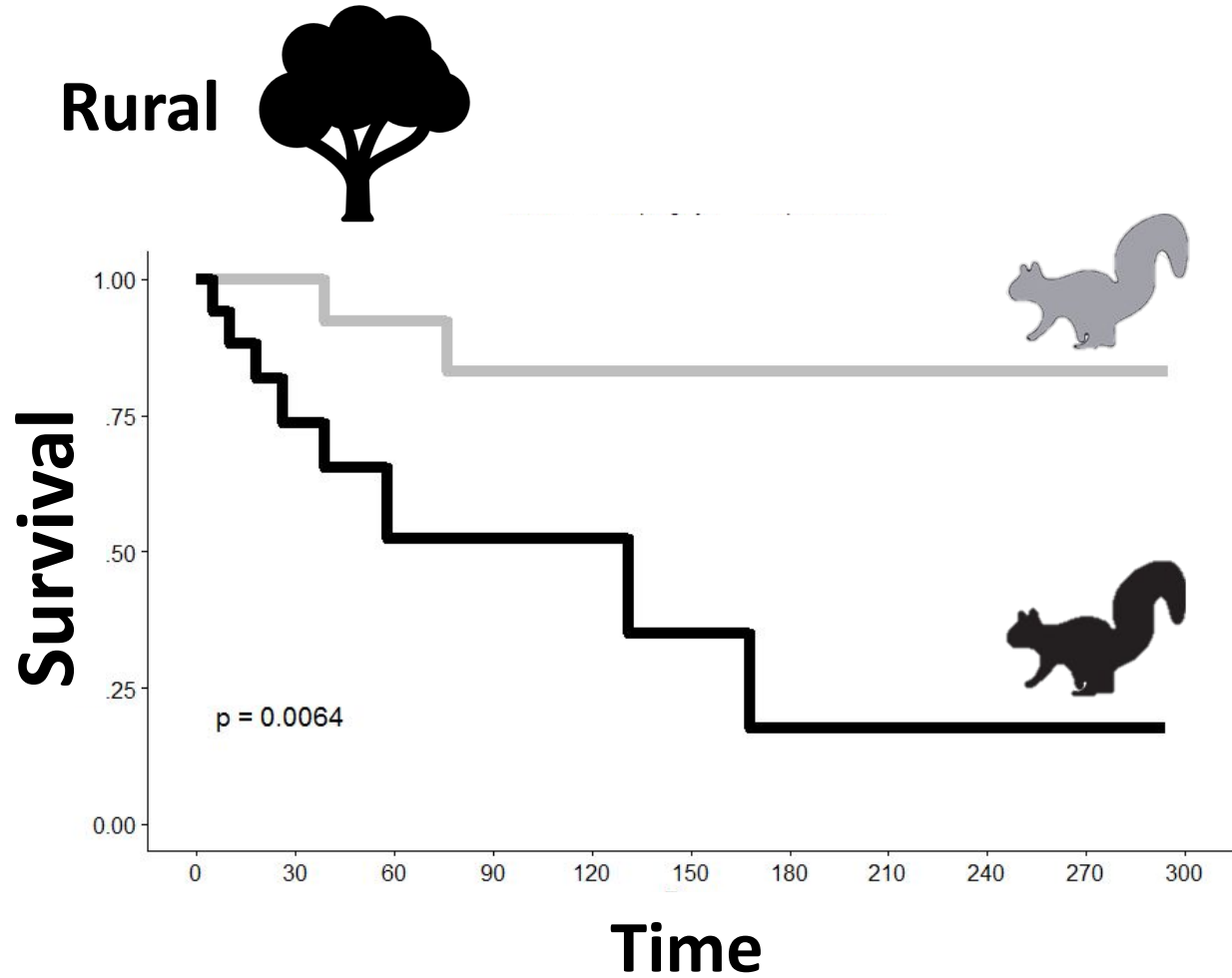
Results: Rural survival lower



Results: Rural melanic lower



Results: Rural melanic lower, but no difference urban



Questions and Hypotheses

- **Hypothesis:** Divergent natural selection drives morph distribution



Found some evidence!

- **Question:** Does survival differ between the morphs in urban and rural environments?



- **Predictions:** Survival is greater for melanics in cities, and lower in rural forests



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Yes!



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Yes!



- **Predictions:** Survival is greater for melanics in cities, and lower in rural forests



1) Survival lower for melanics in rural
2) Not quite evidence for an advantage in urban

Take Home Points

- 1) We found some evidence supporting hypothesis that **divergent natural selection drives morph distribution!**
- 2) Tracking squirrels is HARD
- 3) If you trap and relocate squirrels in your backyard, you're either killing them indirectly... or making them someone else's problem.

Tracking Squirrels is Hard...



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