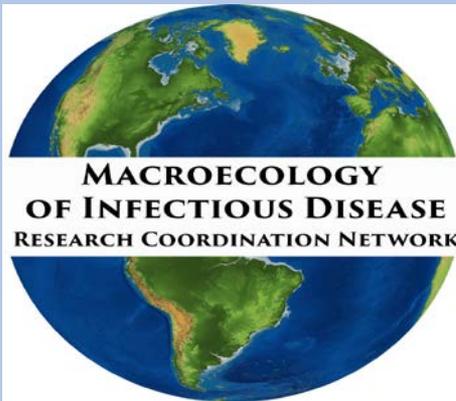


Migratory behaviour predicts greater parasite diversity in ungulates

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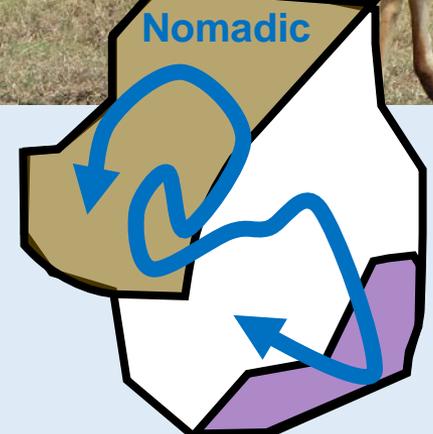
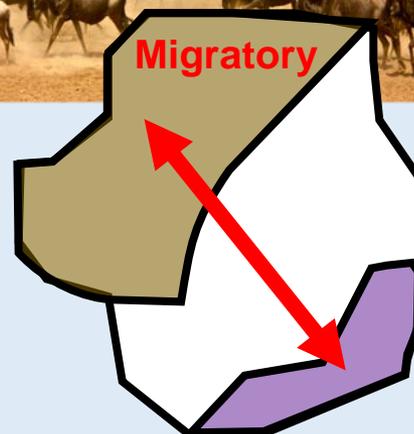
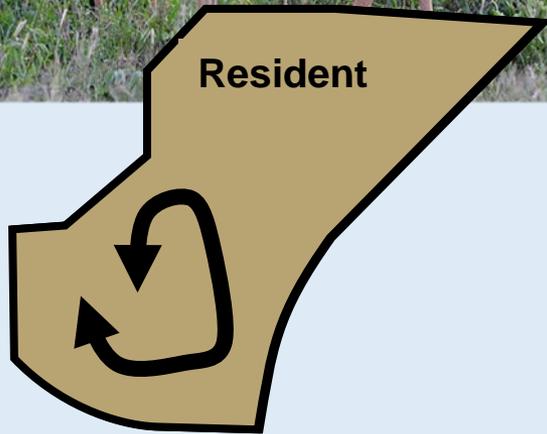
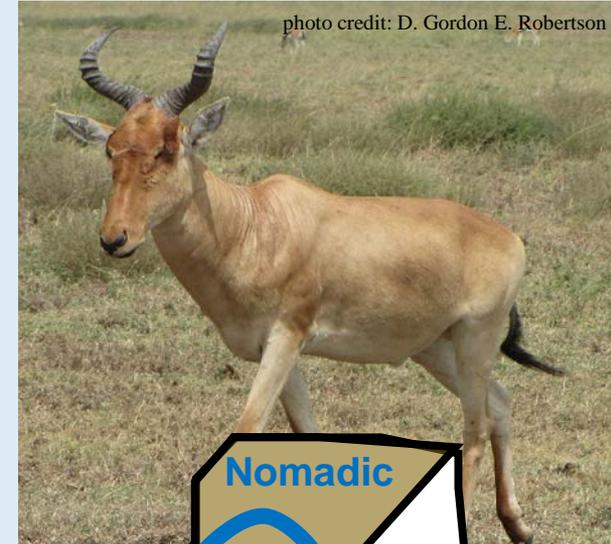
⁴Senckenberg Biodiversity and Climate Research Centre, Frankfurt, Germany



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<http://rsps.royalsocietypublishing.org/content/285/1875/20180089>

Do highly mobile animals have more or fewer parasite species?



Animals that move could have fewer parasite species than those that move less . . .

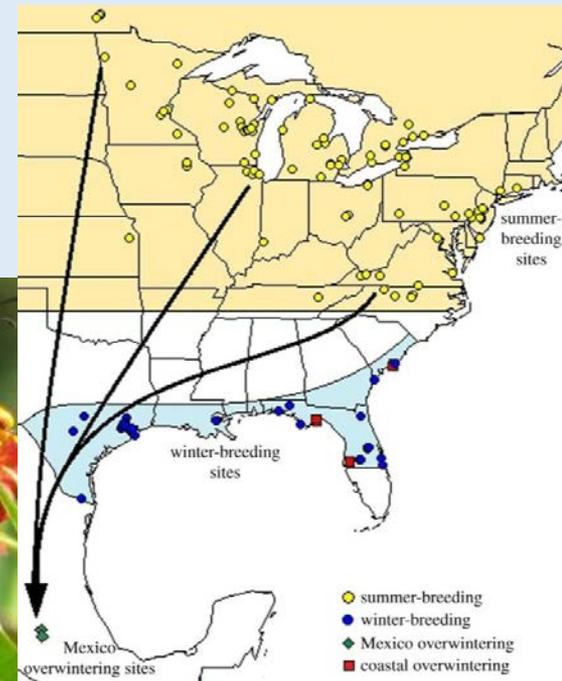
Migration is a strenuous process!
Sicker animals may die during migration,
leaving fewer parasites in the population.
This is called migratory culling.



Photo: Julie Rushmore



Figure courtesy of Dara Satterfield

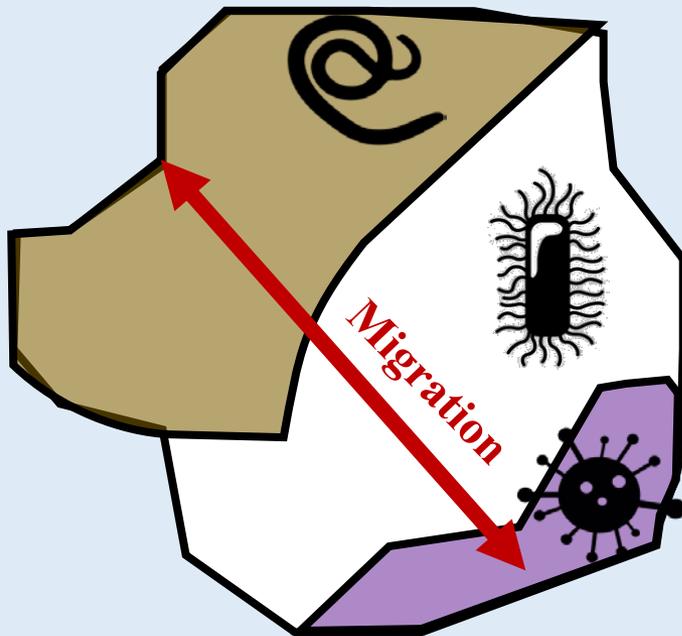


Evidence for migratory culling has been seen in Monarch butterflies.

But animals that move could also have more parasite species . . .

Migratory animals move across many different environments!

Different kinds of parasites live in each environment.



"Hey! Make sure you sample all the parasites in this area!"

As animals move they can be exposed to many different parasites.
This is called environmental sampling.

So, which is it??

Resident



Migratory



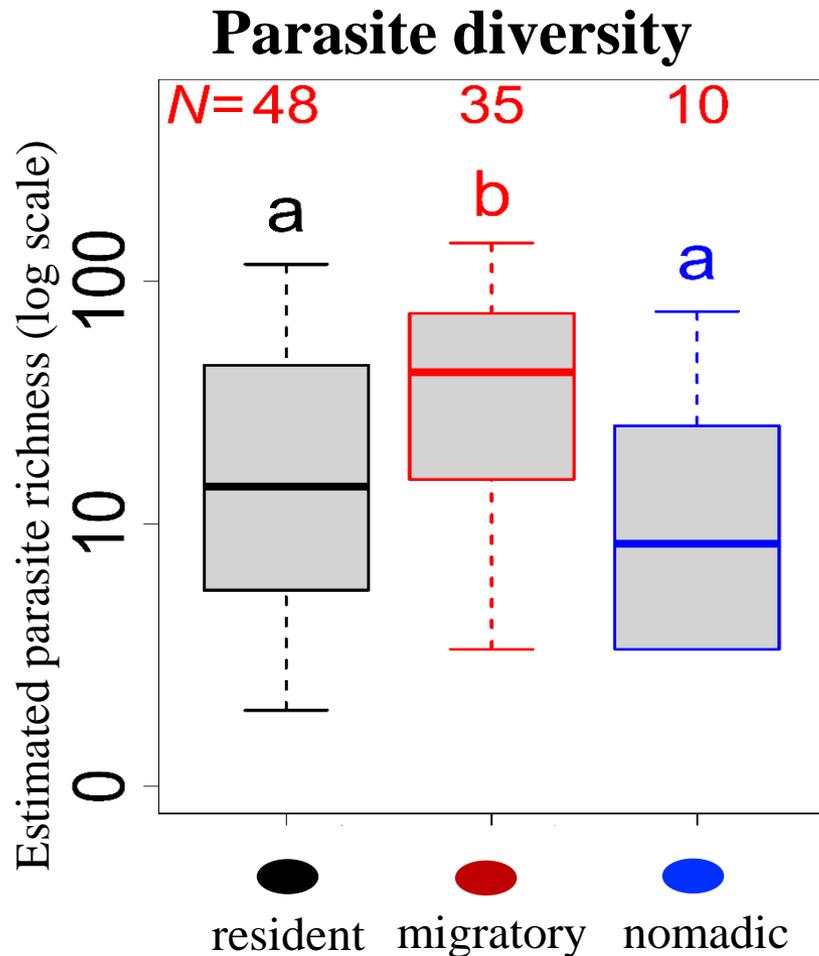
Nomadic



Teitelbaum *et al.*, used previous reports on movement and infection to show that animals that move more *DO* have more kinds parasites

- *Records for 93 ungulate species with 765 different parasites were analyzed. (Data for parasite diversity was sourced from the Global Mammal Parasite Database version 2.0)*
- *Linear models were used to analyze predictors of parasite diversity in ungulates*

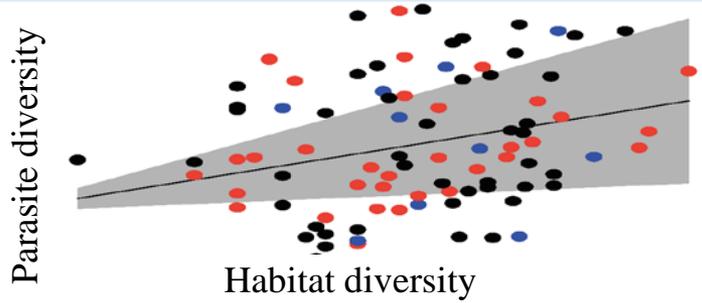
Main Result: migratory ungulates had 3.7 times as many parasite species as nomads



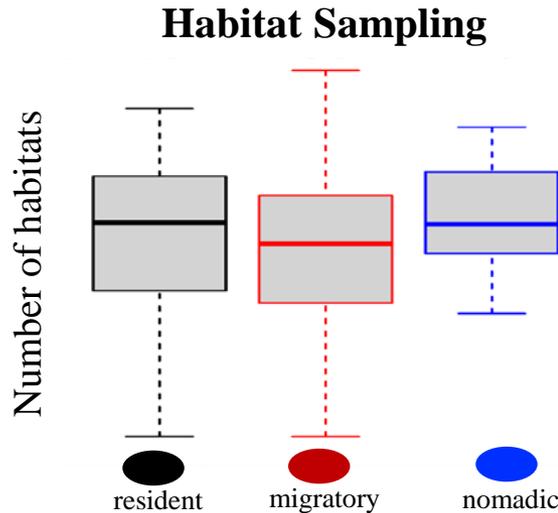
The best model predicted that migratory animals have 3.7 times as many unique parasite species as nomadic ungulates and 2.4 times as many as resident ungulates. Different letters above boxes represent significantly different predictions (Tukey test, $\alpha=0.05$).

Why do animals that move have more parasite species?

Even though parasite diversity increases with habitat diversity . . .



Animals that move don't occupy more habitats, so *environmental sampling* isn't the reason . . .



BUT, parasites that live in migratory animals get to travel year-round to where the weather is better . . .



Tracking favorable weather and food conditions helps wildlife survive, but it might also help their parasites survive – AND could be a reason migratory animals have more parasites.

This is known as *environmental tracking*.



Why does this matter?

Migratory animals can take parasites with them across many environments – once in those new environments, parasites might infect other wildlife, domestic animals, and even humans.

ECONOMICS & HEALTH



- **Wildlife can infect domestic animals**
 - example: African buffalo can infect domestic cattle with tuberculosis
- **Wildlife diseases can also impact human health**
 - example: hendra virus from flying foxes infected horses, which then transmitted the disease to humans

CONSERVATION & BIODIVERSITY

In 2015, more than 200,000 saiga antelope died due to a pathogen that may have been transmitted from domestic animals.



Photo: Navinder Singh

- **Other wildlife species might be infected**
 - In some cases this can lead to mass die-offs or extinction