

# PROGRAMA DE PÓS-GRADUAÇÃO EM ECOLOGIA E CONSERVAÇÃO DA BIODIVERSIDADE

Processo seletivo PPGECB – 2022 - 2

## Prova de conhecimentos em Língua Inglesa

Instruções para a prova:

1. **Não coloque NOME** na prova. Sua única identificação será o número de seu CPF.
2. A prova tem duração máxima de 2 horas.
3. É permitido o uso de dicionários.
4. Todas as questões devem ser respondidas em português.

## Texto: Climate Change Is Shrinking Animals, Especially Bird-Brained Birds

(Shahla Farzan on April 25, 2022)

(<https://www.scientificamerican.com/podcast/episode/climate-change-is-shrinking-animals-especially-bird-brained-birds/>; Text adapted from the podcast)

As the world warms, many animals are getting smaller. For birds, new research shows what they have upstairs may just make a difference in how much smaller they get. Climate change is affecting animals in a lot of different ways. But scientists have noticed a common trend across a variety of species: they're getting smaller. As in—physically smaller in size. But why, and what could this mean?

Scientists have observed this phenomenon in very different animal species from wild sheep to woodrats. But it's especially well-documented in North American songbirds. In 2019, researchers at the University of Michigan published a dataset of more than 70,000 birds that died after hitting windows in Chicago. The data showed the body sizes for dozens of species had actually shrunk over the past 40 years. But when Justin Baldwin, a graduate student at Washington University in St. Louis, took a closer look at the data something stood out. According to the author, there clearly seem to be some species that were shrinking a lot and other species that were shrinking much less.

The question was why were some bird species shrinking faster than others? Baldwin and his colleagues had a feeling that bird behavior might be playing a role. In birds, species with bigger brains tend to be smarter and can change their behavior based on their environment. That means that they might be able to buffer themselves from increasing temperatures, says Carlos Botero, an assistant professor of biology at Washington University and the study's co-author. By adjusting their behavior, by changing the places that they look for food, the times of the day in which they do that, the things that they eat, and the ways in which they access those food sources. All those are ways in which they could experience a little bit less of a negative selection from all this variety of changes that we're seeing through climate change.

A bigger-brained bird, for example, might adjust its behavior and stay in the shadows when it's hot. So the team decided to reanalyze that massive, original dataset—but this time, factor in brain size. They found birds with larger brains in relation to their body size are shrinking at slower rates than birds with smaller brains. And that was true even after controlling for other factors that could affect how quickly these birds are evolving, like generation time and mutation rate.

But Botero says that just because these larger-brained bird species can temporarily buffer themselves from warmer temperatures, it doesn't mean they're completely protected from climate change. It is important to realize that what we see here is not an indication that big brain birds are fine, and that they are not having any problems or that they are just capable to take whatever kind of change is coming from this suite of different environmental phenomena that is happening right now.

The team says there's still a lot to learn when it comes to the ways in which bird behavior could affect how these species respond to climate change. For one thing, in this study, there was only about a twofold difference in relative brain size between the species with the largest brain—the song sparrow—and the one with the smallest—the Swainson's Thrush. That means the responses could be even stronger in birds with larger brains, like crows, Baldwin says.

The researchers say they are sampling only a small amount of the potential variation in relative brain size here in our study. And so that does suggest that even potentially small differences in relative brain size might actually have a large effect on ecological responses to climate change. For now, Baldwin says, one of their biggest takeaways is that smaller-brained bird species could be particularly vulnerable as the climate continues to change.

Questões (cada questão vale 1,25):

1. Segundo o texto, que diferença em comum tem sido observada nos animais relacionada às mudanças climáticas?
2. Aonde essas mudanças foram melhor documentadas?
3. Segundo o texto, quantas e quais aves foram estudadas?
4. Todas as espécies de aves estão encolhendo de forma uniforme?
5. Que características das aves de cérebros maiores as tornam mais adaptadas às mudanças?
6. O que os cientistas perceberam quando analisaram o banco de dados usando o tamanho do cérebro como fator?
7. As aves de cérebros maiores estão protegidas das mudanças climáticas?
8. O estudo cobriu toda a variação possível de tamanho cerebral em aves?