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Editorial

Impact of global climate change on mammals
Impacto del cambio climático global sobre los mamíferos

Global climate change, characterized by global temperature shifts and altered precipitation patterns, is a pressing issue that poses significant threats to biodiversity worldwide. Mammals, a diverse group of organisms with complex life histories and ecological roles, are particularly susceptible to these changes. Some of the best known changes include the effect of climate warming on the distribution of mammals. As global temperatures rise and precipitation patterns shift, the suitability of habitats can change, leading to range shifts in mammalian species (Sony *et al.* 2018). This is particularly important when dealing with endemic or restricted distribution species (Sántiz *et al.* 2016; Lorenzo *et al.* 2019).

While there may be direct and clear effects, there may even be implications for subtler aspects of biotic relationships between species. Climate change can alter predator-prey dynamics, leading to shifts in spatial distribution. Bastille-Rousseau *et al.* (2018) found that the distribution of snow leopards was influenced by changes in their prey's distribution, which was in turn affected by climate change. In another example, Warren *et al.* (2014) revealed that climate change could lead to a significant reduction in the suitable habitat for the Alpine marmot, a mammal species endemic to the European Alps. This proved that species with limited ranges may be particularly vulnerable to the impacts of climate change. But also, specific climate changes as seasonal change could lead to over/under estimations of the impact of climate change on a particular species. This underscores the importance of considering temporal dynamics when predicting the impacts of climate change on mammalian distribution (Smeraldo *et al.* 2018).

By the other side, climate change not only affects the distribution of mammalian species, but can also has significant implications for their reproductive processes. Changes in temperature and precipitation patterns can influence the timing of reproduction, reproductive success, and offspring survival in mammals (Van de Ven *et al.* 2020). By example, warmer or cooler temperatures may cause a giving birth earlier, indicating that climate change can lead to phenological shifts in mammalian species. Such shifts could have significant implications for reproductive success if they lead to mismatches between the timing of reproduction and the availability of resources (Bateman *et al.* 2012). Even more worrisome, climate change and human activities can lead to a decrease in the population and distribution of species, highlighting the potential for climate change to drive declines in some mammalian species reproduction and survival (Zhao *et al.* 2019).

On the other hand, climate change not only affects the physical environment of mammals but also has profound implications for their behavior. Changes in temperature, precipitation, and seasonality can lead to shifts in foraging behavior, migration patterns, and social dynamics among mammalian species (Bastille-Rousseau *et al.* 2018). By example, Cordes *et al.* (2020) demonstrated that climate change can have contrasting effects on seasonal survival and behavior in moose. Warmer autumn temperatures increased survival but also lead to higher tick infestation rates, which can negatively impact moose behavior and health. In a significant way, climate change can influence the spatial behavior and distribution of vectors diseases that affect mammals, including humans (Chalghaf *et al.* 2018).

Also, changes in temperature and precipitation patterns have a profound impact on the habitats of mammals, altering the physical environment and resources available to these species. Changes in temperature, precipitation, and extreme weather events can lead to habitat loss, fragmentation, and shifts in habitat suitability, with significant implications for mammalian populations (Campbell *et al.* 2015; Zhao *et al.* 2019).

Climate change is undeniably having profound impacts on mammalian species worldwide, affecting their distribution, reproduction, behavior, and available habitat. Recent studies provided valuable insights into these effects, revealing complex interactions between climate variables and mammalian biology and ecology (Bateman *et al.* 2012; Campbell *et al.* 2015; Bastille-Rousseau *et al.* 2018; Cordes *et al.* 2020). Despite the wealth of knowledge gained from these studies, there are still many unanswered questions. Future research should aim to fill these gaps, focusing on under-studied species and regions, and considering the potential for adaptation and resilience. More studies are needed that investigate the combined effects of multiple climate variables, as well as the interactions between climate change and other anthropogenic stressors. Long-term studies will also be crucial for tracking the ongoing impacts of climate change and for predicting future trends.

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