New methodology for modeling biodiversity developed at UFMG points to new paths for conservation

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CLEVER researchers of Centre for Remote Sensing of the Federal University of Minas Gerais (UFMG) have developed an innovative approach for modeling biodiversity with great implications to biodiversity conservation studies. Led by Ubirajara Oliveira, the study proposes a new methodology that overcomes the challenges posed by the lack of knowledge about biodiversity in remote areas.

Figure 1 – The lack of knowledge in remote areas poses a challenge for biodiversity modeling and conservation

The article entitled "Controlling the Effects of Sampling Bias in Biodiversity Models", published in the Journal of Biogeography, addresses how sampling biases, or the fact that some regions are better at sampling than others, affect our ability to understand biodiversity patterns. These biases often affect biodiversity estimates, mainly because more accessible regions tend to be more studied. These errors may impact the capacity to identify critical areas for preservation of a diversity of species.

To address this issue, the team developed simulations of virtual species distributions, in which collection biases and the expected results of the modeling were previously fully known. This process allowed the researchers not only to isolate uncontrolled factors present in real data, but also to evaluate the modeling methods under thousands of different species distribution contexts.

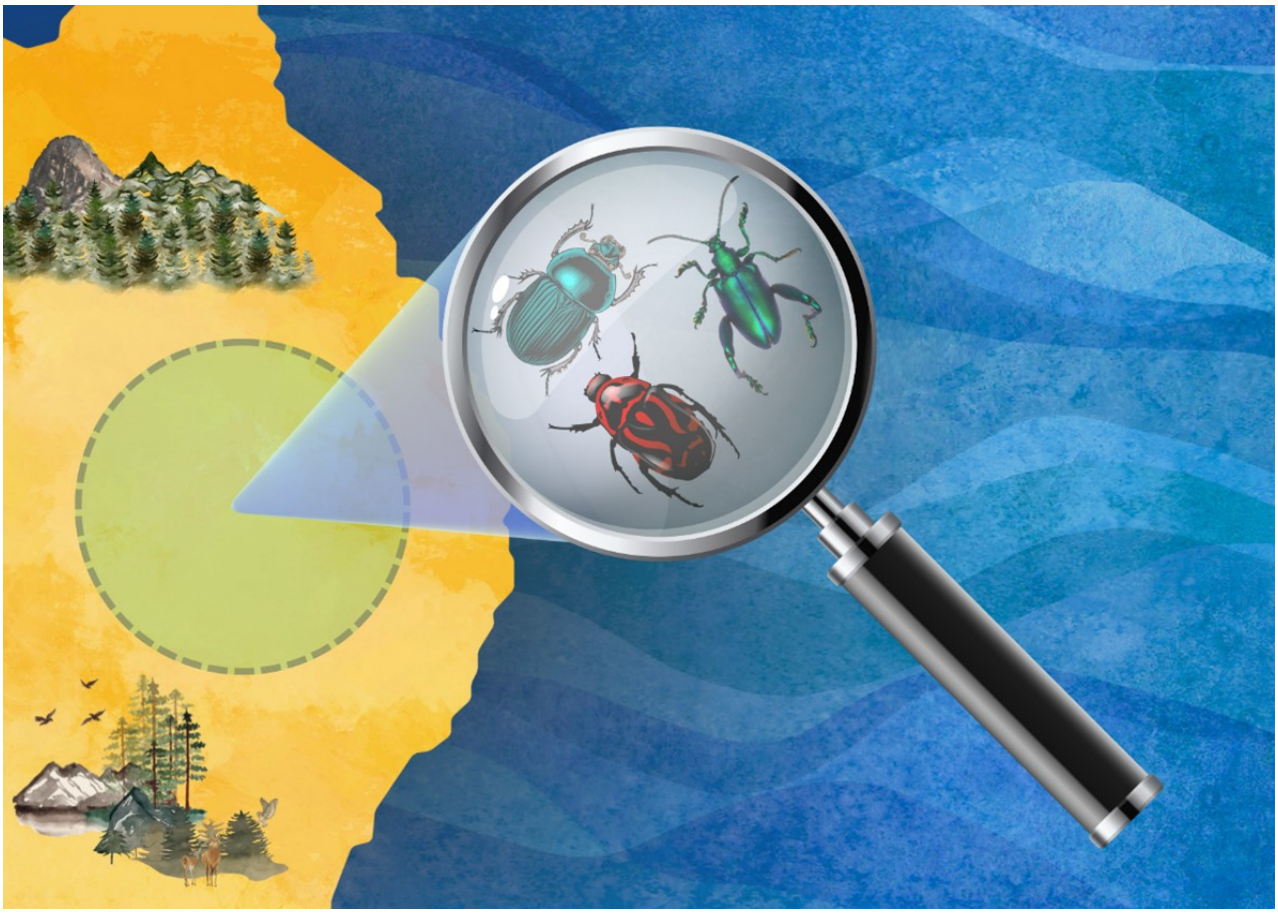

Figure 2 – USSE provides more accurate and consistent biodiversity predictions, mitigating impacts of the sampling bias and gaps.

The results indicated that the most used techniques for mapping biodiversity, such as species distribution models and spatial interpolation, often fail to capture the real biological diversity. Then, the team of researchers proposed a new methodology called Uniform Sampling from Sampling Effort, or USSE, which proved to be effective in mitigating the effects of sampling bias. USSE provided more accurate and consistent biodiversity predictions, resulting in a powerful tool for planning and conservation actions.

Figure 3 – Frontier between crop lands and the Amazon Forest in Mato Grosso – Brazil.

In the Brazilian Amazon, for example, many regions remain unknown in terms of biodiversity and deforestation caused by the expansion of agricultural crops and pastures, which puts at risk unknown numbers of species. The ability to propose effective conservation strategies and public policies for these regions, among different factors, also depends on being able to predict accurately the biodiversity distribution to identify the critical areas for preservation.

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