Impacts of alien species

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Alien species are species accidentally or intentionally translocated by human activities, such as trade or tourism, to new areas where they do not occur naturally. Due to increased globalization, their number is in constant augmentation.

Alien species are recognized as a major driver of the current biodiversity loss. They cause very diverse impacts on biodiversity, which occur through a wide range of mechanisms and affect all native taxa in all types of environments.

Quantifying these diverse impacts using standardized metrics is key to effectively prioritize the most harmful aliens for management and to develop predictive models of their impacts.

The International Union for Conservation of Nature's (IUCN) Environmental Impact Classification for Alien Taxa (EICAT) allows for such impact quantifications: it is a generic tool that classifies alien species into one of five semi-quantitative scenarios, based on their reported impacts on native biodiversity. EICAT therefore facilitates comparisons of impacts across alien taxa and environments.

However, EICAT mainly relies on punctual impact measures and thus does not discriminate between stable, increasing, or decreasing impacts. We developed a conceptual framework allowing to account for temporal dynamics when quantifying impacts of alien species and giving practical guidance for future impact studies. Increasing impacts could thereby be prioritized for management over stable or decreasing impacts, and impact evolution could be better predicted.

We proposed a new classification for the mechanisms through which alien species cause impacts; a mechanistic understanding of impacts will for instance help to develop new practices to mitigate impacts of alien species.

We used EICAT to classify and compare the global environmental impacts caused by alien ungulates, a widely introduced group. We then proposed a new method for measuring the risk of each alien species to cause high impacts, based on the EICAT classification; this method helps fine-tuning comparisons between alien species.

These different findings allowed us to give critical recommendations for improving the IUCN EICAT global standard and will thereby contribute to better inform nature conservation and to improve our understanding of the impacts caused by alien species on biodiversity.

Jury:
Prof. tit. Dr. Sven Bacher (thesis supervisor)
Prof. Dr. Helen Elizabeth Roy (external co-examiner)
Prof. Dr. Jonathan Jeschke (external co-examiner)
Prof. Dr. Daniel Wegmann (internal co-examiner)
Prof. Dr. Louis-Félix Bersier (president of the jury)