Science for Environment Policy

A new approach for evaluating alien species risk

A new framework has been developed by researchers to provide guidance in evaluating alien species risk. Using an analysis of more than 300 risk assessment (RA) models, the researchers highlight that many fail to cover all of the components of alien species invasion and offer guidance on which elements to include in future risk assessments.

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Global trade offers many economic benefits, but it also brings increased opportunity for the accidental, or deliberate, spread of non-native plant and animal species. While many of these alien species are harmless, others can become invasive and cause serious damage. Invasive alien species are one of Europe's main drivers of biodiversity loss, and cause millions of euros' worth of damage every year.

Given limited resources, controlling all alien species is not only impractical, but also impossible. As such, policymakers and researchers have turned to a variety of risk assessment models to identify invasive species likely to cause harm, both environmental and economic.

In this study, researchers reviewed and compared existing RA approaches, and integrated more than 300 different RA models to produce a new framework. They found two general types of RA approaches. Quantitative RA methods are used by academics and take a mathematical approach, often focusing on a single risk component, in many cases, species establishment. Qualitative and semi-quantitative approaches, used for policy development, have a more verbal basis and are usually based on expert opinion. These often deal with more than three different risk components but have a tendency to focus on impact.

The new framework defines risk in relation to each of the major stages in the invasion process: Transport (which includes introduction), Establishment, Abundance, Spread, and Impact (TEASI). Each of these stages is described in the study in mathematical form, yielding a quantitative RA structure.

The TEASI framework also allows the questions asked in qualitative and semi-quantitative methods to be described using equations, by considering them as special cases of quantitative models. It can therefore be described both mathematically and verbally. The researchers hope that this will allow for a more complete understanding, and practicality of use, in both policy and academia.

Its developers suggest that TEASI helps us understand how invasion processes are linked and promotes an integrative approach to alien species RA. However, the framework does not claim to be fully comprehensive, and instead provides an outline which serves as a starting point for future risk modelling work.

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