PRESS RELEASE

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Consequences of being rich: wealth and population are key drivers of invasive species in Europe

A new study of biological invasions in Europe found they were linked not so much to changes in climate or land cover, but to two dominant factors – more money and more people. Wealth and population density, along with an increase in international trade and commerce, were the forces most strongly associated with invasive species that can disrupt ecosystems and cause severe ecological or agricultural damage, scientists said.

An international group of 26 researchers reported the new findings this week in Proceedings of the National Academy of Sciences of the United States of America (PNAS), a professional journal. The publication resulted from a three-year project DAISIE (Delivering Alien Invasive Inventory for Europe), funded by European Union within its 6th Framework Programme.

Dealing with these issues will be “pivotal for policy makers and future management,” the researchers said, although no easy or inexpensive solutions exist, and many nations have been reluctant to take steps that might interfere with economic growth. “Invasive species are a continuing and extensive ecological crisis, and we are finding that human population and accumulated wealth are important drivers of this problem,” said Petr Pyšek, professor of ecology with the Institute of Botany in Průhonice, Academy of Sciences of the Czech Republic, and with Charles University in Prague, the lead author of this study. “Regional patterns of species invasions are complex, and there is still unexplained variation likely due to local scale differences in several of the ecological factors, including climate,” Pyšek said. “But invasive species are in large part an international trade issue, and we are the first to show that economic and demographic factors are key drivers across a range of taxa, more important than regional differences in geography and climate. Next to human population density, the closest correlation is to long-standing national wealth.”

Human activities often related to trade, travel and transport, particularly in the past 50 years, have caused a surge in the number of introduced species, ranging from plants to fungi, insects, fish, birds, reptiles and mammals. While some species are innocuous, many displace native species and cause a range of ecosystem disruption. As a crossroads of international travel and trade, with both a high population and high income, Europe has experienced many invasive species. The study concluded that other possible factors, such as climate, geography or land cover, were less significant than population density and wealth, and that those secondary causes may have been overestimated in the past. This is because mechanisms of species invasion are often associated with international trade. Invasive species can contaminate imported products, stowaway in shipping containers, be brought to new regions as pets that subsequently escape, or even be deliberately released into the wild, as in the case of game animals and biological control agents.

In the new study, researchers were able to predict the number of alien species in Europe to a reasonably high degree simply by defining the level of wealth and the number of people. “The overwhelming effect of human factors, wealth and demography, found for several taxonomic groups translates to human activities responsible for enhancing biological invasions,” researchers wrote in the study. Solving this problem will not be easy, the study suggested. “However, identifying the specific mechanisms of invasion is the critical first step. Monitoring may need to be improved. Legislation to restrict or regulate certain imports will likely be needed, in addition to charging fees or tariffs that would help deal with invasive species when they occur. But the World Trade Organization and other international agreements have no effective mechanisms to address this concern,” says Professor Phil Hulme, co-author of the study and the coordinator of the DAISIE project from Lincoln University, New Zealand. “And aside from good intentions, restrictions could be costly.”

A major challenge will be to understand the specific economic factors leading to introductions so they can be effectively addressed while minimizing negative impacts on international trade. These factors are likely to differ among species. For example, minimizing releases of vertebrate species might require additional regulation of the pet trade, while a focus on transport infrastructures such as canals may help control introductions of alien invertebrates. “Nations do not have a good track record in

forsaking future economic prosperity for environmental benefits," the study concluded. "Only if the true determinants are identified will it be possible to predict and manage alien species invasions adequately without adverse effects on other economic sectors."

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