

Nature's abundance protects us against pandemics

The global crisis caused by Covid 19 has forced us to look seriously at the increasing frequency with which humans are contracting diseases originating in animals, otherwise known as zoonoses. What if biodiversity was actually our best protection against these phenomena, which pose a threat to both our health and the international economy?



Stretch of forest cleared to plant coffee trees, Indonesia.

Since the 1950s, the frequency of animal-to-human disease transmission has almost doubled. Various explanations have been proposed to explain this phenomenon, including the massive increase in movements of goods and people, and the fact that climate change has expanded the habitat range of disease vectors such as mosquitoes. But, ever since the SARS and H5N1 epidemics in the 2000s, researchers are increasingly looking to less obvious explanations, with a particular focus on wild animals as reservoirs of infectious diseases.

It now seems that the declining biodiversity of ecosystems is a factor conducive to the emergence of zoonoses. The hypothesis, which seems counter-intuitive at first sight, is as follows: in nature, viruses tend to target the most abundant species. When biodiversity declines, these species which help to transmit pathogens disappear less rapidly than others, meaning that they become proportionally more significant, increasing the level of transmission and the risk that the parasites will be passed on to humans. When biodiversity is flourishing, on the other hand, the presence of other species serves to dilute dominant populations. This dilution effect can limit the risk of viral propagation by up to 80%. Comparative studies focusing on Lyme disease (transmitted between different species of mammals by ticks), hantaviruses

... Loss of biodiversity may be a factor conducive to the propagation of zoonoses ...



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Crested owls, Ecuador.

(viruses transmitted between different species of rodents) and the West Nile virus (transmitted between different species of birds by mosquitoes) have demonstrated that zones of strong biodiversity have significantly lower levels of pathogen circulation, thus helping to protect neighbouring human populations.

In order to test this theory, researchers are working on a number of approaches: using databases to observe the relationship between declining biodiversity and the emergence of zoonoses; modelling the system to understand the impact of the dilution effect on the propagation of diseases; and, finally, observing situations on the ground at a local level.

For the past three years, a field research team has been observing the connections between biodiversity and viruses in Mexico, in a context where environmental management efforts are highly heterogeneous. Their goal is to observe how different strategies of biodiversity conservation affect the propagation and diversity of viruses coming into contact with human populations. In the future, our work to protect nature could well play a pivotal role in preventing further zoonotic outbreaks.

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