Abstractions

FIRST AUTHOR

More than 40 years after the first measles vaccine became available, the virus is still a leading cause of death in children in many countries. Aid organizations such as Médecins Sans Frontières (MSF) are finding that vaccination strategies that proved successful in developed countries do not always work for developing regions. On page 679, Matthew Ferrari, a postdoc at Pennsylvania State University, and his colleagues show that seasonal and cultural patterns drive predictable episodic outbreaks of measles in Niger's capital, Niamey. In this setting, vaccination can be beneficial during outbreaks — a tactic previously considered inappropriate given the disease's rapid rate of transmission. Ferrari spoke to *Nature* about his work and its impact on health policy.

Do organizations such as MSF typically reach out to academia?

No. MSF focuses solely on providing health care, and has little opportunity to critically analyse data. They first contacted me to examine data from their vaccination programme in Niamey to assess whether supplemental vaccination in response to outbreaks might be beneficial.

What challenges did you face when modelling measles outbreaks?

Niger has one of the highest birth rates in the world, so there is a rapid build-up of children who are susceptible to measles. This makes it hard to determine the critical percentage of people that need to be vaccinated to head off an outbreak. MSF has a good relationship with the Niger Ministry of Health, and they granted us access to 20 years worth of measles incidence rates. Using these data, we showed that the classical dynamics of virus infection and spread do not hold up in Niger.

What unexpected dynamics did you find?

In Niger, the median age of measles infection is two years, whereas it is between five and six in European and North American countries, where children are socially protected until they enter school. We also found that the incidence of measles declines once the rainy season begins — presumably because the city's population falls when people return to agriculture after the dry season. We are now looking at satellite imagery to better understand how changes in population density affect disease transmission.

Has this work changed your career goals?

Yes. I now want to work at institutions with strong public health connections. I like the rapid interplay between data gathering and critical evaluation of health policy, because I think it keeps scientists accountable — a strong motivator to do good work. ■

MAKING THE PAPER

Christopher Clark

Soil nitrogen's detrimental effects on plant diversity may be reversible.

Few scientists can say that their research project grew up as they did. But when ecologist Christopher Clark joined David Tilman at the University of Minnesota, St Paul, as a graduate student in 2001, Tilman's prairie grassland project to understand the effects of nitrogen deposition had already been running for almost 20 years. "I was 7 years old when Dr Tilman started it," says Clark.

Nitrogen is an essential element for plants, but too much of it in the soil results in decreased plant biodiversity. Nitrogen also affects the global carbon cycle. Normally, soil holds twice as much carbon as the atmosphere. The presence of extra nitrogen may cause less carbon to be stored in soil, contributing to global warming.

During the past 50 years, fossil-fuel combustion and fertilizer use have greatly increased the amount of nitrogen deposition in land ecosystems. "It has been estimated that human activities rival all natural processes combined in terms of how much nitrogen is being put into ecosystems," says Clark. "We're basically doubling the nitrogen supply globally."

Tilman's project to study the effects that nitrogen is having on plant biodiversity began in 1982. He deposited varying amounts of nitrogen-containing fertilizer onto a patchwork of grassland plots in three fields of Cedar Creek Natural History Area in Minnesota every summer until 2004. The fields were chosen because they had fallen out of agricultural use, and had become dominated by a species-rich mixture of native grasses and forbs. During the spring and summer months, Tilman — and later Clark — and various teams of summer interns harvested and recorded the plants that had emerged in the various plots.

In their analysis, described on page 712, Clark and Tilman found that even the lowest amounts of nitrogen in their treatments, which mimicked rates of nitrogen deposition over much of the developed world, resulted in the loss of 1 in 6 plant species. This is a large attrition, says Clark, because there are hundreds of plant species at their sites. Contrary to expectation, there was little difference in the loss of biodiversity between sites that received high and low nitrogen input. Clark suggests that because most species in this region are adapted to grow in nutrient-poor conditions, nitrogen inputs at any rate above the low historical levels may have an effect on the plant community.

But the study's results do not bear only bad news. From 1992, as part of a second experiment, Tilman stopped treating half of the plots in one of the three fields with fertilizer. Thirteen years later, he and Clark found that changes in biodiversity in these plots occurred at the same rate as in plots that had never received any fertilizer. "It may take a while, but our ecosystem seems to be able to recover," says Clark, now a newly minted postdoctoral fellow in Jianguo Wu's lab at Arizona State University in Tempe. He is about to embark on a biodiversity study of the Eurasian Steppe in China.

"Our findings suggest that if we start some sort of coordinated national–international effort we can either prevent or reverse some of these losses, which are probably occurring across much of the globe," Clark says. ■

FROM THE BLOGOSPHERE

A Commentary suggesting widespread duplicate publication (*Nature* **451,** 397–399; 2008) has caused a storm of responses. Reactions across the NPG blogs and forums are captured on Nautilus (http://tinyurl.com/39b7gt).

The Publishing in the New Millennium forum on Nature Network reports an informed and passionate debate among scientists about whether duplicate publication is a problem in their fields and, if it is, how it can be stemmed. And at the Nature Precedings forum, Hilary Spencer asks whether posting papers on a preprint server — previously suggested to serve as a possible check and balance in the peer-review system — may encourage plagiarism. Publishers can search for duplicates among manuscripts submitted to their own journals, but a plagiarism-detection system across all publishers (http://tinyurl.com/3y9tan), currently in trial, might be more useful. It will, however, add to publication costs.

For authors wishing to submit to Nature journals, the editors provide guidance on issues including plagiarism and due credit for unpublished data at our Authors & Referees' website (http://tinyurl.com/3bmo5a). ■

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