

The following article, prepared by Bruce Knight, was published as the lead article in *Crop Protection Monthly*, August 2014.

STUDY WARNS OF INCREASED SPREAD OF CROP PESTS

A new international study led by the UK's University of Exeter predicts that the spread of many pests and diseases is so rapid that a significant proportion of global crop-producing countries will be overwhelmed by pests within the next 30 years. The research published in the journal *Global Ecology and Biogeography* describes the patterns and trends in the spread of pests and diseases. It uses global databases to investigate the factors that influence the number of countries reached by the pests and diseases and the number already occurring in each country. The study examined fungi, bacteria, viruses, insects, nematodes, viroids and oomycetes.

Dr Dan Bebber, senior research fellow in Biosciences at the University, said: "If crop pests continue to spread at current rates, many of the world's biggest crop producing nations will be inundated by the middle of the century, posing a grave threat to global food security." Pests predicted to be the most invasive are three species of tropical root knot nematode whose larvae infect the roots of thousands of different plant species, *Blumeria graminis*, barley powdery mildew, and the citrus tristeza virus, genus Closterovirus, which is reported to have reached 105 of the 145 countries that were growing citrus by 2000.

The study looked at the current distributions of 1,901 crop pests and pathogens and historical observations of a further 424 species. Significant use was made of historical records held by CABI International (formerly Commonwealth Agricultural Bureaux) which document crop pests and diseases around the world from 1822 to the present day.

Fungi are reported as the most invasive and most widely dispersed despite having a relatively narrow range of hosts. Professor Sarah Gurr, co-author of the research, outlined the potential threats to crops in northern Europe. She was reported to say: "The fungi are the most invasive. We may well see more powdery mildews and more 'tropical' fungal species in northern EU member states. Certain rust and leaf spot fungi may pose a problem on cereals. We may also see more new variants of old diseases such as late blight of potato and more nematode diseases to add to our current problems with cyst nematodes." Professor Gurr commented that new, virulent variants of pests are constantly evolving and the findings from the study are concerning. She added: "There is hope if robust plant protection strategies and biosecurity measures are implemented, particularly in the developing world where knowledge is scant."

To reduce the potential impact of these new threats at farm level, Professor Gurr recommended more sustainable farming practices and less reliance on a few inbred disease resistant genes and single target site antifungals which hasten emergence of resistance in the pathogen population. She also welcomed recent moves at policy level, such as the UK government *Agritech* strategy and EU Horizon 2020 which she said herald a change in attitude to agriculture. She concluded that more early detection and biosecurity, and more training are necessary to minimise the threat, alongside increased public and political awareness.

Dr Timothy Holmes, head of technical solutions at CABI's Plantwise knowledge bank, added: "By unlocking the potential to understand the distribution of crop pests and diseases, we are moving one step closer to protecting our ability to feed a growing global population. The hope is to turn data into positive action."

The study supports the view that climate change is likely to significantly affect pest pressure on agriculture. A warming Earth will have a significant influence on the distribution of crop pests. The research received funding from the Biotechnology and Biological Sciences Research Council (BBSRC).
