

Combating plant diseases is key for sustainable crops

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This is rhynchosporium on barley. Credit: Adrian Newton, The James Hutton Institute

Climate change is likely to make plants more vulnerable to infectious disease, which will threaten crop yield and impact on the price and availability of food. Dr Adrian Newton, presenting his work at the Society for General Microbiology's Spring Conference in Harrogate, explains how exploiting diversity in crops is the best option to improve food security in a changing climate.

Pest and disease management has helped double food production in the last 40 years, but 10-16% of the global harvest is still lost to plant diseases each year costing an estimated US\$220 billion. Climate change is impacting on the micro-organisms that cause these diseases.

Fusarium head blight (FHB) – a fungal disease that affects both the quality and safety of wheat - has re-emerged over the last few decades as a disease of global significance. Changes in levels of rainfall, humidity and temperature all influence the predominant strain of FHB, in addition to the quantity of the harmful mycotoxin produced by the fungus. These changes are likely to affect wheat production, processing and marketing. Mathematical models have shown that the risk of FHB epidemics and the number of crops containing potentially dangerous levels of mycotoxin will increase across the whole of the UK over the next few decades.

Dr Newton from the James Hutton Institute, Dundee (formerly the Scottish Crop Research Institute) explains the difficulties in predicting the likelihood of disease. "The communities of microbes on [plants](#) are complex and include harmless and beneficial organisms as well as those that cause disease on plants and humans. We need to understand the dynamics of complex microbial communities and their interactions to be able to predict the likelihood of disease."

Understanding these relationships is key to improving our crop production and protection in the face of climate change. "Climate change adds an extra layer of complexity to an already complex agro-ecological system. Higher temperatures, increasing levels of carbon dioxide, water limitation and quality may all affect existing plant microbes as well as favouring the appearance of new microbes. This may increase the incidence of some diseases and reduce the incidence of others," said Dr Newton.

Less reliance on pesticides is essential to ensure sustainable crops, according to Dr Newton. "Plant pathogens are becoming increasingly resistant to pesticides – a problem that is likely to be made worse as their availability becomes reduced by legislation," he said. "One way to protect [crops](#) is to exploit their diversity. This increases resilience to pathogens and other stresses attributable to [climate change](#). This means less pesticide use, reliable crop production and sustainable food production system."

Provided by Society for General Microbiology

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