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Reflections on directions for Plant Pathology

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Plants are the source of virtually all food for humans, and the world's growing population is expected to approach 10 billion in 2050. For that reason alone, we need to be able to grow more food. This challenge is exacerbated by increasingly more urbanised and affluent populations which has the consequence that meat consumption is still (mostly) rising. Agricultural production also suffers the challenges of Anthropocene climate change which means unpredictable weather. Global trades results in increased movements of plants, animals and people providing ample opportunities for, and probability that, plant pathogens will continue to spread globally.

Plant diseases are one of the major challenges for agricultural production and continue to be responsible for huge losses. What prospects are there for reducing their impact and thereby improving the efficiency and sustainability of production?

I survey some major diseases and approaches being taken reduce their detrimental effects. The approaches I describe include some pros and cons concerning cultural practice, resistance breeding, host-induced gene silencing and biological control.

Specialised metabolites are produced by fungi to give them a competitive advantage in the complex ecosystems where they operate. Mycotoxins are a subset of these which happen to be toxic to us or other animals. Fusarium Head Blight (FHB) in cereals is associated with delve into mycotoxin accumulation in grain. I focus on FHB in wheat and oat and the prospects for understanding and developing biological control based on interactions with two fungal biological control agents in order to improve their efficacy and understand their role in reducing mycotoxin levels in grain.