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RESEARCH

Effects of extreme weather and future climate on crop diseases

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Climate change forecast for the UK



Impact on Crop Diseases

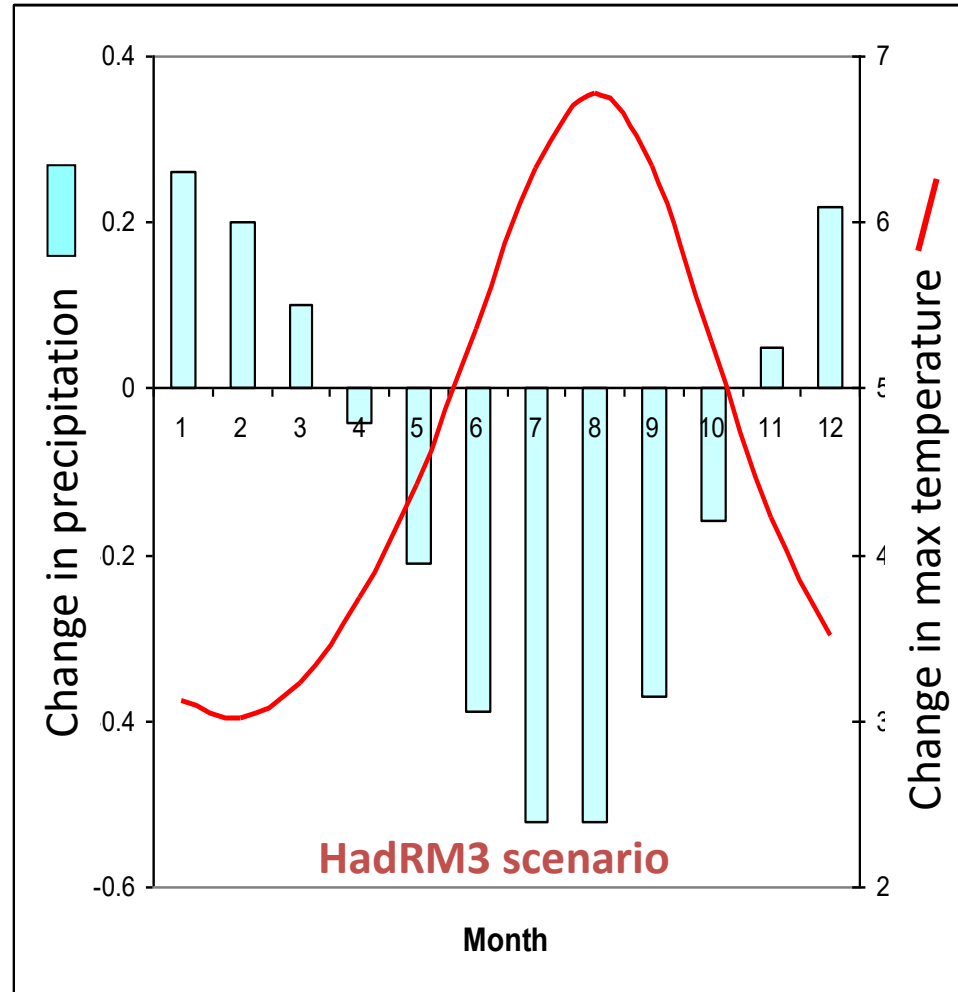
**Wetter
winters**

**Much
drier
summers**

Warmer

**+3 in
winter**

**+6 in
summer**



- Disfunction of some host resistance genes
- Inability to spray on wet land
- The amount of pathogen (inoculum survival might increase or decrease, increased number of reproductive cycles)
- New or more sporadic diseases
- Milder winters will advance crop growth and disease epidemics with more survival of pathogens. So T0 sprays and resistant varieties could increase in importance
- More insect activity will increase virus and phytoplasma diseases

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Predictions based on ecological traits (dispersal, infection requirements, epidemic type)

Disease type		Prediction
Winter-spring foliar-infecting polycyclic rain-splashed fungus e.g. <i>Mycosphaerella graminicola</i>	↑	Slight increase (with a few exceptions – e.g. cool-preferring <i>P. brassicae</i>)
Dry air-dispersed polycyclic foliar fungus e.g. <i>Puccinia triticina</i>	↕	Sporadic – capacity for more severe and less severe seasons
Upper leaf and ear/flower infecting fungus e.g. <i>Fusarium</i> spp	—	Little change except an increased or increased risk for <i>F. graminearum</i> , flag smut karnal bunt and <i>Ramularia</i>
Monocyclic root and stem-infecting fungus (above-ground autumn-winter infection) e.g. <i>Leptosphaeria maculans</i>	↑	Increase in severity and yield loss per unit of disease
As above (above-ground spring infection) e.g. <i>Sclerotinia sclerotiorum</i>	—	On average, little change in incidence or severity, possible increase in yield loss per unit of disease
As above (root infecting) e.g. <i>Verticilium</i>	↑	Varied/unknown response w.r.t. disease severity, probable increase in yield loss per unit of disease
Insect vectored virus e.g. BYDV	↑	increase
Soil-borne virus e.g. wheat soilborne mosaic	—	Little change – depending on rainfall at location
Phytoplasma (insect vectored) e.g. Aster yellows	↑	increase



West et al (2012)
Eur J. Plant Pathol.
133: 315–331

