

Impact of climate change on emerging plant diseases and their threat to food security

Climate changes will affect diseases, yield and quality of our crops, but how? Our climate will change dramatically over the next few decades and as a result, the mean annual temperature, as well as concentrations of atmospheric CO₂ and tropospheric ozone will increase substantially. However, our knowledge is limited on how multifactor climate changes may affect plant health. The prediction is that climate change may alter rates of pathogen development, modify host resistance and lead to changes in the physiology of host-pathogen interactions, which again may influence the severity of plant diseases. With this project we wish to investigate how climate changes may affect growth of crop plants and their interaction with pathogenic fungi, so it is possible to meet any predicted harmful effects in time by plant breeding or new methods of practical disease management. As plant-pathogen model systems will use the fungus *Bipolaris sorokiniana* causing Spot blotch disease on barley and wheat.

Barley and wheat lines with different stress tolerance will be grown under different water regimes, in environments with increased CO₂, ozone and temperature alone and in combination, using values as they are today and forecasted to be in year 2075. Phenotypic, physiologic, cellular and molecular effects of the climatic factors on plant growth will be examined during plant-microbe interaction, using microscopy, physiological measurements, gene expression and metabolite profiling. This project will be connected to an ongoing collaborative project on 'Climate change and plant health' involving Risø DTU and LIFE.

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