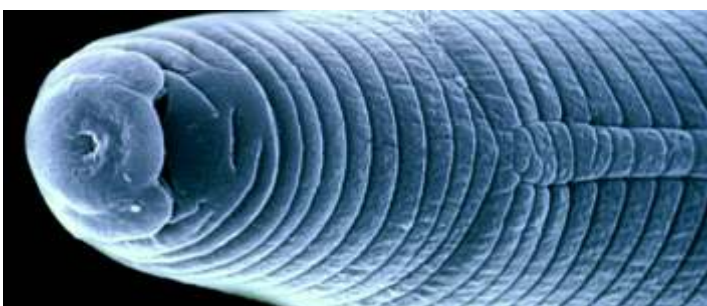


British crops face an ever-changing array of disease problems and new threats are continually emerging as a result of the arrival of new diseases, the evolution of existing diseases, new cropping practices and climate change. Rothamsted works with research and industry partners to identify, monitor and address such problems as they arise.

## Arrival of new diseases

New pathotypes of the cereal cyst nematode, *Heterodera avenae*, and a new species of nematode *Heterodera filipjevi*, have recently been recorded in the UK for the first time. Cereal cyst nematode is widespread in the UK, but largely controlled to non-damaging levels by natural fungal infections. However, there is reason to believe that these new arrivals might not be so susceptible to natural fungal control. In Scandinavia, these new types of cyst nematodes are causing problems in soils where natural fungal control has been effective for many years.

The first soil-borne mosaic virus affecting wheat was discovered in 1999 in the UK, although similar viruses affecting winter barley have been known for 25 years. Resistant cultivars offer the only realistic prospect for control. Rothamsted is developing molecular markers to assist plant breeding programmes and also exploring other sources of resistance to broaden the range of genetic options available.



## New cropping practices



Grass margins and grass weeds, encouraged under various environmental schemes, could act as a source of ergot infection for wheat crops. Rothamsted is part of a LINK consortium assessing how significant such infection sources are and investigating measures to decrease the infection potential of the grass margins. Extensive sampling (from fields and field margins) and spore trapping are being used to monitor the spatial distribution of this disease and assess the relative importance of different inoculum sources. Disease dispersal is being tested in field experiments.



## Evolution of existing diseases

Fungicide resistance is an increasing problem for UK crops. Strobilurin resistance in septoria leaf blotch was first detected at Rothamsted in summer 2002. Since then, as part of a LINK consortium, we have developed innovative assays, capable of detecting resistance-related mutations in fungal populations at very low frequencies. Data from this study have impacted on disease control strategies, guided agrochemical companies and informed PSD policy.

Pathogens can also evolve to overcome cultivar resistance in the space of a few seasons. Research at Rothamsted aims to improve measurement of disease resistance in winter oilseed rape cultivars (focussing on resistance to stem canker and light leaf spot), which will help in the selection and breeding of new resistant varieties. Disease resistance ratings are currently based on a visual assessment of disease and do not explain how resistance is expressed in different plant parts at different stages of disease development. Records of visible disease symptoms are being compared with measurements of pathogen DNA in the plant tissues.



emerging  
diseases



## Climate change

As the British climate becomes warmer and wetter, conditions will improve for certain pathogen species. Fusarium ear blight (*Fusarium graminearum* and the closely-related species, *Fusarium culmorum*) is an emerging problem for UK growers. Fusarium ear blight favours climates warmer than ours and disease risk is predicted to further increase as the UK warms up. Climate change may also make conditions more favourable for growing maize and there is evidence that maize cropping boosts the populations of both *F. graminearum* and *F. culmorum*. Rothamsted is investigating the epidemiology of this disease and whether the level of inoculum can be controlled by crop residue management and rotational approaches.

