

Global changes bring biological hazards to Britain 29 Oct 2003



The Colorado Beetle destroys potato crops and is close to entering the UK

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Britain is at increasing risk from biological hazards such as plant disease and insect infestation.

Although many indigenous hazards have been controlled and even eradicated since the beginning of the industrial revolution, global climate changes, trade and travel are all bringing us into more frequent contact with new dangers. The National Audit Office warned recently that outbreaks of pests and disease are on the rise. Recorded outbreaks have risen from around 150 a year in the 1990s to 370 in 2002. Notable threats include:

- *Colorado Beetle* This insect destroys potato crops. Having spread to France, it is now perilously near to UK farms. The National Audit Office warns that an outbreak of the Colorado Beetle could result in £279m worth of damage, if potato crops in southern England should become infested
- *Rhizomania*. This soil-borne disease harms sugar beet crops. 211 East Anglian farms were badly affected in 1987
- *Mushroom Virus X*. This virus of unknown origin reduces yields by 40% and has so far cost the industry £50m, according to *The Guardian* (29 October 2003)
- *Sudden Oak Death*. This fungus is now present in 280 sites in England and Wales, following its arrival from the US. It also harms rhododendrons (originally brought to the UK from Asia by Victorian explorers)



An example of 'bearding' induced by Rhizomania

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In a similar vein, international travel is bringing more Britons into contact with deadly diseases. Around 2,500 travellers return to the UK with malaria each year, while the recent SARS outbreak highlighted the heightened risk of disease transmission that international air travel brings. The intensified threat of biological hazards in Britain can be viewed as a result of two contrasting yet inter-related sets of processes, both of which impact upon the distribution patterns of potentially threatening biological organisms: *global warming* and *globalisation*.

Global warming and biome shifts

Global warming, as a result of carbon emissions, is altering the earth's climate. The greenhouse effect - a natural phenomenon whereby outgoing terrestrial infrared radiation (heat) is absorbed and held by the atmosphere is intensified as levels of carbon dioxide (CO₂), methane, nitrous oxide and chlorofluorocarbons increase as a result of human activity. There is now virtually unanimous agreement amongst scientists that the global average surface temperature has risen 0.6 degrees Celsius since 1900 and the ten hottest years on record have all occurred since 1990.

Consequently, models of climate change now generally predict a poleward shift of world biomes including the northern hemisphere taiga, boreal conifer, and temperate mixed forests belts (see world biomes map). A recent study carried out in the Montseny mountains (Catalonia, NE Spain) reports a progressive replacement of cold-temperate ecosystems as heather heathland is replaced by oak forest.

Other studies in Europe suggest 0.8°C warming during the last century has already shifted the climatic **isotherms** northwards by an average of 120 km.

However, it is the migration of potentially hazardous organisms that occupy niches within these ecosystems that is causing concern. Some organisms are able to respond to climate change at a faster rate than plants, notably disease-carrying insects such as the mosquito. The mosquito carries the malaria virus and dengue fever, both of which may modify their ranges as a result. However, limiting factors such as nutrient or food availability, soil type, and the presence of adequate breeding sites may prevent a range shift for some hazardous organisms.

'Biological Globalisation'

Other processes bring about an increased threat of contact with biological hazards. Globalisation the widening and deepening of economic, political and cultural linkages between nations contributes to the spread of potential threats. As products are traded and migrants travel between nations, there is growing potential for the transmission of hazardous diseases and organisms.

It is not a new process, of course. The distribution patterns of many plants and animals have been changing for thousands of years in response to human activity. Most famously, Walter Raleigh brought the potato to Britain from South America in the sixteenth century, thereby modifying its natural distribution.

Pests and viruses have also long been on the move as part of this process of change, carried unseen amongst agricultural produce or stowed away in the holds of ships. Rabbits were exported to Australia while disease-carrying rats spread throughout the New World aboard naval vessels. In Britain, the arrival of the cholera virus from India in the 1830s was a particularly unwelcome product of early globalisation (India was then a part of the British Empire). Until Joseph Bazalgette constructed London's sewers in the 1850-60s, cholera epidemics were commonplace.

Heightened risk

Agricultural globalisation has greatly lengthened food supply networks in recent decades. Consequently, the potential for contact with hazardous organisms is growing. This lengthening of networks is driven by consumer demand in MEDCs for cheaper goods, increased variety, and for fresh produce to be made available even when it is 'out of season'. Transport costs have fallen and there are now fewer border controls (e.g. within the EU). Refrigeration of perishables and the growth of supermarket supply chains further enable the process.

Consumer research has shown that a 'typical shopping basket' containing 20 fresh foods has 'travelled' 100,000 miles, with such items as sugar snap peas from Guatemala or asparagus from Peru ([*The Guardian*, May 2003](#)). With so much food travelling the globe, the potential for the transfer of unwanted organisms, such as the Colorado Beetle, is increasing all the time. Meanwhile, migrants and travellers (such as students in their 'gap year') put themselves increasingly at risk of infection from tropical diseases.

What can be done?

Responsibility for monitoring imports lies jointly with DEFRA (the Department of Environment, Food and Rural Affairs) and the supermarkets. The latter must, of course, make every effort to ensure their food is free of infection or infestation for commercial reasons. The report issued this week claims that the UK has a good record but the heightening of risk means that there can be no complacency. The report further suggests that DEFRA needs to conduct more extensive inspections and points particularly to their failure to source Japanese and Chinese suppliers of bonsai trees a known harbinger of pests and disease.

Sir John Bourn, head of the National Audit Office warns that "increasing trade and travel, new farming practices and climate change increase the risk of new plant pests and diseases being introduced and spreading here ... (DEFRA) should now take steps to improve its plant health inspection regime and research, and how it works with others, to keep new and emerging threats at bay."