

A climate lesson from the dinosaurs?



Tyrannosaurus rex
skeleton

Five times in Earth's history, rapid environmental change has caused mass extinctions when most of the species alive at the time were wiped out. These "disasters" were followed by a blossoming of biodiversity, as a rich variety of new species emerged.

The sixth mass extinction?

If species are going extinct more quickly than new species are appearing, then the overall diversity of the Earth's ecosystems is reducing. Loss of biodiversity may weaken ecosystems and limit the natural resources available to us. Some species seem to be particularly important to ecosystems and understanding the role of these key species may help us design better ways of protecting ecosystems. It may also tell us how worried we should be about extinctions.

Climate change and natural selection

We don't know how climate change will influence evolutionary change and extinction, but inevitably there will be winners and losers as species respond in different ways and at different rates.

Some species are already adapting to a warmer climate. In the last decade two migratory birds that visit the UK in spring and summer, the sand martin and the barn swallow, have been arriving earlier and earlier each year. But the order of their arrival has reversed; the martins now arrive before the swallows. The martins' response to a warming climate has been stronger and more rapid than that of the swallows.



Barn swallow

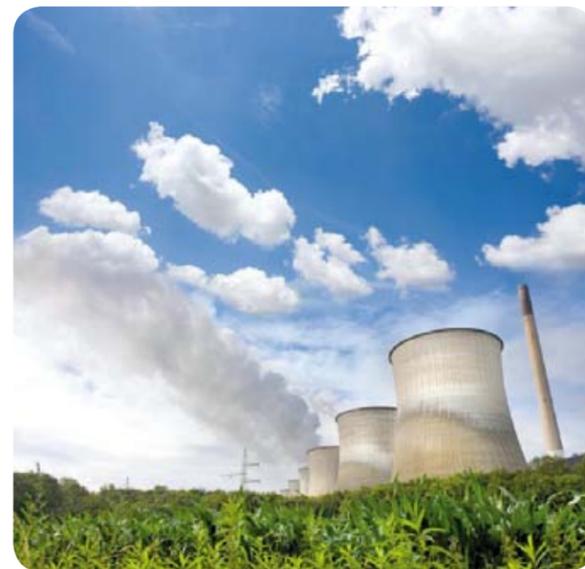
Can we cope in a changing world?

Species change, become extinct and new species emerge as a result of natural selection. Does our understanding of evolution help us balance the needs of humankind with the needs of the Earth's ecosystems?

Gaia

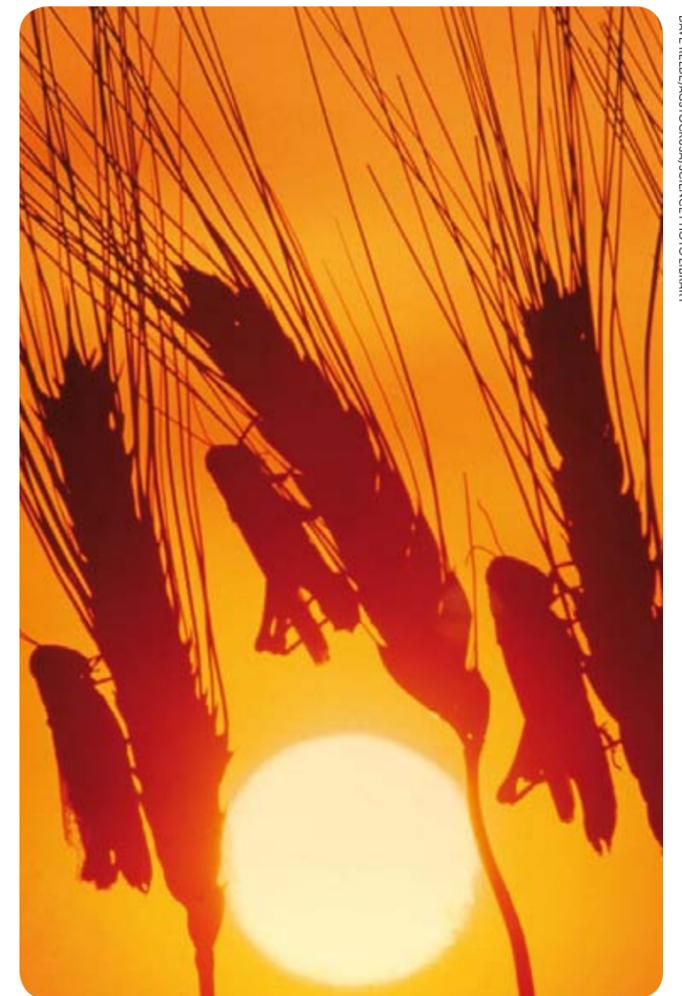
The Gaia hypothesis suggests that the planet, and the organisms on it, behaves like a single, self-regulating organism. This is perhaps overstated, but it does convey both the robustness of the planet's ecosystem in the face of change

and the uncertainty over which parts of the system are most sensitive and easily damaged. Understanding the effect of past environmental change may help us to anticipate, and plan for, the impact of future changes.



Here come the bugs!

As the climate changes, farmers will face new challenges in growing food, not least from the introduction, and evolution, of new diseases that will infect livestock and crop plants. Natural selection allows species to adapt in a changing environment, whether in the wild or on the farm, so understanding how pests and pathogens evolve in different environments is increasingly important in the fight to protect our livestock and crops.



Grasshoppers on cereal crops