

# Don't push nature too hard, it may not be able to bounce back.

The number and variety of many kinds of plants and animals have been declining in the Irish countryside for many decades. Dr Gordon Purvis and his colleagues at UCD School of Biology and Environmental Science have received funding to find out just how serious the problem is, writes Seán Duke.



**Biodiversity. Yet another environmental fad? Something that we don't have to pay much attention to? A bit like global warming, the ozone layer, and the loss of rainforests? Too vague to be of relevance to me.**

Does this thought process feel familiar?

If so, perhaps you should know that the loss of biodiversity, meaning the global loss of plant and animal species, could ultimately have very detrimental effects on human health and wellbeing.

Paying attention now? Good.

Alarmingly, many experts believe that we are now losing species so fast, there is a danger that we could be fast approaching a 'tipping point' where, even if we introduce last ditch measures, we may lose vital 'ecosystem services' on which the natural world and ourselves depend. That could mean, for example, that we end up with sterile soils where no crops will grow, crops that cannot be effectively pollinated, and pest problems that run out of control because of the failure of natural biological control. There are even worse scenarios, where the failure of natural ecosystems leads to our planet becoming almost unfit for human life. And these doomsday predictions do not take into account the incalculable loss of aesthetic quality in our lives, if we were to lose much of the natural world we are part of.

"There is certainly a risk if you push biological systems to extremes like that, you could actually put at risk human health and wellbeing," said Dr Purvis who is at the forefront of biodiversity research in Ireland.

## Background

Biodiversity is a relatively new issue in science, with its profile increasing markedly after the 1992 Rio Convention. Then all European states, and many other nations (with the notable exception of the USA) signed up to the principle that they should do what they can to protect the natural environment from the negative impact of human activities.

"The convention in 1992 put an official seal, or stamp on international concerns but more importantly, made a commitment to try and do something about it by integrating concern about biodiversity into every area of human activity - it became a formalised process. So, Europe produced a whole series of Biodiversity Action Plans (BAPs), one of which is a BAP for agriculture, and the knock-on from that was that each individual country produced their own variant plans."

"The interesting thing about '92 was that it introduced the idea of a target date of 2010.

This has been a kind of albatross hanging around everyone's neck since. It seemed, from the politicians' point of view, a safe enough target, pushing the issue into the future. The reality is that it has crept up very quickly, and we still have an unresolved issue; now, I guess there will need to be some revision and extension of that target".

## Ireland

In Ireland, the issue of biodiversity necessarily revolves around agriculture, and what agriculture is doing, as Ireland remains a predominantly agricultural landscape. At European level post-Rio, policy-makers began to try and push agriculture in a more environmentally friendly direction. This was done through the introduction of agri-environmental schemes, which became a central plank in rural development policy.

## The need for information

One of the problems facing anyone who wishes to study changes in Irish biodiversity over time is that the records are poor. Researchers have only belatedly started to gather information on biodiversity. For example, a countryside bird survey has been established in Ireland that in recent years, and has started to gather critical information on bird diversity, showing apparent declines in some populations, but gains in others. Even more recently, a national Irish Biodiversity Records Centre has been established in Waterford to collate the increasing amount of biological data being collected.

It is not good enough to simply follow what has been done in the UK, or elsewhere, said Dr Purvis, as Ireland's geography, topography and the nature of its farming is different.

"The Irish landscape is quite different from much of the UK, being relatively similar to western parts of Britain like Wales, for instance, with a predominance of small, mainly grassland fields, but quite different from south-eastern England, which has a much more arable farming base," said Dr Purvis.

## Ag-Biota

Dr Purvis and his colleagues wanted to develop a national expertise in biodiversity research within the context of modern agriculture. That was the concept behind a project called Ag-Biota, funded in 2001 by the Environmental Protection Agency (EPA). The project was based in UCD and funded for five years, rather than the usual three, which indicated the amount of work involved and the capacity to be developed.

The work focused on the farmed landscape, rather than special semi-natural areas. The project represented a massive task in data collection and analysis and will be completed in November this year, after an extension was granted by the funding body.

"We identified four key indicator groups, birds, bees, aquatic invertebrates and parasitoid wasps, the latter pretty obscure insects, but biologically they are very interesting.

"Bio-indicators are species that reflect the health of biodiversity generally in an area. These are important, because it is far easier to monitor key bio-indicator groups, than every single species in an ecosystem, which would be hugely costly and time consuming. Birds and

bees are good bio-indicators as the public readily identifies with them, but bees, for instance have a very practical importance for pollination. Aquatic invertebrates are important because they reflect water quality, or the lack of it, while parasitoid wasps have complex relationships with practically all other insect groups and reflect overall insect diversity."

The next step for Dr Purvis and his colleagues was to understand the relationships between these biological indicator groups and farming practice. The kinds of questions that he wanted to answer included: What kind of impacts do changing farming practices have on biodiversity? How can farmers better manage their land to enhance biodiversity?

By finding the answers to these questions, practices that are very damaging can be curtailed, while those having positive effects can be encouraged. This approach promises to provide, for the first time in Ireland, a means for policy-makers to make informed decisions on how best to protect biodiversity, and balance that against the need to protect farming livelihoods.

## Agri-Baseline

The need to focus on creating scientific 'baselines' forms the basis of a second major biodiversity research project, Agri-Baseline, co-ordinated by Dr Purvis and funded by the Dept of Agriculture.

Agri-Baseline has a highly practical aim; it is applying the knowledge gained from Ag-Biota about how to measure biodiversity in farmland. To do this, 180 individual farms in three regions - Cork, Sligo and Offaly - were chosen for a major survey of land use practices, habitats and biodiversity.

## AE-Footprint

The next step was AE-Footprint, an EU-supported project to develop common methods for agri-environmental evaluation across Europe. Dr Purvis and his group, as the Irish representatives in the AE-Footprint project, along with researchers in Teagasc and the University of Limerick, are trying to work out how a common method for documenting the benefits of agri-environmental policy can be developed for use in very different countries, regions and localities.

"You have this massive diversity of farming types, geographical and biological conditions and policy differences across Europe, and the challenge is to develop a common method that can assess the impact of agri-environmental schemes in any geographical region, in any agricultural context."

"That's a real challenge and what this project has actually done is develop the concept of an agri-environmental (AE) footprint index, which is simply a way of describing the agri-environment in any context. The result will hopefully help us document the benefits of agri-environmental policy and show how farming across Europe can contribute to achieving the targets set for protecting bio-diversity."

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# Nature

Dr Gordon Purvis of UCD School of Biology and Environmental Science

