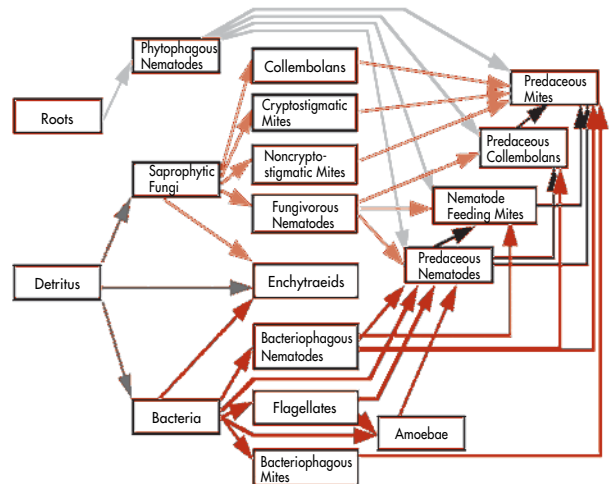


International advancement of community ecology theory (InterACT)

an ESF Scientific Network

The world's ecosystems are rich in species and complexity, and the way they function relies on subtle interactions between species. Ecosystems can be drastically changed and sometimes severely damaged by extinctions or invasions of species, or even by significant changes in single species populations. As we now recognise that human society and the biosphere are so dependant on the services provided by the world's ecosystems, there has been increased research focus on interactions between species and the impact these have on ecosystems as a whole.

To date, and certainly for Europe, most of the research has been on experimental work within individual ecosystems, without sufficient development of a greater underlying theory. Yet a deeper theoretical understanding of such interactions is necessary in order to facilitate predictions of the consequences of species losses on ecosystems as a whole. From such a basis, it might be possible to intervene to preserve an ecosystem, either by protecting a particular species or taking steps to mitigate the affects of its loss.



One way to handle the complexity of foodwebs is to aggregate species into functional groups, as in this soil system at Lovinkhoeve experimental farm (de Ruiter *et al.* 1993 *Plant and Soil*, 157:263).

2) How do we measure the interactions amongst species in real ecosystems?

Measuring the strength of interactions between species in ecosystems is extremely difficult. Theorists have overcome the problem by building models based on rather arbitrary distributions of these interaction strengths which reduces their relevance to natural systems. The objective of this theme is to develop and explore novel measures of interaction strengths amongst species in real systems that are appropriate for ecological models.

3) Can we develop new perspectives on the relationship between the complexity and stability of ecological systems?

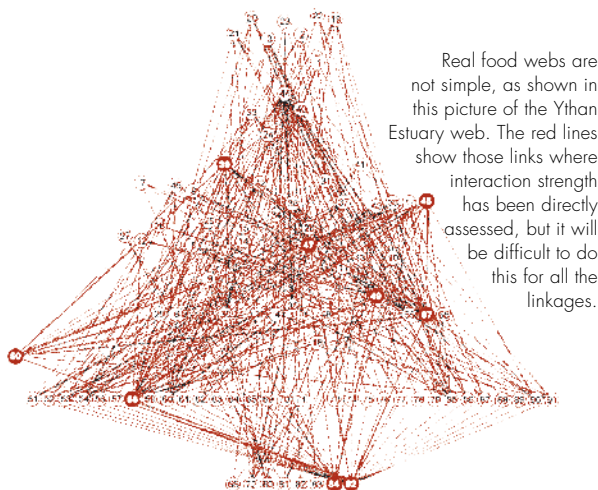
Techniques first developed in the 1970s are available for assessing the stability of model ecosystems to small environmental changes, but there is a clear need to develop novel techniques for the analysis of larger changes, particularly those driven by the activities of Man, such as deforestation and climate change. Developing such approaches will aid in the identification of sets of species that will survive environmental changes and co-exist over long periods of time.

How will these aims be achieved? By bringing together theoretical and empirical ecologists, InterACT will establish a co-ordinated and focused forum for communicating and stimulating ideas to improve the understanding of natural communities, their management, the sustainable use of natural resources, to identify vulnerable ecosystems and the key species within them. Specific activities will include:

- Focused workshops
- Travel grants and exchange visits
- Developing collaborative links with other networks and organisations

Further information at www.esf.org/interact

This Network was approved by the ESF Network Group in November 2001 for a three-year period



Real food webs are not simple, as shown in this picture of the Ythan Estuary web. The red lines show those links where interaction strength has been directly assessed, but it will be difficult to do this for all the linkages.

InterACT is an ESF Network to help provide a springboard for the necessary linking of empirical and theoretical ecologists that can further advance research in this area. Interactions between species and the susceptibility of ecosystems to both large and small changes in the balance between populations are the key elements to be addressed by this Network. The three principle themes of this Network are:

1) What is the response of ecosystems to species change?

The objective of this theme is to identify whether changes in species composition, either through extinction or invasion, can catalyse effects on community structure and cascade through the ecosystem as a whole. Specifically, are there kinds of communities that are most likely to be affected by extinctions and invasions e.g. more open to invasions and liable to extinctions? Also, are there certain kinds of species that are most likely to be involved as actors in these scenarios?



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The European Science Foundation acts as a catalyst for the development of science by bringing together leading scientists and funding agencies to debate, plan and implement pan-European initiatives.

The ESF Network scheme is coordinated from the Foundation's Strasbourg headquarters. For further information and application procedures contact:

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