Biodiversity within a community

Definitions:

Biodiversity

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Species diversity

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Genetic diversity

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Ecosystem diversity

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Species richness

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Techniques for measuring diversity

Find out about the following ecological techniques.

* Frame and point quadrats
* Line and belt transects
* Netting and trapping
* Random sampling

Diversity index

This is a formula for calculating the diversity of an ecosystem.

d = N (N – 1)

∑ n (n - 1)

Where N = total number of organisms of all species

and n = total number of organisms of each species

When collecting data for a diversity index, it is necessary to count numbers of organisms, for example by using a point quadrat.

Look at the worked example on page 244 of textbook, then answer the summary questions on that page.

- Why is the index of diversity a more useful measure than counting the number of species in an area?

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Abiotic and biotic factors

For an individual community there are many factors which can affect the number of species present – abiotic or biotic.

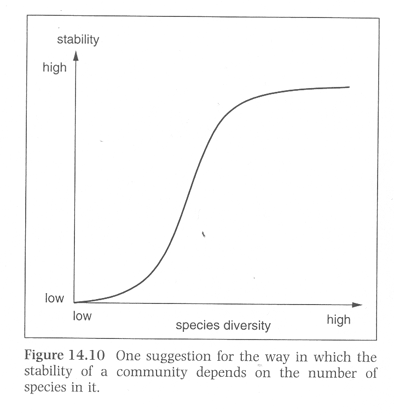
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| Biotic factors | Abiotic factors |
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Stability of ecosystems

In extreme environments fewer species are able to survive. In these extreme environments it is the abiotic factors which dominate the distribution and abundance of species.

Biotic factors are more important when the environment is less hostile, as the diversity of organisms is high. The longer the community has existed, the more species will have had the opportunity to join it – e.g. the longer a tree species has been in British woodland, the more insect species are associated with it (oak, 9000 years, 284 insect species: horse chestnut, 400 years, 4 insect species). All these factors interact, for example if the environment is harsh, a species that is not competitive in an easier environment might be more able to survive there.

# Relationship between stability and diversity

Are diverse communities more stable? Consider a community with only a handful of species. The food web may well contain predators which only have a single prey species. The chance extinction of that prey species would then lead to the extinction of its predator. In a more diverse community this would have less extreme consequences.

However, the interactions between species are also important, and there may be some that are more vital to the community than others.

Human influences on diversity

How has agriculture impacted biodiversity?

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How can farmers help conservation?

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# Biological conservation

# Maintaining species diversity (biodiversity) within a habitat.

# Ecological study of threatened habitats to inform their management.

# Control of introduced species.

# Biodiversity action plans – from the Rio Earth Summit in 1992

# Six reasons why maintaining biodiversity is important

# Moral reasons

# Aesthetic reasons

# Importance of individual species in maintaining the ecosystem

# Benefit to people – fisheries, tourism, industry, medicines, agriculture, forestry

# Maintaining evolutionary processes

# Insurance – we do not know which species will be useful in the future

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| Further reading and questions:  Section 10.3 textbook look at summary questions.  application on page 248.  Watch BBC programme “secrets of our living planet” episode 1 “the emerald band” – google it! |