

Terrestrial Ecology

Ecology Fieldwork

Chapter 3: Factors



Foghlaim Páirceanna Náisiúnta
National Parks Learning

The ecology of our study site is affected by many factors. These can be divided into four categories:

- Climatic factors
- Edaphic factors
- Abiotic factors
- Biotic factors



A Snapshot in Time

It is important to remember that the results of our fieldwork sampling only reflect the conditions on that day. This is particularly true for weather.



Factors Affecting the Study Site

Climatic

Climate influences the animals and plants that can survive in an area.

Edaphic

The soil determines the species that can grow at a site.

Abiotic

Several non-living factors affect the ecology.

Biotic

Living creatures and plants may affect the ecology around them.

Example: Factors in Action for a Green Hairstreak Butterfly

Climatic Factors

- Temperature
- Rainfall
- Snow
- Wind
- Sunshine
- Day Length
- Seasons

Butterflies need warm summer weather to fly, feed and breed.

Overwintering pupae may not survive a poor winter. A cold, wet summer may affect breeding success.

Edaphic Factors

- Soil type
- Soil pH
- Soil moisture
- Mineral content
- Humus

Green hairstreaks live in areas of poor scrub. If the soil is too rich, the habitat will degrade, and will no longer support the wild plants that the butterflies need to feed and breed. Gorse and bilberry are the larval foodplants.

Abiotic Factors

- Aspect
- Altitude
- Gradient (slope)

Green hairstreaks need sunshine. They are most likely to live on a protected south-facing slope, with maximum sun.

Note: Climatic & edaphic factors are also Abiotic.

Biotic Factors

- Predators
- Prey
- Pathogens
- Parasites
- Competitors
- Pollinators
- Decomposers
- Human activities

Predators, pathogens and parasites can all affect butterfly populations.

Competition for nectar sources or egg-laying sites may affect them.

However, the activities of humans is often the most serious factor, with the degradation and eradication of habitats.



Climatic Factors

Equipment

Thermometer

Air Temperature Use a thermometer to record the temperature in the shade.	
Precipitation Is it raining or snowing today?	
Sunshine How sunny is it today?	
Wind Check met.ie to for today's wind speed.	
Climate What sort of climate does Ireland have?	

Weather data for the past month or year can be found on www.met.ie.

Edaphic Factors

Equipment

Soil Thermometer
Soil pH test kit

Soil pH Use a soil testing kit to record the soil pH.	
Soil Temperature Use a soil thermometer to record the soil temperature.	
Is there a difference between the air and soil temperatures? How do you explain this?	
How does the soil pH affect the range of plants that grow here?	

Abiotic Factors

Equipment

Map & compass

Altitude What is the altitude above sea level? How does altitude affect ecology?	
Aspect Which direction does the site face? Which is warmer - a N. or S. facing slope?	
Bedrock What is the bedrock type in the area? How does this affect the soil type?	

Biotic Factors

Biotic (living) factors include the influence of humans and animals on the habitat. Different biotic factors are evident at each site. Here are some to investigate. Some may not be evident at your site. Conversely, you may find other biotic factors that are important at your site.

Biotic Factors: Over-Grazing

Many areas of Ireland have high populations of wild deer or goats. Many areas of commonage have too many sheep.

Can you see any evidence of over-grazing? (Eg: Chewed bark & shoots, grass eaten to the roots, no shrub layer or young trees.)	
What species are over-grazing here?	
Is there a predator missing? What & why?	

Biotic Factors: Pollution


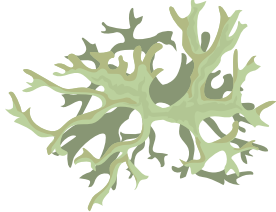

Which of the following are evident at the site? Describe.

Litter	
Noise Pollution (Engines, machinery, loud people)	
Trampling or Damage of the Vegetation	

Bio-indicators: Lichens & Air Quality

Lichens are primitive, slow growing plants. Each species consists of a symbiotic relationship between an algae and a fungus. There are 100s of species in Ireland. They can be very difficult to identify.

Lichens are bio-indicators. Their presence gives us clues to air quality. Flat (crustose) lichens, that grow low and tight to the surface, an often tolerate air pollution. Filamentous species usually need very clean air to survive.

 <p>Crustose Lichens</p> <p>Will grow in clean air, but can also grow in polluted air.</p>	 <p><i>Evernia</i> (Oak Moss)</p> <p>Will grow in clean air, but will also tolerate slight pollution.</p>	 <p><i>Usnea</i> (Old Man's Beard)</p> <p>Will only grow in very clean air.</p>
<p>Describe any lichens that you saw.</p> <p>What do they tell you about air quality at your site?</p>		

Biotic Factors: Introduced and Invasive Species

An Introduced Species is one that is not native to Ireland. In fact, many of our species have been introduced. Eg: Rabbits, hedgehogs and fallow deer were introduced by the Normans and are now considered to be part of our fauna.

An Invasive Species is an introduced species that causes harm to native species and habitats. Eg: Introduced Grey squirrels out-compete our native Red squirrels. Many introduced plants, such as Rhododendron, smother our native plant species.

Are any invasive species present at your site? What?	
What problems does this invasive species cause?	
What viable solutions are there to tackle the problem.	

Other Biotic Factors

If other obvious biotic factors are present at your site, describe them here?

--

Protect Nature

We believe that everyone deserves the opportunity to learn, love and protect Nature.



Learn

Learning to recognize our native plants and animals



Love

Growing to love Nature. We love what we know.



Protect

Protecting Nature. We protect what we love.

What Next?

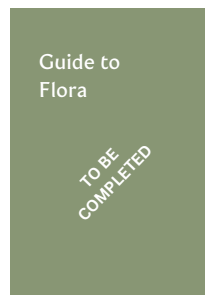
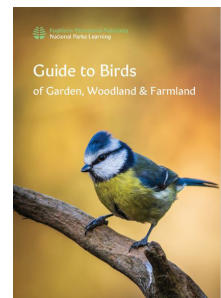
Now you are ready to venture outside and do your fieldwork.

Ecology Fieldwork Notes: Print one worksheet for each student.

If you do not have any identification guides, you may also find our simple guides useful.

Ecology Fieldwork Notes

Name	
Date	
Location	
Habitat	
Adjacent habitats (if applicable)	



We would love to hear from you

We hope that you enjoyed this Lesson Plan and that you found the resources easy to use.

If you have any suggestions on this lesson, or ideas for future resources, please contact us.

