Lichens are made up of two or more different organisms living together, a fungus and an alga. The fungus provides the body (thallus) in which the algal partner can live, protected from damaging conditions such as high levels of light (ultraviolet radiation) and lack of water (drought). The algal partner provides the essential carbohydrates (food for the fungus) from carbon dioxide and water, with the aid of sunlight. This close, interdependent relationship is referred to as a symbiosis.

Unlike mosses and flowering plants, lichens do not have green leaves or a stem. They may be pale or bright coloured and commonly occur in three forms:

- **Crusty lichens**: Closely attached as if pressed on the bark. Crusty lichens are difficult to identify, so are not included in this survey.
- **Leafy lichens**: Leaf-like lobes closely or loosely attached to the bark from the lower surface. Leafy lichens can be confused with moss or algae.
- **Bushy lichens**: Branched and shrub-like, attached to the bark at the base.

The nine types of lichen in the OPAL Air Survey (overleaf) are all leafy or bushy. Lichens can be confused with moss or algae.
Lichen bioindicators

Why lichens? Lichens that are highly sensitive to air quality have been used to detect sources of pollution. In the past, when the air in many places was highly polluted by sulphur dioxide, few lichens could survive, creating lichen deserts around many industrial and urban areas. Lichens are now returning to towns and cities in the UK, and they can still provide a great deal of information about air quality.

Nitrogen-sensitive lichens are outlined in blue

Intermediate lichens can be found in clean and polluted conditions and are outlined in grey

Nitrogen-loving lichens are outlined in red

Important lichen terms

lobes

branches

powdery spots

1. Usnea

Nitrogen-sensitive

grey-green all round
branches thread-like

2. Evernia

Nitrogen-sensitive

grey-green on top, white below
lobes flattened, strap-like

3. Hypogymnia

Nitrogen-sensitive

lobes greyish on top, pale brown below
lobes puffed up and hollow
lobe ends often become powdery

4. Melanelixia

Intermediate

dull brown lobes, closely attached to the bark
paler areas show when surface is rubbed

5. Flavoparmelia

Intermediate

broad, apple-green lobes
wrinkled surface on which powdery spots may develop

6. Parmelia

Intermediate

lobes grey on top, dark brown below
lobes thin, loosely attached to the bark
pattern of white lines on the surface

7. Leafy Xanthoria

Nitrogen-loving

lobes yellow/orange to greenish yellow
lobes broad, spreading
a few orange fruiting bodies present

8. Cushion Xanthoria

Nitrogen-loving

lobes yellow to green-grey
lobes small and clustered
many orange fruiting bodies present

9. Physcia

Nitrogen-loving

lobes grey on top, whitish below
lobe ends raised up becoming powdery
black-tipped whiskers on the lobe edges