

## FEATHER II.

### The colour of the feather

There are countless variations in the colour of bird feathers.

### The colour of feathers is affected by two factors:

- the pigments,
- refraction caused by the feather structure.

Pigments are colouring matters that are found in both plant and animal cells. The pigment colour is the same at all viewing angles, the colour resulting from refraction is the result of selective reflection. Pigmentation is produced by three groups of pigments: carotenoids, melanins and porphyrins.

**Carotenoids:** responsible for the appearance of yellow, orange and red colours. Carotenoids are taken up by the birds in their food.

**Melanins** produce colours ranging from the darkest black to reddish brown to pale yellow. Feathers that contain melanin are stronger and more resistant. These are the dark-coloured feathers responsible for flying. This compound can also be produced by mammals.



**White stork (*Ciconia ciconia*) and its black feathers**

Source: <https://pixabay.com/hu/photos/g%C3%B3lya-sz%C3%A1rny-madarak-tollazat-2433022/>

A common property of the **porphyrin group of pigments** is that they fluoresce when exposed to ultraviolet light. The colours pink, brown, red, green are produced by the different porphyrins.



**Kingfisher (*Alcedo atthis*) in its colourful plumage**

Source: <https://pixabay.com/hu/photos/mad%C3%A1r-j%C3%A9gmad%C3%A1r-%C3%A1llat-mad%C3%A1rtan-8894180/>

What do haemoglobin, which carries oxygen and carbon dioxide, and chlorophyll, which is found in plants, have in common? The basic structure of both compounds is the porphyrin base.

The colours resulting from refraction are also called structural colours. One colour like this is blue. The rays of the feather contain tiny air sacs that are responsible for light scattering. In iridescent colours, the feather rays are twisted. The melanin layers between the fibres refract the light. This is why we see different colours from different angles. For example, in the case of mallards (*Anas platyrhynchos*).

### **Ultraviolet feathers**

Many species have plumage that reflects light in the ultraviolet range, as well. This means that birds can see more colours than humans and therefore they see the world as more colourful.