

# Why do leaves often change color in the fall?

Have you ever wondered what is the science behind the spectacular autumn colors?

The famous French novelist Albert Camus once said: "Autumn is the second spring of heaven and earth, when each leaf suddenly turns into a colorful flower". It's easy to sympathize with the thoughts of Albert Camus if you've ever walked on a beautiful autumn morning in Dinh Tien Hoang street, embrace the blue Sword Lake, or bike leisurely on Thanh Nien Street in a Sunday afternoon relaxed in the autumn weather to feel the wind carried the old style of West Lake, crept through the trees, rolling the yellow leaves tumbling in the air.

1. Fighting for mates can help animals adapt better when their habitat becomes harsh



*Familiar autumn scenery at a corner of Guom Lake, Hanoi*

We seem to be fascinated by the moment when this familiar season comes, due to both the peace and the poeticness it brings to nature, plants, and people. The trees are gradually turning color is an indispensable drawing in any masterpiece of autumn, whether anywhere on this earth.

For most leaf-changing plants, the leaves turn yellow in the fall. However, there are many cases where the leaves turn orange, brown or red (maple leaves), creating a typical scene for the third season of the year. So have you ever wondered what is the scientific mystery behind those spectacular autumn colors?

1. Unexpected benefits of plants and animals: Lighting, explosive detection, disaster prediction and many other excellent applications

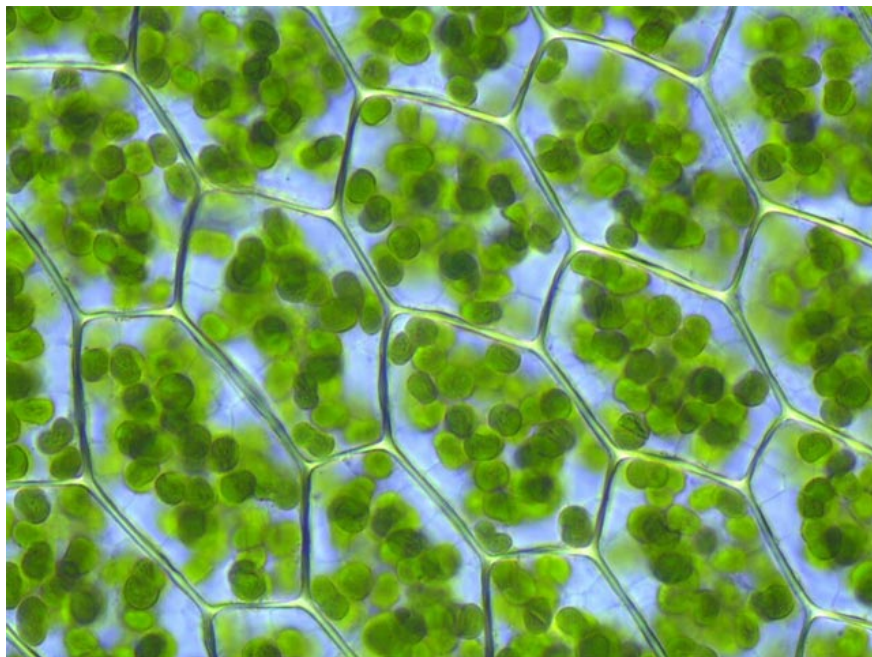


*In the fall, the leaves turn not only yellow but also orange, red, purple .*

There are dozens of reasons why leaves often change color in the fall, but one of the most significant contributors to this interesting natural phenomenon is the fall and daylight hours. It is shorter while night time is longer, and this factor has a strong influence on the metabolism as well as the biochemical reactions inside each leaf.

All derived from biological pigments (also known as "biochromes"). These are basically molecular substances that manifest in every living thing in a specific color by absorbing or reflecting the wavelength of light.

1. Norway's global seed warehouse needs millions of dollars to upgrade because of rising temperatures




*Chlorophyll is an indispensable substance in the photosynthesis process of leaves, while creating a characteristic green color*

If you've ever studied high school biology, you're probably no stranger to chlorophyll. We all know that chlorophyll is an extremely important component of greenery, or the whole life of the Earth, because of its ability to absorb and convert light to create light. fusion of leaves. In addition, chlorophyll is also a factor in the characteristic green color of leaves.

However, there are times when you come across more colorful plants than usual, this is because some of the other pigments found in plants are carotenoids, responsible for the orange on the leaves, and anthocyanins that produce the leaves. red and purple. While chlorophyll and carotenoids are present during leaf growth, anthocyanins are almost exclusively produced 'late' in the late summer and early fall.

During the daytime period becomes shorter and at night becomes longer, the amount of light needed for photosynthesis and chlorophyll production is significantly insufficient, making this process significantly slower. , thereby making the chlorophyll comb no longer as abundant as it was in the summer. When the amount of chlorophyll produced is too low, the characteristic green color of the leaves begins to fade and disappear completely, making way for other colors. To put it more easily, the lack of chlorophyll in the top surface of the leaves is a better opportunity for the layers of carotenoids and anthocyanins that lurk underneath to be 'exposed.' the typical colors as mentioned above.

1. The secret behind the survival ability of water bears, the only "immortal" creature on Earth



**CAROTENOIDS**

CC1=C(C(C(C(C1)C)C)C)C  
**β-CAROTENE**  
A type of carotenoid

Carotenoids can also contribute orange colours. Beta-carotene is one of the most common carotenoids in plants, and absorbs green and blue light strongly, reflecting red and yellow light and causing its orange appearance. It is also responsible for the orange colouration of carrots.

Carotenoids in leaves start degrading at the same time as chlorophyll, but they do so at a much slower rate; beta-carotene is amongst the most stable, and some fallen leaves can still contain measurable amounts.

CC1=C(C(C(C(C1)C)C)C)C  
**VIOLAXANTHIN**  
A type of carotenoid

**ANTHOCYANINS & CAROTENOIDS**

Oc1cc(O)c(O)c(O)c1O  
**ANTHOCYANINS**  
(general structure)

Unlike the carotenoids, anthocyanin synthesis is kick-started by the onset of autumn - as sugar concentration in the leaves increases, sunlight initiates anthocyanin production. The purpose they serve isn't clear, but it's been suggested that they help protect the leaves from excess light, prolonging the amount of time before they fall.

CC1=C(C(C(C(C1)C)C)C)C  
**LYCOPENE**  
A type of carotenoid

Carotenoids are responsible for the orange color on leaves, anthocyanins produce red and purple leaves

In addition to the amount of sunlight and the amount of lighting time - the most important contributing factor to changing the color of foliage - temperature and humidity are also indispensable components. In this majestic 'transformation' of this nature. For example, during the warm, sunny autumn days with the cool, gentle night sky, the leaves will change color faster and more brilliantly.

The reason for this phenomenon is that in the days when the weather is not too hot, the sugar produced in the leaves will increase significantly, until the night, if the temperature drops low and stays stable at 18 - 23 degrees Celsius, capillaries (veins) will minimize to prevent this sugar from moving out. Just like that, a circulation is established and this speeds up the production of anthocyanin pigments, producing red, purple and crimson shades for the foliage.

Not stopping there, altitude and type, species are also two other factors that significantly affect the speed of color change and color of leaves. For trees growing in the rugged high mountains, the color change rate of leaves in autumn will also take place faster than those of the same species but located in the valleys and plains. , even at the same latitude.

1. Admire the magic of nature through the best photos at the Wildlife Photography Contest 2019



*The color and rate of change of leaf color will also be greatly influenced by the position of the tree*

In summary, the color and rate of color change of leaves in the autumn season is a familiar natural phenomenon but extremely complex and diverse. Environmental factors such as light, humidity, temperature, location, and nutrients all have a significant influence on the intensity and timing of changing the color of plants. It is still a familiar tree, but this year it can change leaves faster and more brilliant than last year, which is completely normal.

So, take advantage of the opportunity to take a walk down the street and take some souvenir photos yourself if you suddenly find that this fall is so beautiful! Because it is very likely that you will not be able to see that wonderful scenery again next year, especially in the context of climate change phenomenon on earth that is having complicated developments like today.

1. 17 signs that the 6th great extinction - the nightmare of humanity is about to sweep the earth



*Walk down the street and enjoy the autumn scenery as soon as possible*

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