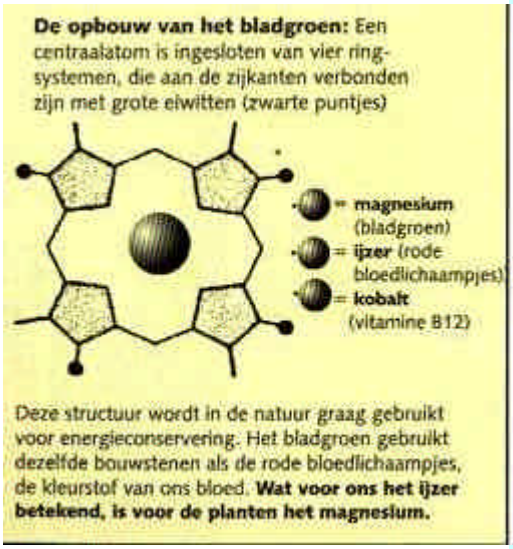
Green leafs

During the last information about transport and logistics in the plants we have worked our way up from the roots through the stem. In this episode we reach the highest regions of the plants, the leafs.

Leafs are green and absorb sunlight, this is photosynthesis. We know it all. But how do plants use the light and why are plants green? And what do they do when it is dark?

The juice of the plants is the water; this was the subject in the last Highlife.
Water is responsible for the stability of the plants (they are limp when they are thirsty). Water is the most important matter of transport and is responsible for the solution of the nutrition salts.
By the evaporation of the water at the surface of the leaves, the groundwater is sucked into the roots. This is why there is a constant flow up.



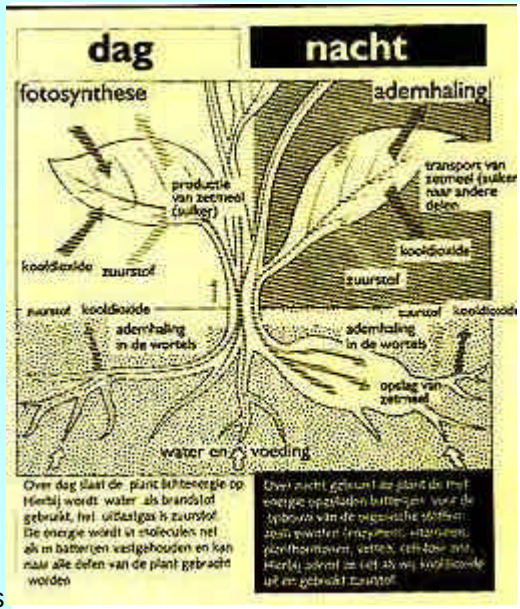
Water has more positions. In the place of production of a plant, water is used as a material for the synthesis of new substances. WATER IS THE FUEL OF PHOTOSYNTHESIS. The water is broken open in its elements by light: hydrogen and oxygen. Hydrogen supplies energy, the exhaust gas is oxygen, the oxygen that we breath.
The newest human developments in the area of energy winning are in this direction, but they are very insufficient, expensive and primitive compared to photosynthesis.
If we human beings will ever be able to imitate photosynthesis so direct energy will be released, energy-problems, hunger and poverty will belong to the past and we will probably visiting other planets for a long time.

With photosynthesis life on earth began.

4.7 billion years ago the air did not contain oxygen and life took place in the big ocean. Life, that were a few sulfur- and methane-microbes. Then one of them started to use light to win energy and build up sugars with carbon dioxide as an element. These first photosynthesis units are still existing in a hardly changed way in the ocean (the blue-alga). The fundament was laid for the development of life. It took another 4 billion years till the first complex organisms were coming into existence. It took 4 billion years to increase the content of the oxygen in the world that other life was possible.

The color of plants

A plant is build up by a string of cells. Every cell of the plant is provided with all functions to live independent. In the daily life cells are divided in questions and goals (root, stem, leaf). But if it is necessary, a root-cell can turn green (potato and light) and a green stem cell can form white roots. Who has slipped plants has seen it.
The parts of the plant at the outside are usually green. If we look at a green cell under a microscope, we see closed rounds filled with color. These colors are green (light and darker), yellow and red.
The green color is called chlorophyll or leaf green, what means exactly the same. Chlorophyll is a Greek word, chloros is meant green and phyllon is the leaf. The other red and yellow colors are the carotene, known to us because of the carrots (also Karotte or carot in German or French).
At the end of every year the carotene's in the trees get visible, because the plants withdraw the leaf green in the stem to save it till next spring. So the red and yellow colors



are left and are the beautiful colors of autumn.

Why are the plants green?

Chlorophyll is the central light catcher. All parts of the plant that are touched by the light, contain that much chlorophyll that they are green. Why green? Sunlight is a mix of all colors of the rainbow. The combination of all colors – purple, blue, green, yellow red – seems white.

All matters that have a color absorb a part of the sunlight. If a flower is yellow, it uses all not yellow parts of the sunlight and the yellow light components is left at the surface of the flower, which we see. A blue flower is taking all not blue light components and seems blue to us.
Chlorophyll, the leaf green, absorbs mainly the not green and not yellow components of the sunlight and that is why most plants are green.

Magnesium and leaf green

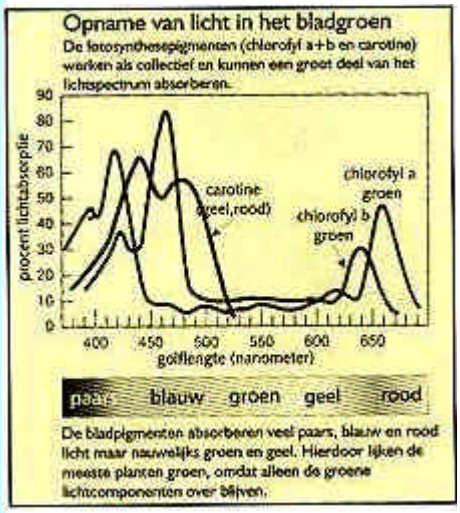
Chlorophyll is a molecule with an interesting geometric shape. A central atom (magnesium) is surrounded by four of the same elements (with sticking points for proteins at the sides).
This structure is often used in nature for conserving energy. We can find it in many compounds like the hemoglobin (with iron as the central atom) of our blood. The hemoglobin is responsible for the fact that our body is tended to oxygen and energy. Another representative of this group is vitamin B12 with cobalt as the central atom.

Magnesium is the center of the leaf green and that is why the plants turn yellow at a lack of magnesium. The plants are not able to build leaf green with an insufficient supply of magnesium. Typical for a lack of magnesium is that the old leafs turn yellow first, because the plants sacrifices these to provide the young leafs with magnesium. This differs from the lack of nitrogen, because the whole plant turns yellow, also the young parts.

How the plant uses the energy of the light to grow and live we will tell you next time. Finally this:

Plants live in a rhythm of day and night.

Everybody that grows using artificial light, knows how important it is to give the plants the correct amount of light. If we let the lights burn for 18 hours, the plants will grow beautifully, but will not bloom. If they get enough night's rest (12 hours light and 12 hours dark) they will be stimulated to make flowers.
Although they are getting enough light-energy at 18 hours of light, this is not enough. They will have to have enough time in the dark to do explosions of force like blooming.



In the daytime the plants gather as much light as possible and breathes out carbon dioxide and oxygen. Water is the necessary fuel. To store the energy, the carbon dioxide is turned into sugar and preserves the energy. During the night the plants uses the sugar energy to build up the matters it needs.

Next time more about this.