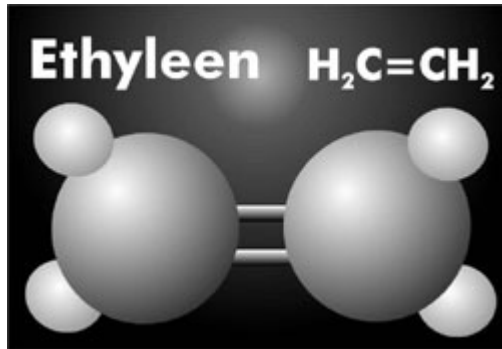


The network of hormones part 3

Beside four plant hormones, we got to know in the last two articles (the auxines, the gibberellenes, cytoquinine and abscising acid), ethylene is the last one of the big five. The last ten years a lot of other matters are found that influences the growth and development of the plants, just like the known plant hormones.

ETHYLENE



Ethylene is a gas. So it is hard to count it to the hormones, but ethylene has some hormonal qualities. The transport of ethylene is not in a certain direction, it flows along the cells and can pass the membranes without any trouble. The plant can bring actively the substances that are produced by the ethylene to other places. Typically for a hormone is that it is produced somewhere else then where it works. That's a fact with hormones.

The working

The restraining of the growth and the producing of buds, the stimulation of fruits and the aging of the existing flowers.

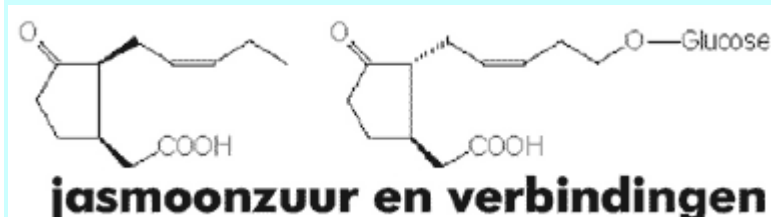
Carbon dioxide is an opponent of ethylene, auxine especially when it is available in too large amounts. Ethylene on the contrary can restrain the transport of auxine and a very high concentration of ethylene can start the production of gibberelene. Ethylene is a difficult to understand switch of the hormones inside the plants.

Ethylene gas is produced everywhere where plant tissue dies. That is in old branches and leaves, in the flowers (that have only a temporary function and die afterwards) and in fruits. Fruits are soft and sweet by ethylene (ethylene decomposes pectin of the cell walls) and they change colors, because the leaf green is decomposed. Also is ethylene responsible for the production of colorings and flavorings. These qualities are used to mature unripe fruits. Matters that free ethylene gas are sprayed for instance on tomatoes and cherries, to make the fruits mature and make cropping easier.

Ethylene is a gas and that isn't decomposed but just disappears into the air. Ethylene is not only a hormone but also a (sexual) lure for insects. We can see for ourselves how the fruit flies come to an old banana or an orange. The ethylene gas that comes from an old banana let other fruits mature very fast and they begin to produce ethylene too. Also freshly cut flowers are getting older very quickly in the neighborhood of fruit and old flowers spread a lot of ethylene too.

For growing plants in closed spaces it is important that dying and old leaves have ethylene and they spread it too. Because old leaves, or branches that are in this space or on the plants, produce ethylene, it cannot only attract bacteria, but also have an influence on the plant itself. The growth of the plant can be restrained, especially when there is not enough carbon dioxide in the air (for instance if fresh air is not available). At the beginning of the blooming phase the start of blooming can be very badly damaged, because ethylene the making of not present flowers restrains. If the flowers are already made, ethylene can cause a fast maturing and aging. This causes inside the hemp flower a decomposing of the stimulating THC component into the less active cannabinoids (CBN). CBN is not produced by the plant, but is oxidized THC (THC is reacting with oxygen). Cannabinole is not present in fresh weed, but exists when the weed is badly stored. Ethylene enlarges the amount of oxygen inside the cells and the oxidation of THC. Watch out that during the drying of the plants no dead or old parts of the plants and certainly don't put any old bananas or cut flowers in the neighborhood. This can improve the taste but diminishes the potency. Also ventilation helps not only against fungi, but also let the ethylene blow away that is produced by the flowers itself.

JASMONE ACID



Jasmone acid and other compounds are everywhere inside the plant. These matters are also hormones and influence the growth and development of the plants but also have a task towards the natural defense against fungi.

OLIGO-SACCHARIDES

Only ten years ago a whole group of matters was found: sugar compounds that are called oligo-saccharides. Saccharides means sugars and oligo means a few. Oligo-saccharides are sugar compounds that exist only of a few sugars (4-9). They were discovered in the Complex Carbohydrate Research Center in Georgia, USA. The longer these matters are studied, the more functions are discovered. They influence growth and are part of the defense system against fungi and bacteria. Oligo-sugars are decomposed products of the cell walls. The cell walls exist of poly-sugars like cellulose and pectin. The decomposed products of the cell wall are combined again and there are 65 kinds of different sugars that are part of the oligo-saccharides. These can be combined in twenty different ways and are as variable as proteins. It looks like the oligo-saccharides in the plant have the same important functions as some human hormones like insulin and glucagon.

Auxine and infections of fungi or damaged cells mobilize oligo-sugars. An oligo-sugar that is stimulated by an infection of fungi, makes a kind of antibiotic which the plant uses to fight against the fungi and which stops the expansion of the infection.

Oligo-sugars are not specific species. Sugars of other plants (tested on corn and maple) do the same job as the own made sugars. The creation of these oligo-sugars needs hundreds of different enzymes, so the plant does a lot of work to build up these matters.

CALCIUM

Calcium plays a big role as a regulator in the teamwork of plant hormones. Calcium influences the growth, the cell division and secretion. What can be measured is that when the auxine concentration is going up, the calcium does the same.

The plant uses a lot of energy to pump the calcium out of the cell (to let it in later on, when action is needed). Research revealed that calcium works as a kind of computing center, in which all signals of the hormones (especially gibberellenes, auxine and abscising acid) are calculated and a complex act is initiated.

Calcium is related to an enzyme and is a switch point of the growth and production of hormones.

FLORIGENE

Florigene, the blooming hormone that no-one knows.

There is no matter in the whole botanical science what was looked for, for such long time, as florigene. Presence of a similar matter is proven by experiments, the matter itself is not found yet. It could be a combination of different matters. The florigene is in every plant the same, because the matter can be moved from one species to another, by grafting the plants.

A plant that is genetically fixed to bloom only as the night is shorter than the day (cannabis bloom if the nights are longer than the days) can be brought to bloom by grafting another kind that blooms if the night is young.

This is not important for growing cannabis, because it would be unfavorable if the plants would bloom with 18 hours of light. By managing the light duration we have an important switch that makes it possible to manipulate plants. These qualities make hemp very suitable for growing at home. The florigene works so strong that it would put this quality of hemp aside.