Ricardo Pérez

QUANTEC® brings light into the dark

Plants in darkness react to virtual sunlight

After professors Stefanie Rogalla and Heinz Krönke[1] have already been able to demonstrate in earlier laboratory trials[2] that seeds treated within QUANTEC® were able to survive the heat stress in an oven with practically no damage in comparison to untreated seeds, they have now completed a further series of trials with the following result: Plants in darkness react to virtual sunlight, which was "sent" by a QUANTEC® device from another room 10 m away.

The laboratory trial

Plants demonstrate typical reactions in darkness and in the light, both chemical and physical. For example, plants close their stomata on the underside of the leaf; Stefanie Rogalla had already carried out research into stomata and is internationally known in this field. It was therefore no problem for her to prepare the undersides of the lamb's lettuce leaves for the investigation and then examine them in a nutrient solution under the microscope.

Since this trial is based on the reactions of the stomata, they are described here in the words of Stefanie Rogalla:

"Stomata are quite small (approx. 40 x 40µm) "gap openings" on the underside of plant leaves, which are subject to a very complex, highly sensitive cybernetic and biochemically and biophysically stimulated regulation process. They are of decisive importance for the survival potential of plants, because when they are closed, for example in darkness, hot weather or under the effects of harmful materials, the plant can optimise its water balance, i.e. transpiration is restricted, and water loss by evaporation is reduced. Under these conditions however, the plant cannot take in carbon dioxide from the air which is required for photosynthesis, in order to generate the biomass for its own growth by starch production. In the light however, and in the presence of potassium ions, the stomata are opened, increased levels of water vapour escape into the atmosphere, the plant transpires more intensively, its water balance is reduced, and it is able to take in more essential CO_2, in order to synthesise compounds such as carbohydrates by means of complicated metabolic mechanisms. Under corresponding environmental conditions (e.g. temperature, light or darkness, dryness, harmful materials), the plant is forced to adjust its stomata opening width relatively quickly in order to survive. The plant must thereby balance the influx of CO_2, which it only obtains with opened stomata, against the simultaneous loss of water vapour, i.e. it must keep the stomata narrow enough in order not to lose too much water, but at the same time wide enough to obtain enough CO_2 for photosynthesis, although this can only take place in the light. Any error in this adjustment will be costly for the plant: it will either wither (negative water balance) or starve (negative carbon balance). This is the dilemma between which the plant must "decide"."

. . . and there was light (Genesis 1,3)

The stomata are therefore normally closed in darkness. The opening and closing of the stomata are carried out by the plant with the aid of potassium ions.

Rogalla and Krönke evaluated 400 stomata per measurement point, which were in complete darkness, and were treated with the QUANTEC®, from another room 10 m away, with the information of light and potassium. The opening of the stomata was evaluated after 4, 7 and 10 hours.

The researchers in their publication[3] on the result:

"After only 4 hours incubation a more intensive opening width was measurable after treatment with QUANTEC®: While the stomata in darkness and without potassium ions or any treatment showed an average (n = 400 measured

1 The names are pseudonyms, since the two authors, professors at different universities in Germany, with great experience in the fields of plant physiology, system and complexity research, and extensive publication lists to their credit, do not want to run the risk of ruining their chances of obtaining funds, or damaging their academic reputation – as unfortunately might be expected in the current science scene.

2 See CoMed 02/10

3 The complete study can be found at: www.my-quantec.com

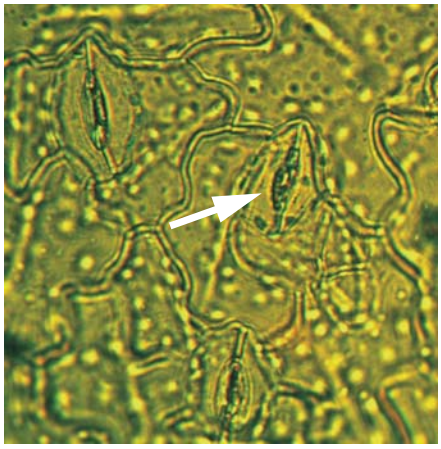

Fig. 1: Stomata closed in darkness

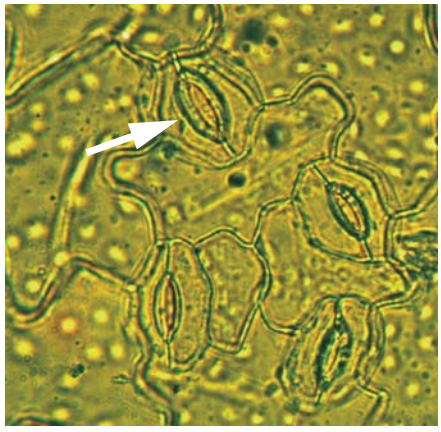

Fig. 2: Also in darkness, but with stomata opened by virtual sunlight (treatment with QUANTEC® from another room)

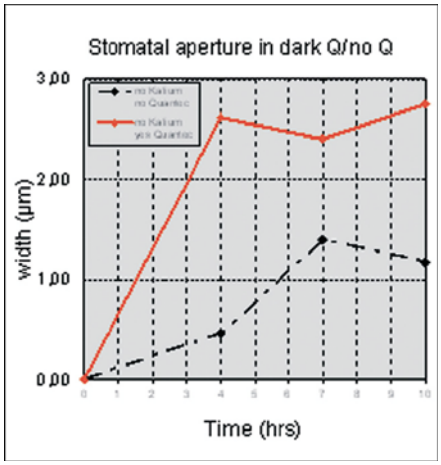

Fig. 3.

stomata) opening width of 0.5 µm, they opened to 2.5 µm after the same time (4 h) under treatment, i.e. an increase in the pore opening by a factor of 5 (!) was measured."

The verdict of the two researchers on the result of their trials series, which was carried out three times in order to test the reproducibility. In order to better estimate the work involved in this study, it should be mentioned that in addition to the preparation of the undersides of the leaves, 400 stomata apertures were measured per measurement point, after 4, 7 and again after 10 hours, making 1,200 measurements per test series, which were used for two curves, or a total of 2,400 measurements under the microscope.

Summary

This study provides the scientific confirmation of the effect of QUANTEC® on plants.

It was able to be demonstrated here that it is possible, with the aid of a QUANTEC® device which was not even close to the plants, to simulate for the plants the effect of sunlight.

In combination with the previous study, which was able to confirm that seeds are able to survive temperatures of 80 °C in an oven by treatment with a protective programme, QUANTEC® has now demonstrated its suitability, from a scientific point of view, for use in agriculture.

QUANTEC® has long since been in practical use in this field, for example for the improvement of soil quality, the regulation of the water balance, the strengthening of plants and defence against plant diseases. The good results (www.quantec.eu > Areas of application) have however previously been received rather sceptically, since these had not previously been achieved under scientific conditions.

This proof has now been provided by these two studies.

Ricardo Pérez
contacto@my-quantec.cl