

## Summary chrysanthemum trial

- **Date:** May 2023
- **Cultivation:** Chrysanthemums
- **Location:** two chrysanthemum nurseries in Westland
- **Researcher:** HortiTech

The aim of the research is to provide insight into the effect of the Climalux CLX V1000 full-LED grow light system compared to Signify 1040W 95/5.

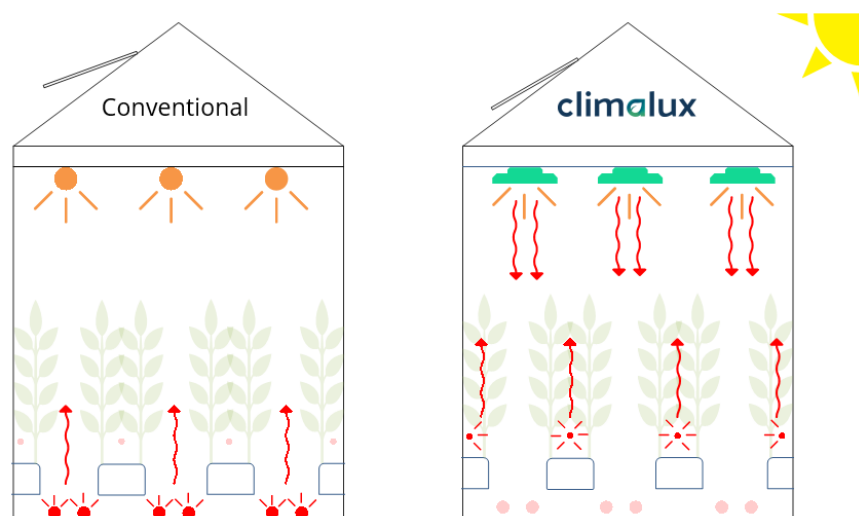
The studies were carried out over a period of 10 weeks on location at Denim Fleur in 's-Gravenzande, the Netherlands (CLX V1000) and a reference location (Signify 1040W 95/5). Analyzes were performed weekly on chrysanthemums from young plant up to and including the harvest phase. Various measurements have been carried out per crop, focusing on both the development phase and the harvesting parameters.

The compartments are equipped with 50 CLX V1000 Climalux full-LED grow lights with a placement density of 11.25m<sup>2</sup>. With 1000 watts of power, this amounts to a maximum power of 89 watts/m<sup>2</sup>. In practice, the outer two lighting strings ran at 900W (90% power) and the inner two lighting strings at 800W (80% power). With light measurements prior to the experiment, the illumination intensity is 158  $\mu$ mol, measured at a power of 71 watt/m<sup>2</sup>.

### Energy

In the conventional set-up with HPS lighting, a relatively high pipe rail temperature is controlled under the crop. The warm air rises towards the greenhouse roof. This is in contrast to the Climalux CLX V1000, where the heat from the LED lamp is blown down onto the crop by means of an integrated fan. Due to the vertical air movement, the heat is used better, which reduces energy costs.

Pipe demand has always been higher at the reference. The difference in tube temperature between the reference and Denim Fleur is large. Converted, there was 35% more pipe demand at the reference.



The crop under the Climalux grow light with full spectrum light gained weight quite quickly and easily, so that lighting could be saved during the last four weeks of cultivation.

## Production

The Climalux grow lights give off more heat in the greenhouse. This difference is clearly visible between Denim Fleur and the reference grower, when looking at the 24-hour temperature and the tube demand. Practice has proven that when the lamp is more red, more  $\mu\text{mol}$  is needed for total growth. The whiter the lamp, the easier it is for the plant to develop with less  $\mu\text{mol}$ .

A week after planting, it is noticeable that Denim Fleur is developing more roots faster than expected. More water is soon used than planned. The plants grow strongly and make many roots, while the reference stays behind.

The plant at Denim Fleur is one leaf ahead after three weeks of cultivation. The speed is not in the number of leaves, but in thicker stems and more shoot growth, compared to the reference. That effect can still be seen more clearly after 10 weeks.

There is clearly less use for inhibitors under the Climalux lamp than with the reference. The functionality of the built-in fan ensures that the plant grows more evenly. As a result, the crop kept a more open character for longer.

What is striking in the last three weeks is the rapid aging of the leaves at the reference grower. The leaves under the Climalux lamp remain green much longer.

During harvest it is noticeable that the reference has larger leaves, a more hollow stem and yellower leaves at the bottom. The chrysanthemums from Denim Fleur have more leaves but smaller, more weight and all leaves are greener.

## Conclusion

In summary, the following can be concluded from the test:

- In this test, Denim Fleur uses 35% less pipe heat compared to the reference.
- The Climalux lamp contributes to more weight over a shorter period, resulting in considerable savings on lighting in the last four weeks of cultivation.
- The reference grower cannot produce an adequate product with LED lighting alone. He needed HPS lighting for this at the end of the cultivation. Climalux shows that a good chrysanthemum can be grown with less light ( $\mu\text{mol}$ ).
- Full spectrum light stimulates the production of roots, so that less lighting is required at the end of the crop. For example, it is true that more kWh is used at the start, but considerable savings are made at the end of the cultivation.
- The fan is of great importance in activating the crop, even when there is no lighting, so that the moisture balance can be regulated.

## Additional information

Would you like to know more about this chrysanthemum trial? Please contact Niels Damen, operational manager. He can be reached directly via [n.damen@climalux.nu](mailto:n.damen@climalux.nu) or +31 6 18 67 81 29.



## Summary chrysanthemum trial – part 2

- **Date:** August 2023
- **Cultivation:** Chrysanthemums
- **Location:** Denim Fleur Chrysanten Westland, the Netherlands
- **Researcher:** HortiTech

In the winter period of 2022-2023, a study was carried out at Denim Fleur chrysanthemum nursery into the effects of the Climalux lamp on the development of the chrysanthemum crop.

This summary describes the research into the effects that the lighting & ventilation system has had on chrysanthemums during a 10-week cultivation round in the spring period of 2023.

The compartment is equipped with 50 CLX V1000 Climalux full-LED grow lights with a placement density of 11.25m<sup>2</sup>. With 1000 watts of power, this amounts to a maximum power of 89 watts/m<sup>2</sup>. In practice, two lighting strands along the gables ran at 900W (90% power) and the inner two lighting strands at 800W (80% power), in order to obtain an equal light distribution in the greenhouse.

The main aim of this research was to demonstrate the effect of the integrated fan in the full-LED grow light Climalux CLX V1000.

### Energy

Due to energy savings, there is less ventilation in the greenhouse during the winter and spring periods. The risk of fungi and infections increases with less ventilation, so internal greenhouse ventilation is essential.

When the irradiance exceeded 300W, the lighting was switched off while the fans remained on at 40% power to blow the rising heat back into the crop to maintain more crop activity.

### Production

The root formation developed as desired during the 14 days 'long day' period. The plant clearly grew strongly. There were enough roots under the plant to switch to the 'short day' period.

In the second half of April, the crop grows according to plan. There is no more exposure, but the integrated fan remains active. The month of April was not a sunny spring month and a rained a lot. Nevertheless, the crop continued to grow well.

Inhibition is done twice in the 5th week of cultivation. In hindsight, there should have been a inhibition before this. The crop is slightly longer than desired (95 cm). However, it has become a firmer (heavier) crop.

When visiting to a grower with the same variety, it appeared that the chrysanthemum had produced three extra leaves under the Climalux lamp.

## Conclusion

In summary, the following can be concluded from the test:

- Fewer crop inhibitors were needed. This effect is probably caused by fan activity.
- The plant developed a visibly larger root system with more taproots.
- Increased air circulation in the crop resulted in healthy (green) leaves down to the bottom of the trunk. As a result, less energy was needed for air circulation.
  - The leaf stays green more easily.
- Plant development was faster.
- Three more leaves have been produced. \
- Harvesting started four days earlier.
- The root system was so strong that the three-days-less 'long day' period had a positive effect on the harvest time.
- The daylight spectrum of the grow lamp stimulated the production of roots, so that less lighting was needed towards the end of the crop.
- More energy was used at the beginning, but that was gained back towards the end of the cultivation.
- The fan was of great importance for the activation of the crop.
  - The fan can be used when a high moisture content exists, even when the lamps are not turned on.
- The energy consumption and the minimum tube temperature can probably be reduced even more.

## Additional information

Would you like to learn more about this chrysanthemum trial? Please contact Niels Damen, operational manager. He can be reached directly via [n.damen@climalux.nu](mailto:n.damen@climalux.nu) or +31 6 18 67 81 29.