

Cavity screen fit with existing system

Saving extra energy with a double screen, without disadvantages such as air movement between the screens that require extra measures against temperature differences. A new cavity screen makes this possible, and existing screen systems in existing greenhouses can be adapted for this purpose.

A double screen saves extra energy and has long been a familiar phenomenon in greenhouse horticulture. Certainly with all the attention surrounding The New Cultivation, the interest has grown. However, for many growers investing in such a double screen is still a step too far. Reasons may include higher investment costs, but certainly also the additional practical installation problems when used in an existing greenhouse, if the current construction does not take a second screen into account. Often additional measures such as ridge screens and vertical ventilators are also needed to control horizontal temperature differences and cold drop. Years ago, screen installation company Screen4Seasons came into contact with a greenhouse grower who was interested in a double screen. But this grower felt that the beams of his trellis were too far apart. In his opinion, this would create too much distance between the two screen cloths, with too much air movement in between. As a result, he was unable to calculate the cultivation advantage of such a second screen profitably. Then the idea arose for a simple cavity screen, in which a stagnant layer of air would be created between two screens that were lying just above each other. With the possibility of making use of the existing installation for a single screen. This idea arose even before variants of cavity screens were devised and applied at trial stations, such as in the Winter Light greenhouse at Wageningen University & Research's greenhouse farming business unit in Bleiswijk (see also the article in issue 18 of Groenten & Fruit). Cultivation trials in the latter greenhouse show good energy-saving and cultivation results with a highly insulating cavity screen, although the special construction chosen there is not economically feasible for practical application, according to the researchers.

Small cavity

In the first instance Screen4Seasons attached the second (upper) screen fabric in a test set-up to the wind-up wires of the existing screen fabric. However, hanging the screen from the wires by means of hooks proved to be very difficult in terms of workmanship.



In addition, the extra upper screen sagged somewhat between the suspension points, which did not result in a nice even cavity thickness. An alternative, with a fully double wire bed, would have made the costs considerably higher, which was undesirable.

Ron Groenewald of Screen4Seasons: "That's why we thought of pulling a few extra wires under the regular wire bed and laying the second fabric on top of it," he says. This made it

possible to create a constant cavity of 4 centimeters between the two fabrics. Both canvases of the double screen open or close simultaneously with one profile. It is therefore not possible to close both canvases independently, controlled overlapping against each other, for example in order to screen off strong radiation in summer without having to leave strips open when the greenhouse temperature rises too high. But this is certainly not necessary when using a diffuse coating on the greenhouse roof.

Even climate

A cucumber growing company became interested because of a promising trial set-up. and last October ordered the installation of the cavity screen on 3.5 hectares. By choosing two clear cloths, the loss of light compared to a single screen remains limited, which extends the number of possible screen hours.

Thanks to the stagnant layer of air between the two screen cloths, the climate is more uniform than with a single screen or with a double screen with a larger distance between the two cloths. Smoke tests in the greenhouse by the WUR confirmed this effect. The smoke moved up and then very slowly parted at the cavity screen, indicating that air movement through and near the screen is extremely small. Where in the past horizontal temperature differences could occur in the greenhouse, with colder spots near the walls, this is now no longer the case with the cavity screen. Results from an ongoing monitoring project by the WUR will provide more data on this later.

Small screen package



The upper screen fabric is pressed neatly against the upper truss when closed. The lower screen fabric makes use of a lowered drag profile, so that it is pulled under the truss when

open. This creates a small overall screen package, despite the extra volume of a second screen.

A usual double screen fabric at both trellises can be restrictive. With this cavity screen, only at the top lattice beam, the bottom lattice remains completely free to mount other things. Furthermore, there is now more space left under the screen cloths, for example in a cucumber crop if a grower wants to switch to a high wire crop. The experience is also that there is less soiling of the screen cloths because they become less damp. The properties of the cavity cause less condensation. Thanks to the climate effect through the double screen, an additional fixed film becomes unnecessary, which saves on annual purchase costs and labor.

One motor

Besides the cavity screen, Screen4Seasons is also working on other developments.

Groenewald: "We can run about 3.5 hectares of screen installation on one engine. In a 7-hectare department, that means two motors, whereas you would normally need six. That's a cost advantage for large-scale companies. In addition to fewer motors, it means a grower needs less cabling to the motors, less electronics, and it requires less control in the climate computer."

This system in itself is not new. It was conceived a long time ago, but was left on the shelf after a few practical applications. Meanwhile, many greenhouse farms lend themselves better to this concept. "Previously, farms were too small in surface area to really benefit from it."