

NEW GENERATION GROWING REPORT



Kevin Connolly, of Ravensdale Nurseries, Ireland, is positive about the AVS units in his existing greenhouse: "This system is well suited to the Irish climate."

Better control over humidity reduces disease

Active ventilation system cuts heating bill and improves yield

An attempt to reduce energy costs, by lowering heating and ventilation, led to higher humidity and a drop in crop growth and fruit quality for Irish cucumber grower, Kevin Connolly, of Ravensdale Nurseries. In 2013 he installed an active ventilation system which solved his cultivation problems and improved crop health.

Ravensdale Nurseries is a family-run business located half way between Dublin and Belfast at the foothills of the Cooley Mountains. It comprises two glass greenhouse blocks that were built in 2001 and 2008 and cover 1.1 ha. Kevin Connolly, who has been running it

since 1989, admits that the location is not ideal due to the weather and available fuel, a situation made worse a couple of years ago by rising energy costs.

The nearby hills block the early morning sun, so much so that radiation remains at 40-60 watts/m² for one to two hours in the morning before bursting up to 200 watts/m². "The amount of light we receive here is about 30% less than in the Netherlands, for example," says Connolly. "To keep crops active we traditionally had to use a lot of heating followed by a lot of ventilation when the sun shone through," he says.

The hills also tend to hold onto early morning mist and cloud for longer than

surrounding areas making ventilation an expensive exercise but necessary to control humidity. "It seemed that a lot of the energy usage was just to control humidity which in turn was ventilated out of the greenhouse."

Crop suffered

The nursery has no access to natural gas, so energy costs are considerably higher than for other growers who do have it. Connolly has two boilers and uses mostly a light crude oil in the winter and LPG in the summer. When costs were rising, the retailers and end customers were reducing the price they were prepared to pay for home grown produce, he says. "This all led to a situation in which the

crops and quality suffered because they didn't receive the appropriate climate as a result of trying to save energy," says Connolly.

He started to look for alternative options, in particular the ventilation systems that had been developed for Next Generation Growing. He eventually decided that the Active Ventilation System (AVS), developed by Dutch company Van Dijk Heating, suited his situation best, both economically and logistically. It was important that it could be fitted into an existing greenhouse and was compatible with the climate control system. The Modbus driven system is designed to suit all common climate computer systems. "It did take several months to get used to the system and integrate it into the climate control with the correct settings. However, if you pay attention and are careful with the settings, you can control the climate even with a second screen in place," says Connolly.

Active ventilation

Thirteen units, which are made entirely of plastic, were installed in the two greenhouse blocks at the base of the gable walls. Some modifications did have to be made to the heating pipes that also run along the walls, which would not be necessary in a new construction, he says.

Each unit draws in outside air and heats it to the desired temperature, either by mixing it with warm greenhouse air or by using an integral heating element. A fan within the unit blows the drier air into the greenhouse via an air hose. In this way greenhouse air is actively ventilated and dehumidified with relatively drier outside air.

Connolly says this system is well suited to the Irish climate. The weather is cool for much of the year even during the summer when the night temperature can still fall below ten degrees with the exception of four to six weeks. This provides a good air and temperature differential for the system to work with.

Good results

The system was installed in 2013 and the results have been very good. "I no longer need to increase the minimum pipe temperature in



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order to get rid of the humidity so that reduces the fuel costs."

Connolly has always fitted a fixed plastic screen during the winter to save energy. "Before the ventilation system was installed, I had to make many holes in the film and remove it by early March. Since we've had the system, I only make half the number of holes as before and the plastic remains in place to the end of March into April.

He says actual figures are difficult to quantify but estimates fuel savings of 5 to 10%. "With changing external conditions it's difficult to estimate how much the AVS has contributed. The winter and spring of 2014 were relatively warm yet light levels in the summer were on the low side. Also energy costs have plummeted recently," he says. All-in-all he expects to be able to pay-back the investment within three years.

Less disease

Another advantage of the lower humidity is being to keep the windows shut for longer than previously on cooler days so he retains a higher level of CO₂. The CO₂ enrichment is provided by the LPG boiler during the summer.

This may have contributed to the slight increase in yield of 5-10% this year. Another notable benefit is the rise in the quality of the fruits by 10-15%, with them mostly all grading Class 1. "We've hardly seen any disease so crop health has been a definite winner thanks to the stable greenhouse environment."

Previously, the crops were very vulnerable to *Mycosphaerella* and other diseases. "Now the crops are clean so we use little or no chemical control, only environmentally-friendly ones," he says.

The cucumbers are grown in stonewool, although in the past he has also used peat, perlite and sponge which he used to recycle. However, when a virus crept in he switched over to slabs which are replaced each year to eliminate the risk of disease. In the new house he installed hanging Meteor gutters, and in 2012 he introduced raised gutters on stilts into the older greenhouse.

No regrets

He produces three crops per year and uses many varieties, although the most recent are Proloog, Laureen and Stockeu (all Rijk Zwaan) which currently produce an annual yield of around 160 cucumbers/m². The cucumbers are all sold within Ireland, mostly to retailer Tesco, but also to Asda and Aldi. The fruits are shrink-wrapped and labeled for retailers who buy them at a fixed price.

"Even though energy prices are low at the moment I have no regrets. The AVS was a reasonably priced system which allowed me to improve my growing techniques and improve yield and quality, without having to change any infrastructure," says Connolly.



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Summary

The installation of an Active Ventilation System into an existing greenhouse led to a more stable environment, resulting in a healthier crop for Irish cucumber grower, Kevin Connolly. The system has also resulted in a rise in yield and quality while fuel consumption has decreased.