

Glasshouse technology

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A plethora of new products and services were launched at GreenTech offering further innovation in protected horticulture, Gavin McEwan reports.



Glasshouses: GreenTech trade show in the Netherlands featured latest innovations for growers in protected horticulture sector - image: Jeroen van Luin

Amsterdam's GreenTech trade show in June (HW, 24 June) centred on innovation in protected horticulture. But the blizzard of 90-odd product and service launches included many worthwhile ones that delegates to the biennial event could have been forgiven for missing.

Developed by an industry and research consortium led by Van der Valk Horti Systems and among the contenders in the show's Innovation Award, the 2SaveEnergy greenhouse covering is claimed to offer multiple advantages from its combined glass and film profile.

The glass layer on the outside has a double anti-reflective coating, while underneath a layer of tough diffuse F-CLEAN film prevents condensation build-up "for at least 10 years", say its backers, and the 5cm cavity between them ensures high insulation in winter.

"The combination has similar properties to multi-coated double glazing but in a format that is light and easy to use, while allowing the same amount of light through as a standard single-pane covering," the consortium claims.

A further design feature is that vents on the ridge can open to allow air from the cavity to disperse. Warm air can even be pumped into the cavity to prevent snow and ice building up in

winter.

To back up its theoretical merits, a prototype tomato glasshouse incorporating the 2SaveEnergy design was built at consortium partner Wageningen University & Research Centre in Bleiswijk, funded by the Dutch government and industry's Glasshouse as Energy Source programme.

Incorporating the "New Growing" approach to glasshouse management, this exceeded expectations last year, with fewer hours of thermal screening required in winter leading to more precious winter sunlight reaching the crop. The energy-use target of 19cu m of gas per square metre was bettered by an actual figure of 16cu m, while the crop came in at 67kg per square metre, ahead of the target 63kg.

"The cultivation went well, without Botrytis or other damage," says project leader Aat Dijkshoorn of industry body LTO Glaskracht Nederland. "This glasshouse and cultivation concept has shown heat savings of around 50 per cent compared to established practice."

But he adds: "The low energy consumption in summer does have the disadvantage that to achieve the production level an external CO2 source must be available to achieve these high savings."

At GreenTech, Van der Valk also introduced ValkScreenVision, a new system for quicker and safer insertion and replacement of glasshouse screens. "It is suitable for every type of screen and can be obtained from a large group of screen installers and greenhouse builders," says the company.

On glass coatings, Mardenkro introduced AntiReflect, a self-explanatory coating for existing glasshouses that, according to Wageningen University data, gives a light increase of three-to-four per cent on the crop, enabling three per cent less energy use while providing a three per cent uplift in yields of tomatoes and peppers and five per cent in cucumbers.

Spectrum modification

Taiwanese firm LeBio has taken a novel approach to spectrum modification with its spectralX, a magenta-coloured mesh or film to cover polytunnels or even entire glasshouses. "It shelters and shades the plants in order to address optimally their photosynthetic needs," says the company, claiming it increases yields and shelf life while reducing losses to pests and diseases. Trials in Taiwan have shown both a five-to-10 per cent reduction in irrigation and a 2-4 degsC drop in air temperature, it adds.

In ventilation, Van Der Ende introduced the Airmix controlled ventilation and air circulation system for use with shading screens, drawing in air from above the screen into the cultivation area below, but also doubling up as a horizontal circulation system. The units can be fitted to new or existing glasshouses but the density and orientation will vary depending on the crop.

The VFloFan from Vostermans Ventilation provides vertical ventilation for the greenhouse that it says gives both a more uniform climate and energy savings. Suitable for a wide range of crops, the fan is easy to mount and maintain, it adds.

Housed in a polypropylene case and mounted at the side of the glasshouse, the Active Ventilation System with Heat Exchange (AVS-WTW) unit from Van Dijk Heating exchanges warm humid air inside the glasshouse with cooler drier air from outside, but harnesses the heat from the outgoing air to warm the incoming air via heat exchangers. "Depending on the energy price, the payback period is around three years," the company estimates.

Lighting systems

Glasshouse lighting also saw new launches from Germany's BLV and US-based Fluence. BLV's new high-pressure sodium lamps, the HPS 600W DE and HPS 750W DE, and metal halide MH 1000W DE feature a high PAR value and what it claims are unprecedented efficiency values. They are compatible with all standard spotlights using lamps with double-ended sockets and with the BLV power supply.

The LED-based VYPRx PLUS from Fluence is designed for greenhouse and indoor horticulture facilities with rolling tables and large areas requiring a blanket coverage of light. Its integrated heat sink means it is passively cooled so requires no cooling fan, while its narrow 7cm width reduces shading compared with conventional lighting units.

In irrigation, Israel's NUFiltration presented its NUF water recycling technology for greenhouses, also a contender for the Innovation Award. Using a patented membrane-based purification process that has also been applied to a range of industrial and medical processes and swimming pools, as well as to drinking water in developing countries, in each case the recycled water stream is rendered free of viruses and other pathogens without the use of chemicals or thermal or biological treatments.

A different approach to the same end is taken by the Opticlear Diamond system from Water IQ of the Netherlands. This processes water treatment in two steps - molecular absorption within a column filled with ceramic carrier material with a suitable coating that can be periodically reactivated; and oxidation as oxidants are injected via a mixing chamber into a second column equipped with a catalyst.

In integrated pest management, Koppert Biological Systems showed its new Aphiscout parasitic wasp mix, intended to detect the early signs of an aphid infestation to inform growers' release strategy. "Parasitic wasps are geared to detect and parasitise long before they are visible to the human eye," explains product manager Tim Bossinga.

It consists of five parasitic wasp species, each with its own preferences and together able to deal with the most common types of aphid pest, giving basic protection against aphids in themselves, while the parasitised aphids also provide information on which parasitic wasp can best be released for a large-scale offensive. Supplied in a cylinder of 250 mummies, Aphiscout also contains a sugar water supply, ensuring the wasps are ready to get to work straight away.

Koppert also launched its Side Effects app for tablets and smartphones, based on its database detailing the side effects of chemical agents on biological controls that can be searched for using their scientific or commercial name. The use-anywhere app does not require an internet connection and regularly updates itself.

Lastly, another Innovation Award contender was Royal Brinkman's Biospreader, intended to give uniform dispersion of predatory mites. It does this via a spinning disc within units mounted on a

horizontal spraying boom and is claimed to be quick to deploy and safe for the mites.

Latest developments in the vertical growing phenomenon

An entire pavilion at GreenTech was given over to the vertical or urban growing phenomenon. As well as the remarkable rise in the number of suppliers offering ready-made or bespoke LED lighting solutions for such projects - of which there were around 10 at the show - so the number of suppliers of modular turnkey systems in various formats is also growing.

Logiqs of the Netherlands has developed Greencube, which enables automated transport of growing units in three dimensions under computer control. "Because of the modular and scalable design, GreenCube systems are only limited by the size and height of a building," the company explains.

Fresh from equipping what is claimed to be Europe's largest plant factory, which opened in Waregem earlier this year, Urban Crops of Belgium showed its PlantFactory concept, also aimed at creating fully automated growing systems "in any available space, whether basement or warehouse".

On the research side, Dutch firm Nijssen launched MyGrowthRoom, a "mobile climate chamber" intended to allow growers and researchers to optimise growth recipes and test new LED solutions before applying them to commercial production. It claims the energy-efficient design can also be scaled up for industrial use.

A less intensive solution, eschewing artificial lighting, has come from Eden Green. Aimed partly at the developing world, its Hydroclimaponics system is vertical and modular but uses only natural light in a bespoke or adapted glasshouse. The result is "a highly efficient, environmentally friendly and economical production facility", it says.

Superficially similar but lit by vertical LED strips, the Aponix Aeroponic Barrel comprises "Lego-like parts that can be assembled into ring segments that then can be stacked for a variable height with a spray nozzle for internal irrigation", its inventor Marco Tidona explains. "It is up to your facility design how many barrels you run and how you arrange and connect them."