

LED lighting is here to stay. That's the message following the opening of Stockbridge Technology Centre's L.E.D High Wire Facility, which has been trialing tomato growing over the winter months. The glasshouse which has been raised by over a metre to accommodate maximum commercial production was officially opened last month (Feb.) by the Rt. Hon Michael Jack CBE, agriculture and food adviser for HSBC. Carol Dutton reports.

Stockbridge – forging the technology to feed the future

The tomatoes are growing under four different lighting conditions - 100% sodium lighting, 50% sodium and 50% L.E.D., full L.E.D. and full L.E.D. under diffused glass. The plants, a variety of midi-plum, Sunstream, which were installed in October, are currently laden with fruit and have been continually harvested since before Christmas.

Although more expensive to install, L.E.D. lighting is 40% to 60% cheaper to run and as new technology advances it will become even cheaper. According to Phillip Davis PhD and Applied Photobiologist for Stockbridge Technology Centre (STC), "soon everyone will have L.E.D. lighting in their homes," - and he is not alone in his thinking.

With more economical lighting it could be financially viable for some U.K. growers to produce tomatoes during the darker months of the year. Combine production from them, with those producing during traditional harvesting months and the U.K. could have an almost continual supply. This should reduce imports, currently running at 80% and give consumers a fresh alternative to tomatoes from Holland or Spain.

While L.E.D. lighting (once installed) may be cost effective, it's still an added expense and heating during the British winter increases

production costs. "These are not £1.99 per. kilo tomatoes," says S.T.C. Chief Executive Graham Ward. Nevertheless S.T.C.s marketing success is encouraging. "Once a week I become white van man" continues Graham, who delivers his 'Yorkshire Tomatoes' to members of East Yorkshire Food Network who sell them on to their customers.

Meanwhile Robert Ramsden, Product and Customer Development Manager of

Delifresh, a specialist supplier of fresh produce and delicatessen products to the catering industry, has successfully placed the fruit with top Yorkshire chefs.

Initially they were put off by the price. "Chefs are not easy to persuade" explains Dean Wade, Group Senior Chef of Provenance Inns who treated us to three, delicious Yorkshire Tomato hors d'oeuvres. "If they've been doing something the same way or using a particular





Rt. Hon Michael Jack CBE, agriculture and food adviser for HSBC inspects the tomatoes growing under four different lighting conditions.

product for the last 20 years they're not keen to change." Mr. Ramsden had complaints about price from every chef he supplied until they tasted the product. From then on, cost was no longer an issue.

Producing out of season is always going to carry a premium but given the public's concern with additives (STC tomatoes don't have any) and flavour, (STC tomatoes have this in abundance), provided the fruit looks good, (it does) and we're assured that it's grown locally, we're increasingly happy to pay, said Dean.

The tomato trials are part of continuing research aimed at, in the words of STC Science Director Dr. Martin McPherson; "Increasing crop production through sustainable intensification." LED4CROPS nicknamed 'The shed', which opened in 2012 is a completely closed facility with no natural light. As L.E.Ds produce less radiated heat than sodium lights they can be placed

nearer the plants allowing, in this case, five trays of plants to be grown one above the other.

"Layering", as it is referred to has the potential to multiply the yield of a single short growing crop (lettuce immediately springs to mind) upwards of four times within the same space used by conventional methods.

Different lighting combinations are being tested on different plants to allow the scientists to manipulate the growing process. "The more we learn the more we know" explains Dr. Davis. "For instance we've found that red LED lighting promotes rooting whereas blue inhibits it, which is useful information when making cuttings. In other situations, red L.E.D. light on its own is not good."

The facility uses recycled water and the plants are pollinated, (here as in the L.E.D highwire greenhouse) by bees from Beesure. S.T.C. staff monitor the influence on different plant species of every change they may make within this totally controlled environment and Martin Evans, an S.T.C. director and C.E.O. of Freshgro, the U.K's largest producer of Chantenays is eagerly awaiting the results of trials on carrots.

Graham Ward points out that if this facility was up and running as a commercial growing unit, to avoid contamination we would be barred entry unless dressed as astronauts or medical staff fighting ebola and at this point the enormity of the exercise strikes home.

If trials can establish that crops can be grown under L.E.D lighting alone then the need for daylight is eliminated, climate becomes irrelevant and self contained, intensive growing units can operate anywhere in the

world. Indeed, they could function in the desert, (perhaps powered by solar energy) or the North or South Poles. (According to Udo van Slooten, General Manager of horticulture LED solutions at Philips who have supplied the L.E.D. lighting for Stockbridge, this is something that his company is already looking into.)

Reminded by Graham that growers are already using electricity generated by sustainable resources such as green waste and viewing the robust health of plants growing in the 'Shed', "increasing crop production through sustainable intensification" seems possible and the challenge to produce enough food for a rapidly expanding population which will be greater in the next 50 yrs, according to Dr. Martin McPherson seems less daunting.

The potential of research into L.E.D. lighting being carried out at Stockbridge Technical Centre is mind blowing and Udo van Slooten points out the importance of the fact that STC is a non profit making organization, privately funded with no public money. "If they were part of a commercial company the results of their research would be a closely guarded secret" he says.

Incidentally, Udo reports that R & L Holt, the family business who have invested £3 million in a new L.E.D equipped facility and were featured in July 2014 Commercial Greenhouse Grower, took second prize in the Tomato Inspiration Awards at Fruit Logistica in Berlin recently. This is great news but at Stockbridge, as Michael Jack succinctly put it they're "forging the technology to feed the future" and tomatoes are only the start. ◆