

LEDs: save money, save the planet

Saving costs while also doing something to help save the planet. This is how Leo van der Harg, a leading miniature pot rose grower, sees his recent decision to introduce LED toplighting on his nursery at Vierpolders, near Brielle, 25km west of Rotterdam. Since 2002, when he set up a brand new nursery, assimilation lighting has been just as vital a feature for his production programme as the heating system.



Leo van der Harg is a second generation professional rose grower.

The original glasshouse area was 29,000sq.m., all of which was equipped with HPS lighting, the most economic choice at the time. Since then, LED lighting technology for horticulture has progressed by leaps and bounds, and its use has become progressively more affordable. Last year, the first LED lights were installed in a newly constructed glasshouse block on Leo van der Harg's nursery. Leo is a second generation professional rose grower, following in the footsteps of his father, who grew cut roses near Delft. His son now produces five million miniature pot roses each year, around 10 per cent of Europe's total. They are sold in every corner of Europe, as well as in his home country, the Netherlands. His choice of varieties is the Kordana brand, bred by the long-established German rose specialists Kordes. About a quarter of his production is of Kordana Grande varieties, a large-flowered range targeted at the high end of the market. Top selling varieties currently are Kordana 'Pearl' and Kordana 'Tatjana'.

Crop production cycle

The crop production cycle, in 10.5cm pots, is normally just 12 weeks. Unrooted cuttings are stuck three or four per pot. After rooting, the pots are transferred to a growing area maintained at 23deg C day



Last year, the first LED lights were installed in a newly constructed glasshouse block for finishing pot roses on Leo van der Harg's nursery.

Workers prepare for a mind-blowing presentation at the point of sale. They use clean pots and remove yellow leaves.



and night. When they have reached a height of 20cm they are sheared back to just 3 or 4cm. That operation is repeated when the regrowth has again attained 20cm. For the last phase in production plants are moved to their final spacing in a dedicated finishing area, which is now the new 7000sq m glasshouse block.

Hybrid lighting installation Leo van der Harg, guided by the expertise of the plant specialists working for Philips Horticulture LED Solutions, former greenhouse grower Niek van Enthoven and his own consultancy company, has chosen a hybrid lighting installation for this new glasshouse, using both LED and HPS lamps. The LED lighting is provided by fixtures mounted 3.20 metres above the height of the mobile growing benches, one 200 Watt fixture per 7.32 sq.m In each fixture there are twenty pucks with a combination of various LEDs.

Of these, some emit light radiation in the red wavelength range, while others emit blue radiation, also important for aspects of the plants' quality such as internode length and flower colour. The number of each type, and their arrangement within the fixture, are based on Philips' research in their quest for optimal light recipes. A range of various spectra are available. Philips and Leo van der Harg opted for the best available range to ensure constant plant quality.

The operation of the lights is based on maintaining irradiation

at plant level at a minimum level of 120micromol/sq.m/second for more than 14 hours per day. The LED installation is sufficient to meet all likely needs for assimilation lighting during the spring and fall months while the energy saving screens are open. The hybrid lighting system allows for extra lighting hours without heat loss.

HPS lamps

In addition to the LED installation, there are 1000W Philips GreenVision HPS lamps mounted at the same height, one per 30sq.m. These are brought into use whenever necessary to supplement light from the LED lamps, in order to maintain irradiation at the required level. In practice, this means that in spring and fall they mainly operate only when the screens are closed. In the darkest months of the year, November to February, their periods of use extend, becoming continuous throughout days of below average natural radiation.

The Philips Greenpower LED fixtures and GreenVision 1000W HPS luminaires are suspended below the bottom edges of the roof trusses, while energy-saving thermal screening operates above truss level, just below the gutters at a height of 4.75m. Lighting is routinely operated while the screens are closed.

Economies in the medium and long term

The economies in the medium and long term are highly attractive. Lower energy consumption -25% lower than for 1000W HPS



Lighting

lamps – is a major business motivation, and is also good news for the environment. Much of the radiant energy emitted by HPS lamps is in the form of heat. LED lamps produce no radiation.

Heat from HPS lamps may be welcome in cold winter conditions, but the temperature increase in spring and fall can harm plant quality. Leo van der Harg has often had to accept that energy-saving screens and ventilators need to be opened at these times of the year during the use of lighting. Otherwise the benefits obtained from using the lighting in the first place could be cancelled. That means heat that had cost him money was being allowed to escape from the glasshouse!

Photosynthetic effectiveness

The gain in energy efficiency from using LED lighting does not stop with the differences in converting electrical energy to light. The photosynthetic effectiveness of light radiation depends on wavelength, with the red and blue wavelength ranges the most effective. In LED lighting systems for plants these are the wavelengths mainly provided. With HPS lamps, on the other hand, a high proportion of the ra-



diation is in the less effective yellow wavelength range.

There is a further eventual economy in installing LED lighting that arises from the very long life of the LED units. They are expected to more years than HPS bulbs, which are best routinely replaced more than twice in the same period.

The best of both worlds

The alternative lighting possibilities that were open for Leo van der Harg were of course to choose an all-LED system or an all-HPS system. The all-LED option, though the most efficient in the long term, would have required a much higher investment, some of it in fixtures that would see relatively little use through the year.

The all-HPS system would have been usefully cut the initial investment, but left him with the pattern already familiar from his existing lighting installation. That is one of higher electricity consumption, the need sometimes to ventilate simply to reduce the temperature rise caused by the lights, and a considerable expenditure on repeated replacement of the expensive and comparatively short-lived bulbs. He feels that the balance advised by Philips specialists is bringing him the best of both worlds. He expects

to break even on his investment within five years, and thereafter to reap handsome dividends. Leo van der Harg is dedicated to producing the highest quality pot roses possible. With LED lighting now provided in the critically important final weeks of life for the roses on his nursery, he can control lighting and temperature independently of one another. That is a big step forward, and it is also a step that cuts costs. III

Since 2002, when he set up a brand new nursery, assimilation lighting has been just as vital a feature for his production programme as the heating system.

Top selling varieties currently are Kordana 'Pearl' (pictured) and Kordana 'Tatjana'.



Demand for pot roses packed in Ti Sento sleeves is strong.

