

RZ Seeds & Services





“Generativity is of the greatest importance in order to be able to harvest quality”

Lighting is far from kind to a plant, so states independent crop advisor Kees Hensen. The combination of the heat from the lamps and letting in cold air when ventilating can, for instance, cause 30% of a young leaf to wither in just one day. However, as long as they are used properly, those same lamps can also realise extra kilos. And it is these extra kilos that make a crop profitable. Hensen is in charge of a good 100 ha of lit tomato crops and brings Rijk Zwaan up to date.

This much should be clear: using assimilation lighting influences all the physiological processes of a plant. The biggest sticking points for a crop are the extra heat produced by the lamps and the changing regime of day and night. All this requires that the growing method be adjusted. “Plus suitable varieties,” according to Hensen. “Plant breeders will have to work on varieties that are strongly generative and do not show their imbalance in the quality of the flowers. And because the crop is going to have a lot to cope with, it should also have good stamina.”

When is it day and night when using assimilation lighting?

“It is day from the moment the lamps come on until the sun goes down. And the period when the glasshouse is in darkness is called night. Very simple, really, but it still leads to confusion sometimes, as it may be day inside the glasshouse while it is really night outside. This situation requires that the crop is set to daytime processes because when the lamps are on, the stomas are open. Together with the drying heat from the lamps this results in enormous transpiration of the crop. This has consequences for the watering management.”



And what about watering during a 'light' night?

"When the lamps are coming on during the night, the leaves react by opening the stomas and the plant then needs water to maintain the right tension. We have to provide the plant with absorbable water, while drying out of the slab also continues at a reduced pace. To do this, it is best to start watering with small rounds of 70 cc about 2.5 hours after the lamps have come on. Do this 3 - 5 times. It is vital to stop watering 1.5 - 2 hours before the screen opens, as increased root pressure during opening of the screen can be a huge source of botrytis."

That extra heat, what effect does it have on the climate?

The amount of light generated makes screening a must. The lamps cause the spatial temperature to rise by about 5 - 8°C. That extra heat is not a problem, as long as you compensate for it with a dip in the morning temperature. In the dark hours before sunrise the temperature may be allowed to rise to 20 - 21°C as far as I'm concerned. When the lamps go off in the morning, the temperature can easily drop by 7 - 8°C. It is very well possible to ventilate above the screen without letting in very much cold air. Problems do not arise until the vents are no longer opened because of frost. Due to the enormous moisture content in the glasshouse, a crop can take on a totally vegetative character overnight! That's why we sometimes set a frost limit of -6°C."

So the lighting does away with the need to have the pipes on?

"No, certainly not! Tomatoes like to have 'warm feet'. That's why I recommend having the pipe temperature set point at 38 - 42°C. That is not really necessary for transpiration purposes. The lamps give off a drying heat which causes the moisture deficit to rise rapidly. This encourages transpiration. I would prefer to see a moisture deficit of 3 - 3.5 during a 'light' night. This creates enough feed absorption and osmotic tension, which benefits the quality of the leaves."

How does a grower maintain quality in a lit crop?

"Generativity is very important to enable a grower to pick quality tomatoes. This goes for all types and varieties. Although you would expect the opposite, using lighting is a vegetative action. The fruit wall is also vegetative at the same time. In order to prevent hollow fruit it is necessary, therefore, especially in winter, to grow the crop strongly generatively. So, put the plant beside the planting hole to start with, use 4 heating periods and take a leaf out of the head from the second truss onwards. The 4 heating periods are: a brief pre-midnight, late night/early morning to get enough moisture in the head, a morning decrease to make the trusses strong and a rising temperature during the day." ☉



▲ Kees Hensen of Agricultural Advice Bureau Solutions provides crop advice, guidance and training, and specialises in lit tomato crops.

Experiences in 2008

- According to the latest norm (from 01-01-2009), the emission from lights in horticulture may be no more than 5%. Growers are advised to invest in a screen which is 99% lightproof. The remaining 4% may then be utilised for leaving a gap in the screen.
- During the time of the temperature dip in the morning, ventilation caused the heads to get cold quite easily. This resulted in the stomas closing so that hardly any feed, such as calcium, was taken to the top 30 - 40 cm of the crop. Result: a grey and dull head. When outside conditions are colder, this problem can be overcome by having the ventilation set point 1 - 1.5°C higher during this period.

Flavour figures of varieties from a lit crop

Lit tomatoes just as tasty

Commissioned by Rijk Zwaan, various varieties were tested for flavour on 20 March and 1 April. The measurements were taken by Wageningen UR Glastuinbouw, department of Flavour Research Glasshouse Edibles in Bleiswijk. The figures were arrived at by using the WUR's instrumental flavour model for tomatoes.

Table: Variety, Type, juice pressed from the fruit wall (% Juice), refraction or °Brix® and the Flavour as calculated by the model.

Variety	Type	% Juice	R	Flavour	Date
Variety A	truss, cocktail	47	5.9	58	1 April 2008
72-139 RZ	truss, cocktail	46	5.4	57	1 April 2008
Elanto RZ	loose	20	4.5	40	1 April 2008
Roterno RZ	truss	27	4.7	47	1 April 2008
Variety B	truss	26	4.1	38	1 April 2008
72-471 RZ	truss	29	4.7	47	1 April 2008
Variety C	truss, large	22	3.5	31	20 March 2008
Levanzo RZ	truss, large	18	3.2	30	20 March 2008
Variety D	truss, large	26	3.1	31	20 March 2008

Roterno RZ

In the 100-g segment, Roterno RZ might well be a good choice for a lit crop. Especially the generative tendency of this variety can contribute to an excellent presentation under the lamps.

Roterno fits into the small truss segment and is ideal for the UK market. The crop is of normal length, fairly open and has upright foliage. The good flavour, combined with great visual appeal, is what has made this variety the success it is for traditional cultivation. This success might just continue as a lit crop as well.

Mecano RZ

Mecano RZ is known for its good balance. This characteristic makes the variety suitable for a lit crop. The phenomenon of pale leaf edges would appear to be minimal when the variety is grown under lamps. Mecano is currently being grown under supplementary light as a 120-g tomato. This generative plant gives a short, strong crop with a nice, horizontal leaf position. Mecano is a real all-rounder but probably reacts differently under lamps than you are traditionally used to. As is the case with all other varieties, growers will have to get to know the variety all over again when growing it with supplementary lighting.

Varieties in trials

Before Rijk Zwaan launches its varieties they are trialled extensively. This also applies to our tomato varieties. Depending on their variety characteristics, we also trial varieties under assimilation light. Our advisors and breeders follow their performance in these trials very closely indeed. At the moment the capacities of Levanzo RZ (truss, large), 72-471 RZ (truss, medium) and 72-139 RZ (cocktail) are being trialled in lit crops.

Worth mentioning

More than 13 ha of Amoroso RZ and 13 ha of Brioso RZ grown under lamps clearly show that Rijk Zwaan develops superb varieties for lit crops. Practical results of both varieties are good.



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