

## BULBS THAT GROW IN THE DARK

# Stacks of tulips

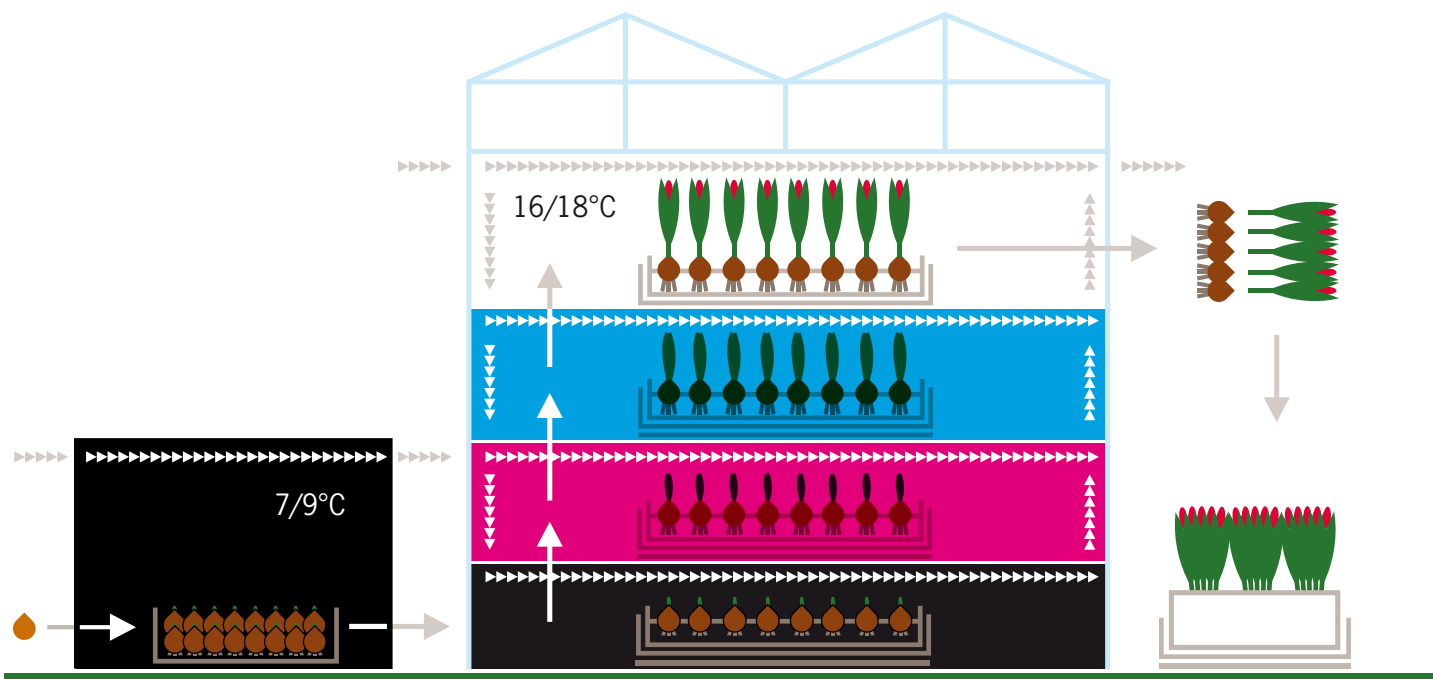
**You cannot generally grow flowers in stacked layers. But you can with tulips. Wageningen UR is developing a new system for growing these quintessentially Dutch flowers in four layers, each with its own colour of light. The method saves space and energy.**

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**T**he colourful fields of Spring flowers are an iconic Dutch sight. But cut tulips are grown in greenhouses, mostly by growers who produce bulbs in the summer and cut flowers in the winter. Together with a group of innovation-minded horticulturalists, Wageningen UR is investigating a new system for what is known in the trade as 'brewing' tulips, as opposed to growing them. The tulip – the Netherlands' biggest flower product by far, taking up 11,000 of the 24,000 hectares given over to flower bulbs – lends itself to growing in layers as it does not need very much light. The bulb is

packed so full of energy stored from the previous growing season that it can even get off to a good start in the dark. Applied Plant Research (PPO), part of Wageningen UR, has shown that the tulip plants can even cope without light for the first 30 percent of the 'brewing' season. They do then look a little yellow, but they soon recover completely. This characteristic makes the tulip suitable for multi-layer cultivation. In layered cultivation, each tulip spends a quarter of its growing time in each layer. They start at the bottom, in the dark. Then they move up to the second layer, where the light is red. The next layer up is bathed in





blue light and finally, at the top, there is full sunlight. If the plant stays in the dark too long, its crooked growth becomes irreversible. But if it only gets as little as one minute of light every half an hour, it grows surprisingly straight and green. ‘We call that steering light’, says researcher Jeroen Wildschut of the Flower bulb business unit at PPO. ‘That is needed to steer the growth and development in the right direction. Under red LED light, the plants get a better leaf distribution and the evaporation gets going properly so that the flowers do not develop a notorious disease which causes them to grow too quickly, with weak stems. Blue light then ensures that the stem grows straight. We are now optimizing this four-layer system in practice.’ A robot moves the trays of tulips up one layer at the required intervals. The plants stand in water rather than soil, which makes the trays lighter. ‘This gives you four times the production in the greenhouse for

the same gas consumption’ says Wildschut. ‘Energy is getting more expensive all the time. What is more, you can raise your productivity with multi-layer cultivation without expanding your greenhouse. We now want to run trials using the system in eight companies.’

**MERCURY LAMPS**

The advent of energy-saving LED light bulbs played a key role in the development of the multi-layer growing system. ‘Mercury

vapour lamps have to hang at least two metres above the crop, otherwise they give off too much heat. But you want to pile up the layers of tulips as close together as possible. The temperatures at which tulips are ‘brewed’ have to be very precise. If it is half a degree too hot or too cold for a couple of weeks, the logistical system gets messed up. The great thing about LED light bulbs is that they do not radiate any heat, so they can be hung closer to the crops than the traditional mercury vapour lamps could.’ To combat the excessive relative humidity between the layers of flowers – some species of tulips ‘sweat’ a lot – dry fresh air is warmed up and blown in between the layers. Wildschut: ‘No doubt flower growers will develop their own recipes for each species, for steering their development. We would like now to research this system’s potential for hyacinths and daffodils. It is trickier for lilies, because they really have to have sunlight.’ ■

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