Delivering and Handling Young Plants
Minimising disruption in growth

GRODAN® is once again happy to share its knowledge to support the Australian greenhouse industry. In the fourth and final article within this series for Practical Hydroponics & Greenhouses, GRODAN Crop Consultant and young plant specialist HANS VAN HERK outlines the importance of communication between propagator and grower and provides tips on how the young plants should be handled during the delivery process so that disruptions to growth are minimised.
Communication
Good communication is essential for a smooth transition from propagation to the production greenhouse. In an ideal situation, the grower should visit the propagator two or three times during the last 10 days before the planned delivery date. During these visits the discussion between propagator and grower should be centered on how to condition the young plants in preparation for their move between the two companies. As you can imagine, this is a technical discussion in respect to temperature and irrigation strategy. These discussions are important as the propagator needs to be aware of the conditions which the plants will face in their new home so that disruptions to growth are minimised.

Keeping growth under control
During their final days in propagation the young plants will increase in size rapidly and competition between the individual heads for light will increase (Picture 1).

In Europe, where propagation is undertaken during the dark months of November and December, it is always beneficial to give the plants an opportunity to produce extra assimilates (sugars). This is achieved by using assimilation lights, especially in the early morning before natural sunrise. This is the time cell elongation occurs, so turning on the assimilation lights at this time has the added benefit of keeping the plants compact (Picture 2).

Temperature
Assimilation lights are not used in Australia [yet], so using lower 24-hour temperature and especially a lower night temperature set point will have a similar effect on plant development. The lower 24-hour temperature will decrease the speed of growth, meaning that assimilates will remain in the plants and soft growth will be avoided. In most situations, the lowest temperature set point used is 14°C, although with certain varieties, such as cherry types, this can go lower [i.e. 12–13°C] or higher [i.e. 15–16°C] with beef types.

Irrigation strategy
Working with greenhouse temperature set points is all very well if the temperatures outside are cold [i.e. in winter]. However, it is very hard to control growth with temperature alone if propagation occurs in the middle of summer as it often does in Australia. Then irrigation strategy becomes an important tool and in the previous article, ‘Delivering the right plant specification’ [PH&G March 2013], I discussed how this can be used to steer growth in a generative or vegetative direction.

The timing of the last irrigation prior to delivery will have a huge impact on plant quality. If irrigation is given too late the result will be a lot of broken heads. Ideally, during transportation the blocks should have water contents [WC] between 60–65%, so it is important to time the last irrigation accurately. In winter, plant transpiration is low and so the last irrigation session may be two or three days before delivery. In summer, transpiration is much higher and it may be necessary to irrigate during the afternoon prior to the day of transportation. At this stage the Water Content Meter can be an important tool to help the propagator make the right decision.
Moving from propagator to grower

Packing
There are two options for packing plants: standing upright (Picture 3) or lying down (Picture 4). There is a trade-off between quality and cost with each method (Table 1). As usual, it is always advisable to go for the method which delivers the right quality. However, transport distance and plant size will influence the decision. Naturally, if the grower is close to the propagator, packing straight up is the most logical option.

It is important that there is always sufficient space for the heads between each layer of the Danish trolley (Picture 3). This will allow air circulation and therefore uniform temperatures in the transport truck. It also helps avoid damaging them as they are unloaded.

Transportation
The golden rule for transporting young plants is to always use trucks with climate control (Picture 5)! Soft-sided trucks should be avoided at all costs. The temperature of the truck needs to be +/- 1°C compared to the location where the plants were packed, with a ‘normal’ transport temperature 16 and 18°C. If the differences between nursery (warm) and truck (cold) are too great, the plant will adapt quickly, but the roots and blocks will follow slowly because of their larger volume. This can create too much root pressure, bursting cells within the leaves (Picture 6) and causing broken heads when the plants are subsequently unpacked. For quality control, data loggers can be placed inside the truck to follow the temperature and humidity, although modern trucks already have this feature.

Preparation for delivery
It goes without saying that prior to arrival of the young plants the nursery should be well prepared. Some useful information on preparing for the new crop can be found on the GRODAN website (www.grodan.com) by following the link to ‘user advice’.

Planting
There should be a smooth and seamless transition from the truck into the greenhouse. It is not a good idea to leave Danish
Tomatoes can be planted directly on the slab or stood beside the planting hole. In both situations the goal is to achieve controlled uniform growth.

I often hear the phase: “I want to stress the crop at the beginning of the cultivation cycle in order to balance the growth.” No you don’t, believe me. The last thing you want is stress. You want controlled uniform growth. Plantop Delta blocks are ideal for controlling growth because of their hydrophilic fibres. When steering generatively (i.e. when irrigating less), the blocks hold water more uniformly. This means it is possible to wait longer between irrigation sessions and, therefore, it is easier to obtain the right balance in the crop.

Summary
I hope you have found this series of articles interesting. I have enjoyed writing them. We have dealt with many issues, outlining the importance of young plant quality (PH & G, July/August 2012), the importance of uniform plant development (PH & G, November/December 2012) and young plant specification (PH & G, March 2013).

Propagation is an important aspect of the cultivation cycle and there are always new insights and developments. GRODAN work within these developments and consequently our products are matched to the wishes of the customer. Increasingly, propagators are seeing the value of ‘steering young plant growth’, and crucially, the role that water management can play in this.

If there are further questions I can be contacted on email (info@grodan.com).

About the author
Hans van Herk is a specialist young plant advisor for GRODAN, the world’s leading substrate supplier to the professional horticultural industry.