Improving the Quality of Young Tomato Plants

The quality of young plant material can have a massive influence on total production

Grodan is once again happy to share its knowledge to support the Australian greenhouse industry. In the first of four articles for Practical Hydroponics & Greenhouses, Grodan® Crop Consultant and young plant specialist HANS VAN HERK provides an insight into the world of hi-tech tomato propagation and describes the trends that are happening in Europe and their significance for Australia.

Young plant quality
All over the world greenhouse tomato growers start their crops with new young plant material. The young plants can be produced 'in-house' or by specialised plant propagators. The reason for the distinct split is due to several factors notably the size, concentration and age of the hi-tech greenhouse industry. For example, in Australia the industry is relatively young and is not highly concentrated so we find more in-house propagation. In contrast, the hi-tech greenhouse industry in The Netherlands is huge, highly concentrated and has steadily evolved since substrate growing on stone wool was introduced by Grodan over 40 years ago. As such the industry now supports 18 specialised plant propagators. In fact, propagation has now become such a specialised sector in terms of knowledge and the equipment used that it is impossible for the grower to do it in-house.

Whatever your choice or situation young plant quality is the number one priority for a successful start to the crop and the realisation of a total high production.

One statement, which is often repeated by contributors to this magazine is: "We have more light than European growers so why do we not have a higher production?" The answer probably lies, in part with the quality (uniformity, specification delivered) of the young plant material. In this series of four articles I will explain why young plant quality is so important for the grower. In this first article the developments and trends in the propagation sector over the last 5 years will be discussed as well as the evolving relationship between propagator and grower which, due to demands for higher and higher quality and more rigorous plant specifications (type of graft, size and date of first flowering), has brought the propagator closer to the grower.
Development and trends within plant propagation

Today, propagation in Holland is conducted entirely on ebb flood systems. These systems are highly mechanised with automated wetting lines for plugs and blocks (Image 1) combined with highly efficient seeding lines. Machinery is used at every stage from selection of root stocks for grafting (Image 2) to spacing on the concrete floors (Image 3). This places demands on Grodan not only to provide its customers with plugs and blocks that promote optimal and uniform germination and growth, but also with a high level of dimensional stability, something that was conceived during the recent development of the Pro-plug and Plantop Delta blocks. Within the greenhouse itself the level of organisation is high due to huge volume of plants being produced during the peak season. For example, with grafting it is not unusual to see 100 ladies working 10 hours per 6 six days per week in order to fulfill an order for 1 million grafted plants.

In the last 3 to 5 years the propagation industry has changed, the propagators have become larger because their customers, the growers, have also increased in size. They have developed very close working relationships with the growers and as a result have become increasingly specialised. This circle of development has resulted in providing the growers the best assurance of quality as it has resulted in the emergence of propagators growing one type of crop or focused in one specialist area of growing. A good example of the latter is how tomato growers with assimilation lights are working with their propagators. Growers using assimilation lights generally plant their new crops in the period between July – October. A primary goal is to minimise the length of time they are not harvesting so they demand older plants with one, in some circumstances, two clusters already flowering on the date of delivery. Such a plant can be 70-80cm in height so for the propagators this raises a number of challenges. To keep the growth under control they need to create compact plants, meaning that final spacing can be as low as three to five plants per square metre. They steer both the climate and the root zone environments, in the root zone, allowing the WC in the Plantop Delta block to go as low as 30%, rising in EC within the range 10-12 mS prior to flooding. Flooding with EC 4-5 mS refreshes the nutrient balance and re-saturates the block WC back to 82-85%. Without question they must be in total control to meet the required specification on the planned delivery date.

Meeting the goals of the Australian grower

Of course, assimilation lights are not used in Australia and with long transport distances or a shortage of space for in-house propagators such a large plant specification will not be suitable, however, there is scope for plant propagators specialised in seeding and grafting to transport young plug plants for growing to final specification in locations closer to home. In this way a grower/propagator who is not grafting year-round will receive the benefits, knowledge and experience of one who is.

Whatever your choice or circumstance one thing is for sure - the goals of the Australian grower are exactly the same as the European grower; that is maximum production and maximum quality. The most important ingredient for a successful start to the crop is good communication between the grower (client) and the propagator (supplier). It should be very clear what is expected (Image 4) and what will not be tolerated. In this respect it is very important for a...
propagator to know what the grower wants to do with his crop (i.e. the growth strategy following delivery). Taking ‘quality’ to this level will enhance the possibilities for a good start.

Tips, which can make the whole process easier
- Always maintain good contact between propagator and grower.
- If visits are not possible due to distance, communicate by email and include pictures of plant development.
- When the planned delivery date approaches increase the frequency of contact and make sure everyone is ready in time.

Quality assurance
Quality assurance is becoming more and more important. It has been common practice for years not to place young tomato plants alongside young cucumber plants due to the different growing temperatures required. Now it is important to make the same segregation for single-headed grafted plants and those that are pinched. However, young plants are a natural product and their final quality will be determined by the skills of the propagator combined with the tools he/she has to work with, including outside climatic conditions. We may accept that warm nights will impact on the quality of cluster formation and that light levels, which are below average for the time of year, will affect the overall plant quality and the position of the first cluster. However, certain basics should never be compromised:
- A high level of nursery hygiene.
- Good planning and a company mantra, which focuses management and labour alike on quality, meaning:
  - Optimal handling of seeds and transplants at the moment of seeding, grafting, transplanting and delivery.
  - On time spacing at each stage in propagation.
  - Correct density of plants at each stage in propagation.
  - An equal temperature regime without large fluctuations during propagation.
  - Strict attention to irrigation EC/WC and nutrient management.

The latest development in the quest for greater quality assurance is the Good Seed and Plant Practices (GSPP). This is an international audit scheme aimed specifically at propagators. GSPP ensures that the propagation nursery has robust quality management systems in place. Accreditation by this scheme is a sure sign of your propagator’s commitment to quality.

Summary
Young plant quality is the key to a successful and high total production. In the next article I shall describe more specifically the key processes in propagation to ensure a uniform and high germination percentage and how to obtain the maximum number of useable transplants. In the subsequent articles I shall go into more detail on the tools you can use in propagation to steer young plant development based on customer wishes. The final article will address delivering and handling procedures to ensure a minimal disruption to growth and development.

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.