

COMMERCIAL HORTICULTURE

MAGAZINE OF THE NURSERY INDUSTRY

OCTOBER / NOVEMBER 2017

Kings' new industrial-look Plant Barn



Can tissue culture be automated?



Inside the outer container is a 49-cell tray insert. Holes in the base of each cell allow agar to distribute evenly through the cells

Automated tissue culture system hailed a breakthrough

AUSTRALIAN TISSUE culture and plug production company, Majestic Selections/Young Plants of Victoria, has been developing an automated plant tissue culture system, called the Nic-In System, which it says could revolutionise tissue culture production.

Their innovation is a precision-moulded 49-cell production tray and container which they say for the first time in the world will allow robotic transplanting of tissue culture-grown plantlets.

"All tissue culture plants are grown in sterilised tubs or containers, mostly the round Chinese food containers," company director Shaun Keenan told Comm Hort. "What we've done is to develop a rectangular tray and cover container to replace those.

"When the plants are ready you take the tray out of the container and present it to the transplanter via a conveyor, called a delivery cradle.

"Normal tissue culture operators will plant 3000 to 3500 plants a day. Our automated system will do about 6000 per hour.

"The Nic-In tray utilises existing machinery developed in Europe to automatically transplant seedlings grown vegetatively. We have chosen to work with automation company TTA of Holland and use their Midi Transplanter, which has been around for several years so is proven off-the-shelf technology."

The Midi Transplanter Majestic has bought is a seven gripper model which matches the seven by seven row configuration of the Nic-In tray. The small finger grippers

reach into the cells in the Nic-In tray, pick up the plantlets row by row, separate them, take them across to another conveyor and plant them into normal soil-filled plug trays.

During the transplanting process the machine grippers are kept clean by little nozzles which blow air to remove loose material. Then after every five cycles or so, they automatically plunge into a hot water bath for cleaning.

Inexpensive automation

"We're really just replicating the seedling industry," says Shaun. "We're not changing anything in the laboratory and we're not changing anything in the nursery – we've just developed an automation system in between to link both. So it's a very inexpensive way of automating without getting into developing robotics, which can take a lot of time and a lot of money."

Shaun says swapping from crop to crop is no problem.

"You pre-program the computer in the transplanter to change for different crops. The transplanter will then work differently on petunias than it would with pansies or begonias. Each crop has its own subtleties.

"We are right now working with TTA, who have already developed protocols for seedling crops, to

come up with protocols that will work with our crops. In fact my business partner in Majestic and the inventor of the Nic-In tray, Nico van Rooijen, is in Holland at the moment (mid-September) working with TTA on these protocols."

Shaun says the Midi Transplanter Majestic has ordered should be up and running at its Melbourne facility by mid-November.

"We'll be the first worldwide to implement the system. We started to develop it about three years ago initially just to improve our own production, cut costs and free our people to do more highly skilled things than just transplanting. Then we suddenly woke up to the fact that there's a whole world market out there wanting to automate.

"The Dutch say four to five billion tissue culture plants are produced worldwide every year. We are only a very, very minute part of that.

"Most tissue culture around the world is produced in low-cost countries; that's where the laboratories are. But most of the planting-out is done in high-cost countries like

A gripper head from the Midi transplanter holding tissue culture plantlets



PRODUCTS / SERVICES

North America, Europe and Japan and automating that process will bring big savings for them.

"We believe a nursery could pay off the cost of an automated transplanter within 18 months with this new system, through higher production output and reduced labour cost."

Long-lasting trays

Labs wanting to adopt the Nic-In system can source their own compatible transplanter, then get their tray requirements from Majestic. The trays and containers – which are patented – are being manufactured in Melbourne. After use they can be cleaned and autoclaved in the normal way and re-used. Shaun says only time will tell, but they should last a lot longer than those currently being used.

He also notes that the rectangular shape of the Nic-In trays and containers makes better use of lab shelf space than round containers and should also be more efficient for transport.

Majestic was earlier this year granted A\$417,000 funding towards the commercialisation of the Nic-In system. This came through the Australian Government's Entrepreneurs' Programme which supports entrepreneurs, researchers and businesses in commercialising their novel products, processes or services. The grants need to be matched dollar-for-dollar by the businesses receiving them.

Majestic currently produces around five million plants through its tissue culture lab per year, and another 28 million from seeds and cuttings at subsidiary nursery, Young Plants.

Contact details are at www.majesticselections.com.au