Ines van Marrewijk

Coming clean on crazy roots

Don't shake hands with fellow growers if you are worried about crazy roots.

At Hort NZ's recent conference, covered crop hygiene specialist Ines van Marrewijk gave New Zealand tomato and other covered crop growers some simple and practical methods of dealing with the disease that only arrived in New Zealand relatively recently.

"Crazy roots is a bacteria. It [bacteria] is the most fast reproducing organism there is."

She said the disease first appeared in Europe and the United Kingdom in 1985 and in the Netherlands in 2002. Crazy roots (agrobacterium) has spread virtually throughout Europe, including France and Greece.

It is unknown where crazy roots came from, she said, and urged her audience not to worry about that. "Start thinking about how to get rid of it."

She said greenhouse hygiene is an important tool in reducing the spread of crazy roots.

"Being here and seeing your colleagues, shaking hands. Maybe that's the first [contact] with the infection you will have. It could happen." The best examples of covered crop hygiene could be observed in Holland, she said, where no-one was allowed in a greenhouse without sanitising their shoes and hands.

She emphasised two key points – make sure you know what disease you have; and your greenhouse cannot to be too clean.

Sharing the results of Dutch research so far on crazy roots she said prevention is key, certainly preventing it from spreading.

However, first correctly identify what the disease is and get a specialist in to do it.

"Find out what it is and how it can be spread. Most of our diseases can fly through the air. Bacteria don't fly; they don't make spores but spread with contact."

She said that bacterial diseases in greenhouse crops, including clavibacter, are increasing.

Crazy roots enters through a root wound. It can survive in soil for 15 years.

Ines stressed it is important to keep the greenhouse, including gutters and the drainage system, "100% clean", beginning with water.

The best examples of covered crop hygiene could be observed in Holland, she said, where no-one was allowed in a greenhouse without sanitising their shoes and hands.

"Cleaning up does not mean spraying chemicals. It starts with water, high pressure. Only one treatment of disinfectant at the end."

She said the dripper should be removed and soaked for 24 hours in an acid solution of one or two pH. The drainage system and gutters also need cleaning and flushing with disinfectant.

Risky places for RMD and other diseases

Gutter with rough surface
Need some acid for cleaning

Tube to drainsystem
Difficult to reach

Drain water from slab does not flow away

Empty silos, sludge out, and disinfect

Open soil without foil covering
DUST: bacteria everywhere

Dripper: is NOT clean
Remove: dipping in pH 2-3

SUPPRESSING: IN THE CROP

Suppress speading

- Disinfect drain water
  - 240mJ/cm2 UV; 99% efficiency
  - Heater: kills bacterium but plasmid?

Suppress symptoms

- Cleaning product in water:
  - Na-hypochlorite: 5ppm max at dripper
  - Peroxide: 15ppm max at dripper
- Lowering pH (pH 5.0 drip). Bacteria do not like low pH
- Prevent root damage (no entry of bacteria)
- Control of Pythium

INFECTION SOURCES

- Roots
- Substrate, water pipes and (drain) water silos
- Detected in:
  - Root environment
  - Soil in greenhouse with RMD
  - Drain water
- Not detected in:
  - Soil samples outside greenhouse
  - Starting (fresh) water
  - Dust on roof greenhouse
  - Stems of infected plants (+ in 3cm)

HANDLING OF PROBLEMS

- Chloride in water keeps "root-free" place on block
- Replace dripper to other place or beside block
- Remove foil from block or lift foil up
- Extra drain hole in slab for drainage (last option)
- Remove extra leaves
- 'Every' plant with RMD gets an extra stem (tomato)
- Remove roots from drainage system

GREENHOUSE CLEAN OUT

- Gutters: First water, high pressure, brush, then disinfect
- Dripper (+tube): keep in pH 1 for 24 hours
- Disinfect also drain system underground
- Empty silo, remove sludge and disinfect inside
- Maintain and control disinfector and filters
- Beware of clean equipment of contractor
- Clean also outside and warehouse before deliveries come
- Full field foil to avoid dust from soil, cover gutter
- Delivery of new substrate, do not store on own location
- Choloride, peroxide, per-acid are effective
- 100% clean substrate (do not store in dusty area/hal)