Question — What is the effect of Terrazole on useful micro-organisms?

Answer — At this stage no damage has been established, but trials are still under way.

THE PURPOSE AND OPERATION OF A NUCLEAR STOCK UNIT

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1. (a) **Purpose.** A Nuclear Stock Unit is based on the concept of an enclosed insect-proof area where plant material can be maintained in a "virus-free" or "high-health" status, and kept true to type. "Virus-free" — usually means free of known viruses. "High-health" — free of viruses of known economic importance.

Although insect-proofing is of prime importance to the maintenance of the high level of plant health required, strict observation of plant-hygiene is of equal importance and includes regular application of plant therapeutants for the control of pests and diseases with a special emphasis on the control of the main virus vectors, i.e. aphids, leaf hoppers and nematodes. The Unit becomes the source of nuclear plant material for research and for distribution of "Clean Stock" to growers.

(b) **Establishment and Layout.** The present Nuclear Stock Unit at the Horticultural Research Centre in Levin was built in 1967 and replaced a smaller temporary unit that had been in existence since 1961. It consists of a central service shed 13.70 x 3.95 m with two 15.20 x 3.55 m glasshouses on one side and three 30.45 x 6.10 m screenhouses on the other.

The unit is proofed against all insects as large or larger than winged aphids by screening glasshouse vents and service shed windows with a 24 x 24 mesh woven plastic gauze. The gauze completely covers the screenhouses. Entrance to the Unit is by a double door airlock in which an aerosol insecticide is released manually immediately after the outside door is closed.

(c) **Operation: Glasshouses.** The glasshouses are lined with clear plastic sheeting for increased heat retention in the winter and at night, and a shading compound is applied to the outside of the glass for the duration of the hotter months (September to May), to reduce overheating.

The glasshouses are heated by underbench electric fan heaters, the heat being distributed by a perforated plastic tube, and are maintained at a minimum of 16-17°C. The cooling of the glasshouses is by fan and vent with the aim of keeping the houses at 18-20°C. If the temperature rises above 24°C a misting system comes into operation to prevent overheating. When required, (from March to October) the plants are provided with supplementary lighting to extend day length. Banks of 150 watt incandescent light globes provide the supplementary light and are controlled by time switches and some additional heat is also provided by the lamps. There is a mist propagation unit in one house. All watering in the glasshouses is done manually.

Screenhouses. The screenhouses contain the "banks" of berryfruit cultivars in the form of Nuclear or basic stock. Usually 2 or 4 plants of each are kept and maintained in 2-4 litre containers.

Any strawberry cultivars wanted for bulking up are grown in soil bins 2.40 x 1.20 x 0.30 m and will yield up to 400 plants per bin, depending on cultivar, from two mother plants. *Rubus, Ribes* or *Vaccinium* cultivars that require bulking up are planted in 100 litre steel drums and grown on for cutting production.

All watering in the screenhouses is by mist line and trickle and is controlled by time switches.

(d) **Importance to the Berryfruit Industry in N.Z.** This Unit is a part of the Berryfruit Section of the Research Centre and is important to the berryfruit industry as it serves several purposes.

1. Provides a source of "high-health" nuclear plants for release to the nursery side of the industry.
2. Serves as a quarantine unit for the introduction of new strawberry cultivars from overseas — other berryfruit cultivars are held by Plant Diseases Division of DSIR at Mt. Albert for their Post-Entry Quarantine period of 1 to 2 years before release to the Levin Horticultural Research Centre.
3. Introduced strawberry plants are indexed soon after they arrive.
4. Provides plants for trials to evaluate cultivars.

2. The main cultivar collection consists of:

Fragaria (strawberry) — 135 cultivars (including 17 virus indicator clones).

Rubus — red raspberry — 43 cultivars
purple raspberry — 3 cultivars
black-cap raspberry — 1 cultivar
brambles — 26 cultivars

Ribes — blackcurrant — 26 cultivars
whitecurrant — 2 cultivars
redcurrant — 7 cultivars
gooseberry — 12 cultivars
Vaccinium — blueberry — 17 cultivars

3. **Propagation.** As the glasshouses are maintained at a minimum of 16 to 17°C and daylength is controlled by supplementary lighting to give 16 to 18 hours of light in every 24 hours, plants of most berryfruit cultivars can be induced to provide propagation material at almost any time of the year, at the same time the standard methods of propagation are still used: that is,

Stolon plants — strawberry
Winter dormant cuttings — currants, gooseberry, blueberry
Tip layers — bramble
Stool division — raspberry

Other methods of propagation used are:

1. Strawberry —
   (a) Seed — *Fragaria vesca* 'Alpine' is grown from seed as it does not produce stolons.
   (b) Crown discs — Used in heat therapy and if a cultivar becomes infected with red core (red stele) disease. The crown is stripped of all leaves and roots and then is cut into 4 to 6 mm discs; the discs are put into fine pumice and placed in a mist unit. Dormant lateral buds usually break and can soon be carefully removed and grown on.
   (c) Unrooted stolon tips removed before leaves and root initials appear root readily under mist.
2. *Ribes* –
   (a) Softwood cuttings (gooseberries need more research into propagation technique as they are more difficult to root from soft cuttings than currants).
   (b) Single node cuttings are treated like single node grape cuttings; any dormancy is broken by bottom heat and extended day length.
   (c) Seed. Seedlings of several cultivars are useful as virus indicators.

Rubus —
(a) Softwood cuttings. These root readily but there is a fairly rapid decrease in rooting ability as the wood matures. Winter cuttings made from dormant canes will root but there is a tremendous amount of cultivar difference in the ability to root and in the ability of the developing buds to differentiate into growth shoots and not fruiting spurs.

(b) Root cuttings. All raspberries and most brambles will produce plants from adventitious buds on cut up sections of root, the exceptions being some of the thornless brambles that arose as bud chimeras and must be propagated from the shoots and not the roots to maintain the thornless state.

4. **Virus indexing.** For strawberry virus indexing, selections of several *Fragaria* species are used: *Fragaria vesca, F. v.* 'Alpine', *F. virgininia,* and *F. chiloensis.*

Until recently an excised leaf-petiole method of virus transmission was used, but this has been replaced by a modified stolon graft using a double-tongue bottle graft with the donor stolon kept in a test tube of water. The graft is bound by using a piece of self-adhesive crepe rubber bandage (usually one graft is sufficient). After grafting, the indicator plant is defoliated. Three to four weeks after grafting, the grafted stolon is removed and any virus-like symptoms are recorded — some viruses produce symptoms in less than 3 weeks.

Symptoms produced can be found in the following general groups: chlorosis, necrosis, distortion, stunting.

Any part of the indicator plant can be affected and mild to severe symptoms can be found.

It is possible for a virus to be symptomless on the donor plant yet cause severe symptoms or death to the indicator. Some viruses are harder to transmit than others and may require several attempts before transmission is achieved.