CONTROL OF MELOIDOGYNE JAVANICA IN POTATO TUBERS AND M. HAPLA IN THE ROOTS OF YOUNG ROSE BUSHES BY MEANS OF HEATED WATER

BY

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Water temperatures of between 46°C and 47.5°C with an immersion period of 2 hrs, killed all stages of M. javanica contained within moderately to severely blistered potato tubers, without adversely affecting subsequent sprouting of the tubers during a 3 months storage period.

Immersion of the roots of dormant rose bushes to just below the bud union, for 60 min in water heated to 45.5°, killed all eggs and larvae of M. hapla, without adversely affecting the subsequent growth of a vigorous floribunda and a non vigorous hybrid tea variety budded on vigorous thornless Mexican Briar rootstocks.

Plant quarantine restrictions on the movement of vegetative propagation material infected with root knot nematode, impose limitations on various sections of any developed community. Amongst those affected may be plant breeders who can be restrained from obtaining specific varieties which are required for their breeding programmes, and nurserymen who may be prevented from importing or exporting for purposes of trade.

It was therefore decided to investigate the possibility of destroying nematode parasites in seed potato tubers and in the roots of young rose bushes, without adversely affecting the viability of the plant material so treated.

POTATOES

Materials and Methods

Freshly lifted Up-To-Date potato tubers, infected with the root-knot nematode Meloidogyne javanica (Treub), were graded for size suitable as seed and degrees of nematode ‘blistering’ ranging from moderate to severe. They were arranged in batches of twelve to include in each both moderately and severely blistered specimens.

The apparatus used was a laboratory waterbath with a capacity of 22.75 l. The bath was 53.5 cm long, 30.5 cm wide and 19.0 cm deep, with 230-250 volt, 6.25 amp. heating elements.

At each selected temperature in 20.5 l of water, 36 tubers, (three batches of twelve) weighing approximately 2.25 kg were spread in a single layer on a perforated tray supported above the heating elements.
Temperatures were thermostatically controlled between 43° and 49° for periods of time ranging from 1 to 4 hrs. At the conclusion of each selected immersion period, one batch of twelve tubers was removed and allowed to dry and cool at room temperature before storing under poorly lighted and cool conditions.

Control or check tubers were immersed in water at room temperature for periods of 1 to 4 hrs.

Three months after the water treatments, the tubers were examined for viability, observations were based on general condition and whether normal vigorous sprouting had taken place.

At this time, from every tuber in each batch of twelve, egg masses were removed by dissection and collectively put to hatch in shallow water, the tubers were then finely chopped and mixed with a heat sterilized potting medium before placing in 6 × 23 cm diameter flower pots.

Tomato seedlings, variety Marglobe, which had been reared in a sterilized growing medium, were planted singly in all pots, and irrigation throughout the growing period of 4 months was from municipal water supplies.

At the end of the 4 months growing period the plants were removed from the pots and the roots were examined for the presence of nematode galls.

Results

Observations on potato tuber and nematode survival and infectivity are to be found in Tables I, II and III respectively.

Table I

<table>
<thead>
<tr>
<th>Temperatures</th>
<th>Period of immersion (hrs)</th>
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<tbody>
<tr>
<td></td>
<td>1</td>
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<tr>
<td>Control (water at 20°)</td>
<td></td>
</tr>
<tr>
<td>43°</td>
<td>67</td>
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<tr>
<td>44.5°</td>
<td>84</td>
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<td>46°</td>
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<td>47.5°</td>
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<td>49°</td>
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<td>100</td>
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Results in Table I are based on firmness, colour, degree and vigour of sprouting of the tubers at the end of 3 months storage following treatment.

Variation between replicates was negligible and therefore statistical analyses of the results were deemed unnecessary.

Results in Table II are based on the degree of root galling or infection resulting on tomato plants grown for a period of 4 months in a sterilized potting medium, to which had been added finely chopped infected tubers which had been exposed to various water treatments.