Table 1 *New host records of Meloidogyne incognita*

Name of plant	Family	Observation
Adhatoda vasica Nees	Acanthaceae	+ + +;SM
Ammi visnaga Lamark	Apiaceae	+ +;SM
Asparagus racemosus Willd	Liliaceae	+ +;SM
Bacopa monnieri Wettst.	Scrophulariaceae	+ + ++,MA
Boerhavia diffusa L.	Nyctaginaceae	+ +;SM
Calotropis gigantea (L) R Br ex Ait.	Asclepiadaceae	+,S
Cissus quadrangularis L.	Vitaceae	+;S
Commiphora wightii Jacq.	Burseraceae	+;S
Convolvulus microphyllus Sieber, ex Spreng.	Convolvulaceae	+ +;SM
Desmodium gangeticum (L.) DC	Fabaceae	+ + +,SM
Elytraria acualis Lindau	Acanthaceae	+ +;S
Euphorbia thymifolia L.	Euphorbiaceae	+ + +;SM
Hemidesmus indicus (L.) R. Br.	Asclepiadaceae	+;SM
Indigofera tinctoria L.	Leguminosae	+;M
Ipomoea hederaceae Jacq.	Convolvulaceae	+,S
Mellisa officinalis L.	Labiateae	+ + +;M
Nigella sativa L.	Ranunculaceae	+ +;SM
Oxalis latifolia H B. & K.	Geraniaceae	+ +;S
Piper longum L.	Piperaceae	+ +;M
Pluchea lanceolata (DC) Clarke	Compositae	+ +;M
Plumbago zeylanica L.	Plumbaginaceae	+ +;M
Polygonum plebeium R. Br. Prod.	Polygonaceae	+ + +;SM
Psoralia corylifolia L.	Fabaceae	+ +;S
Rauvolfia serpentina (L.) Benth. ex Kurz.	Apocynaceae	+ +;SM
Salvia sclarea L.	Labiateae	+ + +;ML
Solanum incanum L.	Solanaceae	+ + +;ML
Solanum sisymbrifolium Lam.	Solanaceae	+ +;SM
Solanum zanthocarpum Schrad.	Solanaceae	+ +;M
Spilanthes acmella Rich.	Compositae	+ +;M
Tamarix gallica L.	Tamaricaceae	+ +,M

Table 1 gives new host records of *Meloidogyne incognita* (Kofoid & White, 1919) Chitwood, 1949[1-3].

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AN EASY METHOD FOR MASS MULTIPLICATION OF THE ENTOMOPATHOGENIC FUNGUS *CEPHALOSPORIUM LECANII* ZIMM.

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THE white halo fungus *Cephalosporium lecanii* Zimm is an effective insect pathogen occurring naturally in abundance in winter on the coffee green scale *Coccus viridis* Green. The occurrence of this fungus has been recorded in India, Java, S. Java, Surinam, Puerto Rico, Cuba, Tanzania and Columbia[1]. The fungus was observed even as early as 1919 in India[2]. Yet no effort was made to utilize this fungus in controlling the coffee green bug until 1975 when Easwaramoorthy and Jayaraj experimentally proved the efficacy and usefulness of this fungus[3] which brought about 50% to 90% mortality of the insect depending on the weather conditions, surfactants used, etc.

Apart from the coffee green bug, *C. lecanii* also infects the rice hoppers *Nephotettix virescens* and *Nilaparvata lugens*[4] banana aphid *Pentalonia nigronervosa*[5], *Aphis gossypii*[3] on chilli, and *Phenococcus insolitus*[3] on egg plant.

In coffee green scale control, the dose recommended for this fungus is 1 litre (per coffee plant using a high-volume sprayer) of the spray fluid containing 16 million spores/ml. As such it works out that about 3 flasks of fungus material have to be suspended in 1 litre water; *i.e.* for each coffee plant[3]. This amounts to a large number of conical flasks (250 ml) containing the fungus grown on sorghum grains being transported to the field. After use, the flasks have to be returned to the laboratory and washed for reuse. The transport laboratory to the field and back involves a considerable amount of bulk, and risk of breakage of glassware.

To avoid this cumbersome process, an easy method of mass culturing the fungus was tried and found successful in which the use of conical flasks is dispensed with. Instead, sorghum grains are sterilized and the sterilized grains transferred asceptically (in a culture room) into fresh polythene bags. After inoculation with the fungus, the bag is sealed using a flame. Incubation is done at room temperature for 3 weeks and the bags are then transported to the field. Once used the bags are discarded.

The use of polythene bags helps to avoid use of

glassware in bulk and the risk of breakage of glassware and the high initial cost involved. Similar method has been used for a long time for the multiplication of biofertilizers like *Azatobacter* and *Rhizobium.*

7 September 1983; Revised 13 August 1984.

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EFFECTS OF VITAMINS ON GROWTH OF CULTURED NORMAL AND NEMATODE INDUCED ROOT GALL TISSUES OF *LYCOPERSICON ESCULENTUM* MILL.

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TISSUE culture techniques are being used to study the nutritional requirements of different tissues[1–3]. Most of the studies are confined to normal tissues only[2, 3]. In the present report studies have been made to compare the nutritional requirements of normal (hypocotyl in origin) and nematode induced root gall callus of *Lycopersicon esculentum* Mill. Till to date there is no report on a nematode induced root gall callus cultures. However, there are some reports on cultures of virus[4], bacteria[5] and insect[6] induced galls.

In the present study, the effect of 6 vitamins *viz* biotin, calcium pantothenate, choline chloride, cyanocobalamin, folic acid and riboflavin (0.5–10.0 mg l^{-1}) have been studied on the growth of normal and nematode induced, root gall tissues of *L. esculentum* Mill., an important vegetable crop.

The callus (normal) was isolated from the segments of hypocotyl (ca 1.0–1.5 cm long) and root galls (ca 0.2–0.5 cm diameter) on Murashige and Skoog's[1] (MS) medium with 0.08 mg l^{-1} of kinetin and 10.0 mg l^{-1} of NAA. After surface sterilization with 0.1% mercuric chloride, explants (hypocotyl and gall) were thoroughly washed and cultured. Medium was jelled with 0.8% BDH agar and the pH was adjusted to 5.8 prior to autoclaving at 1.06 Kg./cm^2 for 15 min. Observations were recorded after 30 days of incubation in the dark at 26° ± 2°C and 55% relative humidity. Experiments were repeated thrice and the arithmetic mean along with standard deviation of fresh weight of 6 replicates was calculated. In control experiments, the vitamin in question was eliminated.

In controls, the growth of gall tissue was better (10.00 ± 0.20 g/flask) in comparison with normal tissue (8.70 ± 0.17 g/flask). On addition of biotin and riboflavin, the growth of normal and gall tissues decreased continuously with increasing levels. Growth was less than in the controls except at 0.5 mg l^{-1} of either vitamin. Poor growth of the tissues on riboflavin has also been noted in *Nigella*[7]. In all the cases the growth of gall tissue was better than normal tissue.

Growth increased very slightly on calcium pantothenate and choline chloride (0.5–5.0 mg l^{-1}) in comparison to controls. On cyanocobalamin, the growth of the normal tissue decreased continuously in comparison to controls; however, the growth of gall tissue was slightly higher than the controls on 0.5–1.0 mg l^{-1} but on further increase in cyanocobalamin the growth decreased.

Folic acid proved better than any other vitamins as the maximum growth of normal tissue (10.1 ± 0.2 g/flask) and gall tissues (12.6 ± 0.3 g/flask) was observed on 1.0 mg l^{-1} and 2.5 mg l^{-1}, respectively (table 1). Folic acid was found to be most essential for the growth of *Nigella* tissue and interactions of vitamin and hormones resulted in best growth of the tissue[7].

In all cases the growth of normal tissue did not exceed the growth of gall tissue. It may be due to the fact that gall tissues have more endogenous anxin, which may be a factor in improved growth of gall tissue.

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