

Crop Diseases Research Institute, P.A.R.C.¹; Department of Zoology² and Department of Botany³,
University of Karachi, Karachi - 75270, Pakistan

THE EFFICACY OF SOME ORGANIC AMENDMENTS IN CONTROLLING SPIRAL NEMATODES ASSOCIATED WITH APPLE

by

A. KHAN¹, S. ISLAM², S. S. SHAUKAT³ and F. M. BILQUEES²

Summary. Soil amendments reduced the population density of *Helicotylenchus pseudorobustus* associated with apple trees in the following rate of efficacy: tobacco dust > poultry manure > horse manure > sawdust.

The spiral nematode *Helicotylenchus pseudorobustus* (Steiner) Golden is commonly encountered in apple (*Malus domestica* L.) orchards in Swat district, North West Frontier Province, Pakistan (Islam *et al.*, 1994); it disrupts cortical cells and kills roots (Vovlas and Larizza, 1994). An attempt was made to control *H. pseudorobustus* in apple orchard with four organic amendments which had previously been shown to provide effective control of several plant parasitic nematodes (Babatola, 1969; Sitaramaiah and Singh, 1969; Stirling, 1989; Kaplan *et al.*, 1992; Kaplan and Noe, 1993; Khan *et al.*, 1994).

Materials and methods

Field trials were conducted during May to October, 1993 at Roringar village, Swat district in an orchard of 10-12 years old apple trees cv. French Golden. The soil was a sandy loam, pH 7.2-7.5 and the climate moderate with a minimum temperature of 16 ± 2 °C and maximum 34 ± 2 °C. The initial mean population density of *H. pseudorobustus* was 207 ± 6.57 nematodes/cm³

of soil. Each treatment, including the untreated control, consisted of four replicates, each of which was a single tree. Organic amendments used were horse dung (C/N ratio 32.6 ± 2.82), poultry manure (C/N ratio 4.9 ± 0.46), tobacco dust (C/N ratio 38.8 ± 3.16) and sawdust from "Chir" *Pinus roxburghii* Sargent with a lignin content of $30.33 \pm 0.29\%$ (C/N ratio 273 ± 3.4). Fresh materials were used. All amendments were applied at 900 kg/ha and incorporated to a depth of 0 to 40 cm around the trees (50 cm radius).

Counts of *H. pseudorobustus* were obtained seven days before treatment, and at 40, 80 and 120 days after treatment. Three 250 cm³ samples (15-40 cm depth) were taken from the rhizosphere of each tree and pooled. Samples were mixed and nematodes, extracted from 100 cm³ subsamples by a modification of Cobb's sieving and gravity method.

The results obtained were subjected to statistical analysis using covariance (ANCOVA). The initial population was used as the covariate (x) and the final population was the measured response (y) (Gomez and Gomez, 1984).

Results and discussion

In all treatments, population density of *H. pseudorobustus* drastically declined compared with controls at 40 days after treatment ($P < 0.001$) (Fig. 1); up to 120 days the population density slightly increased but remained remarkably lower than the controls in which the population also showed an upward trend. The different amendments reduced the population

density of *H. pseudorobustus* in the order tobacco dust > poultry manure > horse manure > sawdust. The population density at 120 days was reduced to 4.4% of the control by tobacco dust, whereas sawdust reduced the density to 41% that of control.

The results suggest that the application of the amendments, particularly tobacco dust with a high C/N ratio, can provide effective control of *H. pseudorobustus*.

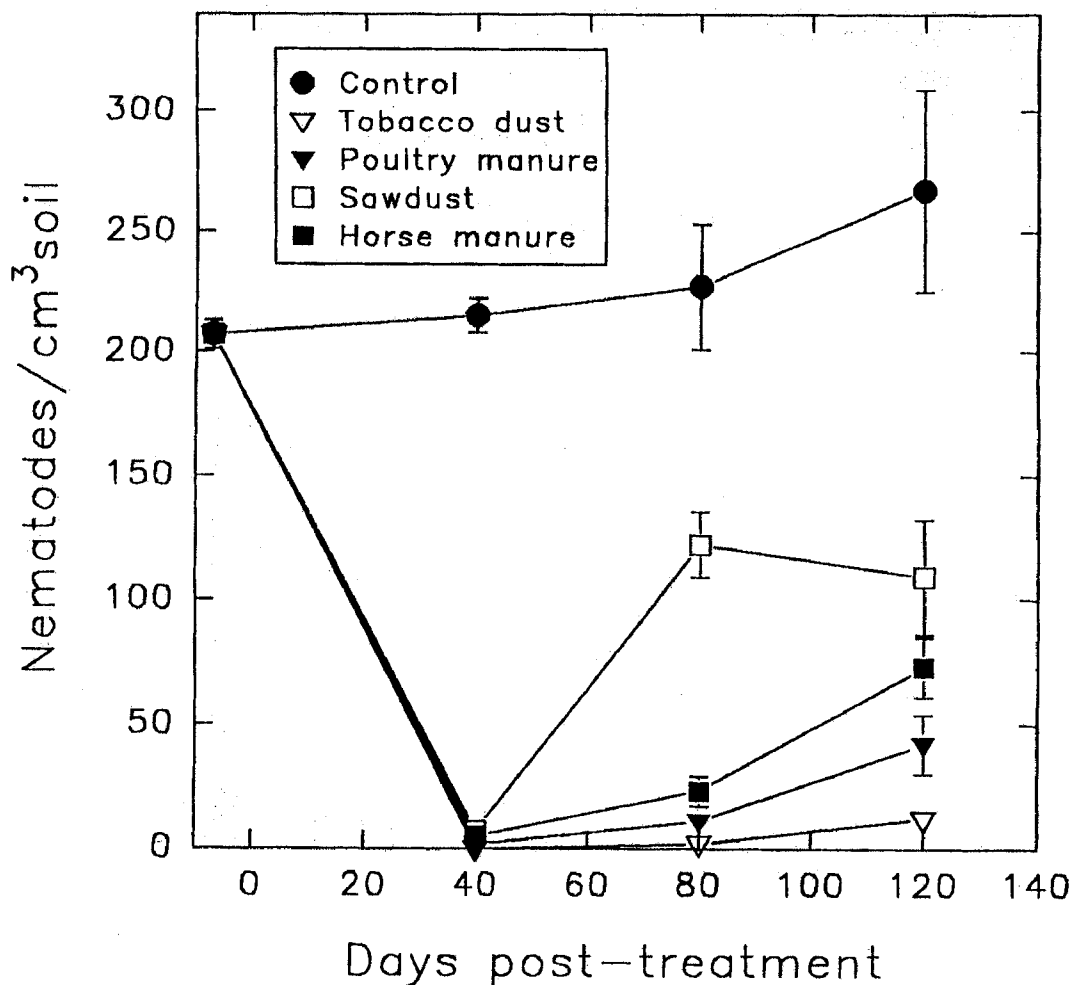


Fig. 1 - Population density of *Helicotylenchus pseudorobustus* in various amendments at different times.

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