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PATHOGENICITY OF *XIPHINEMA INSIGNE*
ON *VITIS VINIFERA* CV. ANABESHAHI

by

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Xiphinema insigne Loos, 1949 is widespread in India. It has been reported in association with fruit trees, cereals, tea, coffee, vegetables and grasses (Loos, 1949; Siddiqi, 1959; Yadav and Varma, 1967; Janarthanan *et al.*, 1969; Bajaj and Jairajpuri, 1977). Large populations of *X. insigne* were found on grapevine cv. Anabeshahi during a survey of the National Bureau of Plant Genetic Resources, New Delhi. Because of the paucity of information on the pathogenicity of *X. insigne*, a pot experiment was undertaken to assess its damage potential to grapevine.

Xiphinema insigne used in the experiment were from a population cultured for a year on *Vitis vinifera* cv. Anabeshahi growing in sterilized soil in 35 cm diameter clay pots. Suspensions of nematodes (adults and juveniles) were pipetted around the roots of rooted cuttings of Anabeshahi grapevines growing in pots, each containing 3.5 Kg of autoclaved sandy clay loam. There were four treatments with different densities of nematodes added plus a control without nematodes (Table I). Each treatment was replicated five times and the experiment was arranged in a randomized block design in the open. The plants were treated as necessary to control pests and diseases. After 200 days, the growth of the plants were measured (Table I) and the nematodes were extracted from each pot by Cobb's sieving technique.

Sixty days from the start of the experiment, chlorosis of the leaves was noticeable in the treatment with 5000 nematodes per pot. Later, these symptoms appeared in the treatment with 500 nematodes per pot but only at 180 days from the start of the experiment in

Table I - Effect of different inoculum densities of *Xiphinema insigne* on the growth of grapevine cv. *Anabeshahi*.

| Treatment (initial inoculum) | Root dry wt (g) | Shoot dry wt (g) | Leaf no. | Total leaf area (cm ²) | Shoot ht. (cm) | Final nematode population |
|-------------------------------------|--------------------|---------------------|-------------|---------------------------------------|-------------------|---------------------------------|
| Control | 12.22 | 7.60 | 56 | 1701.82 | 79.40 | — |
| Nematode free associated control | 11.98 | 7.62 | 55 | 1695.38 | 78.80 | — |
| 50 nematodes per pot | 9.10 | 4.74 | 40 | 1300.31 | 60.65 | 4,060 |
| 500 nematodes per pot | 7.44 | 2.98 | 34 | 1036.17 | 48.82 | 29,960 |
| 5,000 nematodes per pot | 2.72 | 1.62 | 23 | 504.58 | 31.20 | 66,080 |
| S.E.M. \pm | 0.37 | 0.29 | 2.02 | 91.06 | 5.27 | — |
| C.D. (P = .05) | 0.78 | 0.63 | 4.29 | 193.04 | 11.17 | — |

the treatment with 50 nematodes per pot. Statistically significant reductions were recorded in the main shoot height, root and shoot weights, leaf number and leaf area, proportional to the inoculum density (Table I). The root tips of inoculated plants were swollen, bent and sometimes blackened. At the end of the experiment the highest number of nematodes were recorded from pots with the highest inoculum density, but the greatest rate of multiplication occurred in pots with the lowest inoculum density.

The effect of *X. insigne* on grapevine is similar to that of *X. americanum* on sugar maple (Di Sanzo and Rhode, 1969) or *X. americanum* and *X. chambersi* on strawberry (Perry, 1958). The conspicuous galling of the root tips of grapevine caused by *X. index* and *X. diversicaudatum* (Davis and Jenkins, 1960; Raski and Radewald, 1958) was not observed in the experiment with *X. insigne*. However, Cohn and Orion (1970) and Weischer and Wyss (1976) did not observe galling on root tips of grapevines infested with *X. index*.

L I T E R A T U R E C I T E D

- BAJAJ H.K. and JAIRAJPURI M.S., 1977 - Variability within *Xiphinema insigne* populations from India. *Nematologica*, 23: 33-46.
- COHN E. and ORION D., 1970 - The pathological effect of representative *Xiphinema* and *Longidorus* species on selected host plants. *Nematologica*, 16: 423-428.

- DAVIS R. A. and JENKINS W. R., 1960 - Nematodes associated with roses and the root injury caused by *Meloidogyne hapla* Chitwood, 1959, *Xiphinema diversicaudatum* (Micoletzky 1927) Thorne, 1939 and *Helicotylenchus nanmus* Steiner, 1945. *Bull. Md. Agr. Exptl. Sta. A.*, 106: 16 pp.
- DI SANZO C. P. and RHODE R. A., 1969 - *Xiphinema americanum* associated with the maple decline in Massachusetts. *Phytopathology*, 59: 279-284.
- JANARTHANAN R., SESHADRI R. A. and SUBRAMANIAM T. R., 1969 - Studies on *Xiphinema* spp. and *Longidorus* spp. from Madras state. Proc. All India Nematology Symposium, New Delhi, p. 34.
- LOOS C. A., 1949 - Notes on free living and plant parasitic nematodes of Ceylon. No. 5, *J. Zool. Soc. India*, 1: 23-29.
- PERRY V. G., 1958 - Parasitism of two species of dagger nematodes (*Xiphinema americanum* and *X. chambersi*) to strawberry. *Phytopathology*, 48: 420-423.
- RASKI D. J. and RADEWALD J. D., 1958 - Reproduction and symptomatology of certain ectoparasitic nematodes on roots of Thompson seedless grape. *Pl. Dis. Repr.*, 42: 941-943.
- SIDDIQI M. R., 1959 - Studies on *Xiphinema* spp. (Nematoda: Dorylaimoidea) from Aligarh (North India) with comments on the genus *Longidorus* Micoletzky, 1922. *Proc. Helm. Soc. Wash.*, 26: 151-163.
- WEISCHER B. and WYSS U., 1976 - Feeding behaviour and pathogenicity of *Xiphinema index* on grapevine roots. *Nematologica*, 22: 417-423.
- YADAV B. S. and VARMA M. K., 1967 - New host plant of *Xiphinema basiri* and *X. indicum*. *Nematologica*, 13: 469.

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