

RESEARCH NOTES

Observations on the Host-parasite Relationship of *Pratylenchus vulnus* on Grapevine, *Vitis vinifera*

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Studies on the host-parasite relationship of *Pratylenchus vulnus* Allen and Jensen to roots of several major crops have shown that this nematode feeds on cortical cells, an activity which causes extensive damage (2, 3). Similar information is not available for grape, although the association of *P. vulnus* with root injury on grape has been reported (1, 7). The purpose of the present study was to investigate the host-parasite relationship of *P. vulnus* on grape var. 'Thompson Seedless' and the nematode's effect upon root tissues.

Two-bud grapevine cuttings were obtained in November 1973 and placed in cold storage. Eighteen of the cuttings were transplanted, in mid-February 1974, singly into 20-cm clay pots containing autoclaved sandy loam soil. *Pratylenchus vulnus* was cultured monoxenically on carrot slices (4). Ten days after being transplanted, one-half of the plants were inoculated with an aqueous suspension of 1,000 nematodes/pot. Inoculum was poured into 10 holes in the soil of each pot at 5 to 7.5 cm from the grape stem. Pots were placed in sawdust beds in a greenhouse and irrigated at 1- to 3-day intervals with distilled water as needed. Half-strength Hoagland's nutrient solution was provided weekly. Soil temperature was maintained at 20-30 C, except for a 5-week dormancy period during the winter when greenhouse heaters were turned off and soil temperature dropped to 5-16 C. During this dormancy period, tops of plants were pruned. After 362 days, random root sections from inoculated and noninoculated plants were selected for examination. Roots were cut into pieces 10 cm or less in length and stained in a solution of lactophenol with 0.05% acid fuchsin. Freehand transverse and longitudinal sections were cut from necrotic and healthy-looking roots of both inoculated and noninoculated material. Sections were mounted on slides and examined microscopically.

Progressions in size and color of necrotic lesions were found throughout the root system 362 days after inoculation (Fig. 1-A). Extensive colonization of secondary and adventitious roots by *P. vulnus* was associated with cavities in the cortical parenchyma. Adults, juveniles, and eggs



FIG. 1-(A-C). A) Secondary roots of grape variety 'Thompson Seedless' showing dark lesions associated with the presence of *Pratylenchus vulnus*. B) Longitudinal section of grape root showing different stages of *Pratylenchus vulnus* randomly oriented. C) Burrow showing two nematodes migrating in opposite directions. Note cell discoloration.

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were present although none were found in meristematic or vascular tissues. These features are characteristic of parasitism by *Pratylenchus* species in many hosts (5, 6). *Pratylenchus vulnus* also was found oriented randomly, sometimes appearing parallel to the vascular tissue and other times coiled within several cells (Fig. 1-B). This random orientation would appear to occur in cavities where direction and configuration of nematodes are not impeded by cell boundaries. Nematodes, along with abundant eggs, were found inside the lesions, with the highest numbers in necrotic areas. Large lesions contained 40 to 50 nematodes. Very few nematodes were found at the edge of lesions and none 3 mm or more beyond. Lesions initially appear as light brown spots, then turn dark, and enlarge and girdle the roots. Mechanical damage to cell walls resulted from nematode penetration. There was no evidence of nematodes having fed on the endodermis or penetrating the stele. *Pratylenchus vulnus* moved intracellularly rather than intercellularly. Cavities (Fig. 1-C), probably resulting from rupturing of parenchyma cells, were observed. Darkened necrotic tissues free of nematodes also were observed in roots from noninoculated

plants. Apparently these were the result of normal senescence.

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