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HOST RESPONSE TO *CRYPHODERA KALESARI* (HETERODERIDAE: NEMATODA)

by

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Summary. *Cryphodera kalesari* induces a single uninucleate giant cell in the stelar region of roots of *Terminalia tomentosa*. The cytoplasm of the cell is dark and granular denoting high metabolic activity.

Heteroderids, represented by *Heterodera* and *Globodera*, are considered to be the most evolved among plant parasitic nematodes, and induce adaptive cellular modifications in the form of multicellular syncytia in the vascular tissues of their host plants. The lesser known heteroderids, viz., *Hylonema*, *Sarisodera*, *Bellodera* and *Meloidodera*, however, induce a single uninucleate giant cell (Taylor *et al.*, 1978; Mundo-Ocampo and Baldwin, 1983a and 1983b, 1984) and, therefore, are considered less evolved phylogenetically (Mundo-Ocampo and Baldwin, 1984).

The genus *Cryphodera* Colbran is currently represented only by five species and there is no information on the host response to them. *C. kalesari* Bajaj *et al.*, 1989 is widespread in natural forests of Shivalik range of Himalayas in Haryana and Himachal Pradesh states of India. Histopathological changes induced by *C. kalesari* in 'sain', *Terminalia tomentosa* Wight *et Arn.* (Family Combretaceae) were studied.

Materials and methods

Roots of *T. tomentosa* infected with *C. kalesari* Bajaj, Walia, Dabur *et Bhatti* were collected from a glass house culture maintained at the

Department of Nematology, CCS Haryana Agricultural University, Hisar. Root pieces bearing mature females were selected microscopically, washed thoroughly with distilled water and fixed in FAA. They were passed through an ethanol series for dehydration. Then the roots were embedded in paraffin wax, sectioned at 10 μm , and stained with safranin and light green for observations with a light microscope.

Results and discussion

No external symptoms of nematode infection were visible on the roots. However, a few mature females tended to erupt out of the roots. The nematode body resided in the cortex causing extensive disruption of the cortical parenchymatous cells and rupturing of epidermis due to the protruding females (Fig. 1A). The nematode head lay embedded in the stele where a prominent single uninucleate giant cell, presumably of the pericycle in origin, was formed (Fig. 1B). The single uninucleate giant cell measured 75-117 μm in length and 40-80 μm in width. The cytoplasm of this cell was dark and granular denoting high metabolic activity. The wall of the cell near the nematode anterior region and

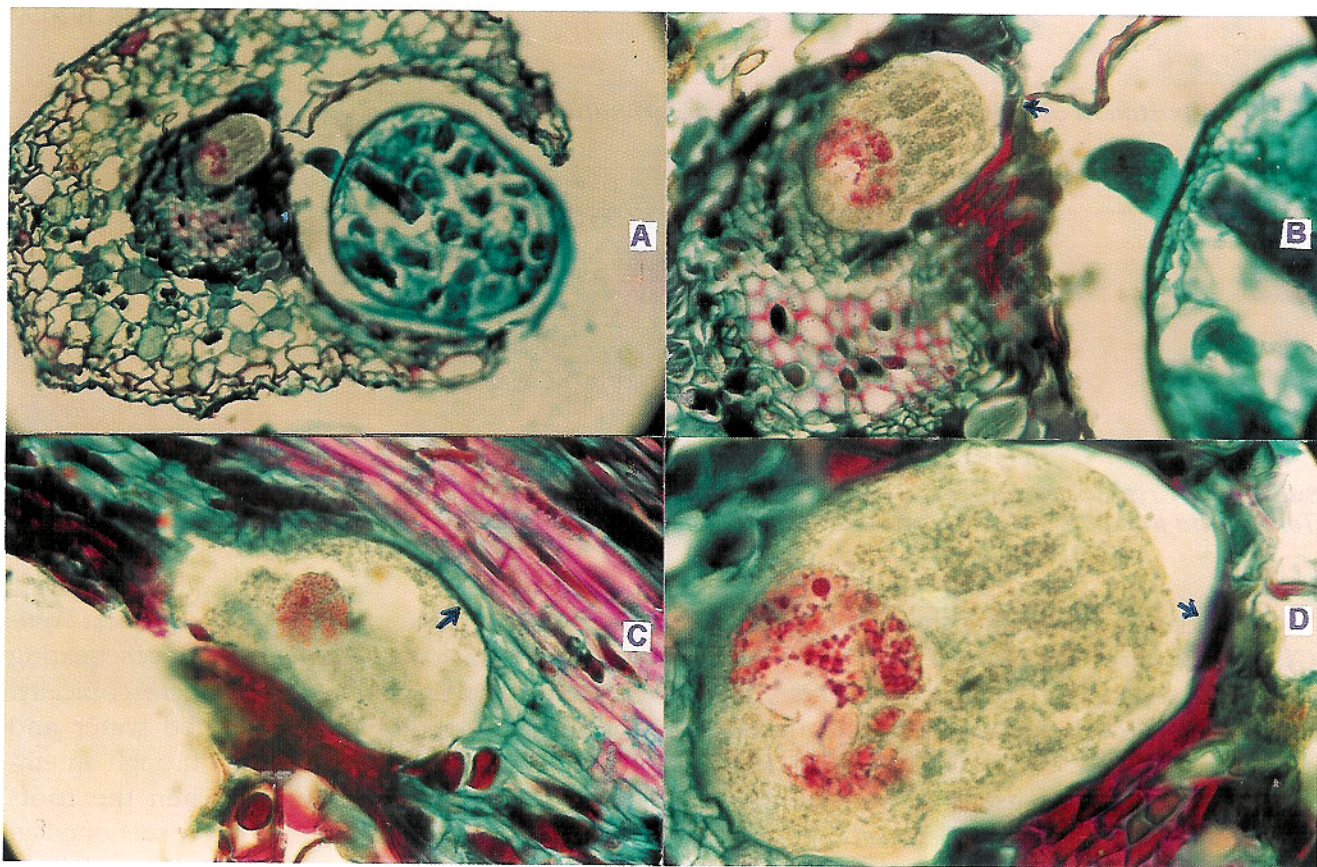


Fig. 1 - Roots of *Terminalia tomentosa* attacked by *Cryphodera kalesari*; A, mature female located in the cortex with the anterior region near the stele, the epidermis is ruptured with the female partly protruding out. A single uninucleate giant cell is located in the stelar region (cross section); B, single uninucleate giant cell with dark granular cytoplasm, cell wall is thickened (arrow) near the nematode anterior region (c.s.); C, single uninucleate giant cell with thickened cell wall (arrow) opposite to xylem vessel (longitudinal section); D, complete single uninucleate giant cell, note the nucleus with several small rounded organelles and the thickened cell wall (arrow) near the nematode anterior region (c.s.).

adjacent to the xylem vessels, was thickened (Fig. 1C). However, no wall ingrowths were visible. The nucleus appeared dark red, rounded and 19-24 μm in diameter and contained several rounded bodies (Fig. 1D). A prominent nucleolus was, however, not discernible.

Host response, combined with conventional morphological characters is very useful in developing phylogenetic analysis within a group. Among members of Heteroderidae two basic types of host response are induced, i.e., single uninucleate giant cell and syncytium. Mundo-

Ocampo and Baldwin (1984) modified the cladogram of Heteroderidae proposed by Ferris (1979), and considered single uninucleate giant cell as a plesiomorphic (primitive) character and syncytium as an apomorphic (derived) character. Our studies on *C. kalesari* are based upon light microscopy alone, and lack finer details on plasmodesmata and plastids. Nevertheless, the histological changes brought about by *C. kalesari* support the observations on *Bellodera*, *Meloidodera*, *Sarisodera* and *Hylonema* that also induce single uninucleate giant cell.

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