

## Histopathology of cotton resistant line CNPA 17-26 B2RF to *Meloidogyne incognita* obtained by marker-assisted selection.

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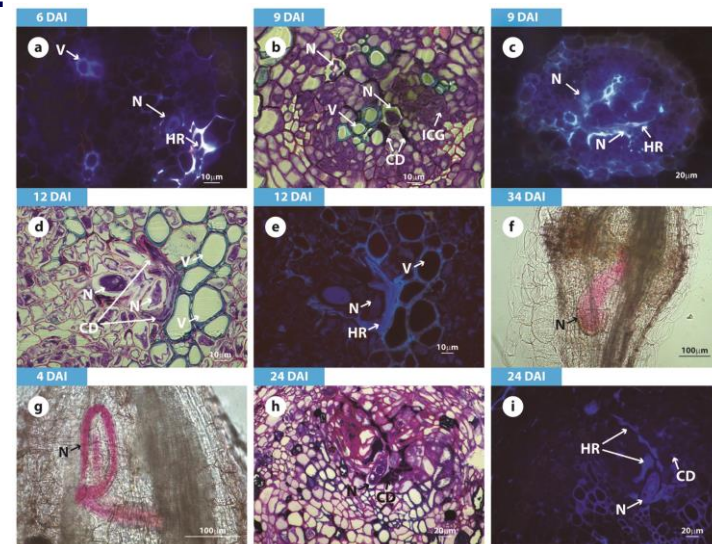
The root-knot nematode, *Meloidogyne incognita*, is a major pathogen of cotton crop. Breeding plants for genetic resistance is the most desirable strategy to control this pathogen.

**Objective:** To clarify the resistance mechanisms, in CNPA 17-26 B2RF derived from the M-315 resistance source.

**Materials and Methods:** The resistant line CNPA 17-26 B2RF (triple cross [BRS 368RF x M-315] x [BRS 430B2RF]) was selected for histopathological characterization of plant-nematode interaction, compared with the susceptible FiberMax 966. Plants were inoculated with 10,000 J2s. Roots stained with acid fuchsin, or thin sectioned and observed for fluorescence under microscope with UV excitation, or stained with toluidine blue at 2, 4, 6, 9, 12, 15, 19, 23, 26, 30, 34 and 40 DAI.

**Results and Discussion:** The nematode penetrated equally in both genotypes. **Susceptible plant:** Well developed feeding sites (6 to 30 DAI). Females reached maturity at 26 DAI, and eggs observed at 30 DAI. **Resistant plant** (Fig. 1): Blue fluorescence or dark blue color in the tissues around the nematode (hypersensitivity reaction, HR) in the cortex and central cylinder, indicating accumulation of phenolics in the roots (2 to 6 DAI). At 9 DAI, early-stage giant cells next to nematodes. At 12–40 DAI, initial giant cells were completely degraded with phenolics involving the nematodes and giant cells. No fully developed giant cells or mature females or eggs were observed, only J4s and males at 34 DAI.

**Conclusion:** The resistance (near-immunity) of the line CNPA 17-26 B2RF was related to early (2–12 DAI) defense responses that totally prevented nematode reproduction.



**Fig. 1.** Roots of *Gossypium hirsutum* CNPA17-26B2RF (resistant) infected with *Meloidogyne incognita*. A,C,E – UV fluorescence. B,D,H – toluidine blue. F,G – acid fuchsin. A – fluorescence (hypersensitivity reaction, HR) in the root central cylinder (CC) at 2 DAI. B,C – initial giant cells in in CC, cell death and HR at 9 DAI. D,E – cell death and HR in CC at 12 DAI. F – J4 female at 34 DAI. G – male at 34 DAI. H,I, cell death and autofluorescence (HR). N = nematode, CD = cell death, V= vessel, ICG = initial giant cell, HR = hypersensitive reaction.