Characterization of Histological Effects of *Meloidogyne incognita* Infection in Resistant and Susceptible *Coffea arabica* Genotypes

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SUMMARY

Root-knot nematode infection is responsible for many losses in coffee crop infested areas. The *C. canephora* species is a source of genetic resistance, but difficult to be directly used by breeders in the allotetraploid, long life cycle of *C. arabica* plant, which is the most cultivated species and the most susceptible to nematodes at the same time. We studied tissue cuttings from two resistant (H 419-5-4-5-2 progeny of the Paraiso cultiva and UFV 408-28 of the Hibrido de Timor cultivar) and one susceptible (catuai Vemelho IAC 15) coffee genotypes of *C. arabica* regarding *M. incognita* development. The resistance of those genotypes was previously confirmed for *M. exigua* and *M. incognita*. Here we present the plant response at histological level upon infection with a highly pathogenic population of *M. incognita* race 1. We observed the penetration, migration and establishment of feeding sites during a period of five days, corresponding to the early stages of the nematode parasitic cycle. The infected root sections were analyzed by optical microscopy under UV light in order to detect the autofluorescence related to aromatic compounds. Accumulation of phenolic compounds was registered next to nematodes bodies penetrating the epidermis of resistant roots. Migrating nematodes were also observed inside the vascular system of resistant plants, surrounded by necrotic cells. Neither necrosis nor autofluorescence of phenolic residues were recorded in the susceptible plant, while nematodes were present and started feeding. Corresponding portions of the root tissue cells and nematodes presences were revealed by toluidine blue staining. Giant cells formation was not observed in the early stages of infection in one of the resistant genotypes, while the other resistant plant allowed initial formation of feeding sites. At the same time, highly vacuolated and dense cytoplasm containing cells were observed in the susceptible plant. Results indicated that the mechanism of resistance involved the hypersensitive response that should be blocking the *M. incognita* development in the resistant cultivars. Confirmation of the histopathological responses of contrasting genotypes will be useful to future ESTs libraries construction.