

Transformation of *Coffea arabica* for Root-knot Nematode Resistance Using Cysteine and Serine Proteinase Inhibitors

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SUMMARY

Biotechnology procedures were applied for the control of *Meloidogyne konaensis* on coffee trees. This nematode species is a parasite of *Coffea arabica* cv. Typica grown in the Kona region of Hawaii. Cystatin, a modified cysteine proteinase inhibitor from rice, alone or in combination with a cowpea trypsin inhibitor was inserted into arabica somatic embryos using *Agrobacterium tumefaciens* or by particle bombardment. Over 2500 viable lines remained after a 7 month selection period on antibiotic media. Plants were regenerated from 71 lines of selected somatic embryos. A nematode biological assay was conducted in a secured laboratory. Ninety-one of the transformed plants, representing 41 lines, were challenged with *M. konaensis*. Roots were harvested 347 days after inoculation and the nematode eggs and juveniles were compared among transgenic and non-transgenic lines. Twelve lines demonstrated resistance to *M. konaensis* and supported fewer than 70% of the nematodes found on wild-type coffee plants. This technology is a promising control method for root-knot nematodes in *C. arabica*.