

Biological Control of *Meloidogyne incognita* on Coffee Plants using the Isolates P10 of *Pasteuria penetrans*

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SUMMARY

Root-knot nematodes (RKN), *Meloidogyne* spp., are widely distributed in coffee plantations in Brazil, where they cause great losses to the coffee farmers and economy of the country. Recent surveys on coffee plantations have shown *M. exigua* in 100% of infected samples from Minas Gerais State and a substantial increase in *M. paranaensis* and *M. incognita* (races 1, 2, 3 and 4) in Paraná and São Paulo States. *M. incognita* is the most important species in São Paulo State. Public concern over the toxicity of nematicides and their impact on the environment has focused research on alternative methods to control plant-parasitic nematodes. *Pasteuria penetrans* (Thorne) Sayer & Starr, an obligate hyperparasite of root-knot nematodes (RKN) has for many years shown itself to be a very promising biological control agent. Isolates of *P. penetrans* from different geographical areas were tested for the ability of the endospores to attach to second-stage juveniles and to colonize females of different populations of *Meloidogyne* spp. The bacterium isolate P10 was selected to control the four races of *M. incognita* from coffee. This work aimed to assess the potential of the isolate P10 of *P. penetrans* to control *M. incognita* race 2 on coffee over a period of two years and to improve our understanding of the factors affecting its efficacy as a biological control agent. The isolate P10 of *P. penetrans* was evaluated in greenhouse conditions, using two doses of a bionematicide powder (BP) on seedlings of 'Mundo Novo' coffee: 10^7 endospores (5.0 g BP/seedling) and 10^6 endospores (0.5 g BP/seedling). Coffee seedling substratum was treated previously with these two doses of *P. penetrans* and after 2 months the plants were cultivated in soils presenting different textures: clay-sandy-soil (38% of clay, 2% of silt and 60% of sand) and sandy-soil (17% of clay, 0% of silt and 83% of sand). When the coffee plants were 30 cm high, they were inoculated with 20,000 eggs/plant of *M. incognita* race 2. The coffee plants were evaluated 8, 16 and 24 months after nematode plant infestation. The biological control effectiveness was evaluated by the reduction of egg numbers per root system, ranging from: 60% (0.5 g in clay-sandy-soil), 70% (5.0 g in clay soil) and 80 % (0.5 g and 5.0 g in sandy soil). The suppressive mechanism caused by the bacterium was evaluated by the percentage of infected second-stage juveniles (J2), number of endospores attached /J2 and number of infected females. The high suppression rates were related to the time increasing from 8 to 24 months and to the percentage of sand in the soil. No effect of bacterium dose was observed after 24 months of experiment. Future studies in field conditions will be essential to confirm the potential of *P. penetrans* to control *M. incognita* on coffee.