

Effect of RNAi silencing of an Esophageal-Gland-Specific *Mi-msp-1* gene of *Meloidogyne incognita* during the Early Stages of Nematode Parasitism

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Abstract—Root knot nematodes belonging to the genus *Meloidogyne* are the most devastating group of plant parasitic nematodes and the key economically important species in *M. incognita* whose genome has been sequenced along with stage specific transcriptome. Gene silencing using RNA interference is one of approaches to utilize the nematode genes for developing tolerant crops to overcome the nematode inflicted yield losses. In this addition, we provide the molecular evidence in support of parasitic characteristics of *Mi-msp-1* gene, a putative secretory protein from *M. incognita* and its molecular characterisation via expression localization, qRT-PCR and Southern hybridization. In situ mRNA hybridization analysis showed that the transcripts of gene *Mi-msp-1* accumulated exclusively with in the subventral esophageal gland cells of the pre parasitic second stage nematode and the transcript levels of *Mi-msp-1* were strongly upregulated during the early parasitic stages, indicating that they function at specific stages during *M. incognita* parasitism. We used in vitro RNAi strategy to knockdown *Mi-msp-1* gene associated with parasitic stages to determine the expression of key cell wall degrading enzymes and vice versa as the delivery of venom allergen-like proteins into host tissue coincide with the enzymatic breakdown of plant cell walls. Immediate short term effect of transient in vitro silencing of *Mimsp-1* brought about by soaking in double stranded RNA was seen in terms of significant reduction in penetration of *M. incognita* in tomato roots in Pluronic gel medium. On the contrary, long term silencing effect could be supported by the reduction in both infection and multiplication which established that *Mi-msp-1* could be a potential target of anti-nematode strategy.