

Molecular tools in the study of systematics of nematodes

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Molecular biology has revolutionized the field of nematode systematics. Molecular methods of identification provide accurate, reliable diagnostic approaches for the identification of plant-parasitic nematodes. Initially, the techniques were used solely for taxonomic purposes, but increasingly became popular as a component of diagnostic information for farmers, growers and advisors. Diagnostic procedures are now available to differentiate the plant-pathogenic species from related but non-pathogenic species. The microscopic size of plant parasitic nematodes poses problems and techniques have been developed to enrich samples to obtain qualitative and quantitative information

on individual species. In addition, techniques are available to evaluate single nematodes, cysts or eggs of individual species in extracts from soil and plant tissue. The IEF of proteins, PCR-RFLP, Real time PCR, PCR with specific primers, LAMP and DNA sequencing are the most widely used approaches for identification, taxonomy and phylogenetic studies. DNA bar coding and the extraction of DNA from preserved specimens will aid considerably in nematode systematics and diagnostics. Examples of molecular approaches for resolving of different aspects of species delimiting, phylogeny, biogeography and diagnostics in several groups of plant parasitic nematodes are presented and discussed.