Abstract

The factors associated with unthrifty growth of apple are not fully determined, resulting i n inadequate diagnosis of apple replant disorder (ARD). The present study isolated and identified nematodes and fungi from ARD -infested soils to determine factors that interacted to cause ARD. Nematodes were extracted and identified in several orchard soil subsamples. The remaining soils were mixed to give composite soil. Transformed and non-transformed apple host seedlings were planted in the composite soil in a greenhouse, harvested after 10 weeks, and processed for isolation and identification of fungi. Pratylenchus and Xiphinema nematodes were present in the soils. Root-lesion nematode (RLN) frequency was always 100%, and dagger nematode (DN) frequency ranged from 40-70%. The RLN and DN ranged from 56-350 and 5-58 per 100 cm 3 of soil, respectively. Isolation frequency of Pythium species was highest (29%), followed by 10% for Pythium cryptogea, 4% for Pythium cambivoraand Pythium catorum, 3% for Pythium megasperma , and 2% for Phytophthora species. Both transformed and non-transformed apple hosts were infested by at least several fungi. Of the six apple hosts tested, Pythium sp. and F. oxysporum colonized six each, Pythium cryptogea, C. lucidum and C. destructans colonized three each, Pythium cactorum, Pythium cambivora and Pythium megasperma two each, and Phytophthora sp., F. solani, F. equiseti, F. acuminatum and Rhizoctonia sp. one each. Consequently, the ARD symptoms observed on diverse apple hosts were associated with combined effects of RLN, DN and various species of Pythium, Phytophthora, Cylindrocarp on, Fusarium and Rhizoctonia. Whenever unthrifty growth is observed in soil especially that under perennial fruits and continuously cultivated annual crops, similar diagnostic isolation of multiple pathogens should be performed. In developing management st rategies, germplasm for the crop in question should be evaluated in multiple sites or in composite soil in order to identify germplasm with broadspectrum resistance or tolerance to the pathogens.