First Report of the Root-Knot Nematode Meloidogyne arenaria Race 2 from Several Vegetable Crops in Jordan

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Meloidogyne arenaria (Neal) Chitwood (race 2) is reported for the first time in Jordan. The nematode populations were recovered from several vegetable crops, including tomato (Lycopersicon esulentum Mill), squash (Cucurbita pepo L.), cucumber (Cucumis sativus L.), and bean (Phaseolus vulgaris L.), at Dier Alla in the northern area of the Jordan Valley. Symptoms included root galling, leaf chlorosis, and stunting. Galled plant root samples were collected during a survey conducted from May 2002 to August 2003 covering most of the irrigated agricultural areas of Jordan. Eighty-three Meloidogyne spp. populations were collected from various vegetable crops and fruit trees. Identification to species and race levels of the nematode populations was based on combination of currently available methods including nematode morphology, host preference based on the North Carolina (NC) differential host test (1), and cytogenetics and DNA-fingerprinting. Seventy of the eighty-three collected populations were identified as M. javanica, five as M. incognita (race 1), three as M. incognita (race 2), and five as M. arenaria (race 2). The perineal patterns of M. arenaria were characterized by a low, round to indented dorsal arch near the lateral field with irregular forks in the lateral field, fine smooth striae, and a distinct whorl. Race 2 was identified with the NC differential host test. Cytogenetic studies indicated that M. arenaria populations were triploid with an average of 52.2 chromosomes, while the populations of M. incognita (race 1), M. incognita (race 2), and M. javanica were hypotriploid with an average of 45.2, 46.1, and 46.7 chromosomes, respectively. Two polymerase chain reaction (PCR)-based assays were used to confirm species identification and to study genetic variability of the Meloidogyne spp. populations including sequence characterized amplified regions (SCAR) and random amplified polymorphic DNA (RAPD). In the SCAR-PCR-based assay (2), typical DNA products of 420, 670, or 1,200 bp in size were amplified by using extracted DNA of M. arenaria (race 2), M. javanica, or M. incognita (race 1 or 2), respectively, as template DNA. The RAPD-PCR primer, OPA-01, produced DNA patterns with bands that clearly distinguished M. arenaria from the other two Meloidogyne spp. To our knowledge, this is the first report of the root-knot nematode, M. arenaria race 2, in Jordan.