

**RANDOM AMPLIFIED POLYMORPHIC DNA (RAPD) MARKER FOR GENETICAL DIVERSITY PATTERNS OF IRANIAN ONION GENOTYPES RESISTANT AND SUSCEPTIBLE TO ROOT AND BASAL ROT DISEASE**

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**Abstract:** Onion, *Allium cepa* var. *cepa*, is the most widely used vegetable in the world and is found in a large range of food recipes in many different cultures. Onion is grown in many places with different climates. Top producers include China, India, USA, Egypt, Iran, Turkey, Pakistan, Brazil, Russia and Korea. In 2010 the estimated world production of dry onions was 74,250,809 Metric Tons (source FAOSTAT), which corresponds to about 11 kg per person (in 2010 the world had about 6.9 billion persons). *Fusarium* basal rot, *Fusarium oxysporum* f. sp. *cepa*, is an important soil-borne pathogen that can survive in soil for many years as chlamydospores or as a saprophyte on crop residues. The pathogen infects the onion root and basal plate area, causing a dry rot. The disease is more serious when soil temperatures exceed 80°F and soil moisture is high. *Fusarium* basal rot symptoms appear as a pinkish brown rot that becomes covered with a whitish mycelium. Leaf tips yellow, entire leaves wilt beginning with the older outer leaves, scattered plants is stunted, and eventually die. A semi-watery decay progresses from the basal plate upward and secondary invaders (bacteria) cause a watery, foul-smelling breakdown. Infected plants may appear after bulbs develop, and are easily pulled from soil as most of the root system becomes rotted. Late-season infection may not be visible until storage. The disease can be very damaging to susceptible varieties in fields with a history of *Fusarium* basal rot. Resistant sources are the main method of control. In this manuscript, Random Amplified Polymorphic DNA (RAPD) markers were used to evaluate genetic similarity and interrelationship among onions cultivars for various ranges of resistance to *F. o. f.sp. cepa*. The total number of amplified DNA bands varied between 5 (primer OPA-16) and 13 (primer OPA-17) with the average of 8.3 bands per primer. The maximum number of polymorphic bands (13) was obtained with the Jaccard coefficient was used to calculate the genetic similarity. UPGMA was used to generate the dendrogram. PCR amplified product bands ranged from 300 bp to 2000 bp. Sensitive cultivars such as Yazd and Zanjan showed similar polymorphism in average range 400-1700 bp. A maximum similarity value of 95% was observed between 2 cultivars of Sefid-Ghom and Sefid-Kashan, whereas Yazd and Kashan were found to be genetically most diverse (33%). The cluster tree analysis showed that the genotypes were broadly divided into 3 main groups representing sensitive, tolerance, resistant. A dendrogram based on similarity values using UPGMA confirmed the polymorphisms results.

**Keyword:** Genetic, diversity, Onion, , Root and Plate Rot, RAPD



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