Deciphering Resistance To Phytophthora Capsici in Pepper

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The US pepper industry in 2012 was valued at $802.7 M. One fifth of this value is from chile (hot-type) peppers. One of the biggest problems for the pepper industry is *Phytophthora capsici* (Pc) in which all commercial varieties suffer yield losses despite good management practices and available landraces with high levels of resistance. Moreover, breeding resistance to Pc is complicated by the dynamic array of races of *Phytophthora* found in fields over time and variable resistance across plant varieties and tissue types. A high density map with 3892 markers was generated in a set of recombinant inbred lines derived from the highly resistant *Capsicum annuum* accession Criollo de Morelos-334 (CM334) and Early Jalapeño. These lines have been systematically screened for root rot resistance against a set of isolates defined by differential analyses collected from Mexico, New Mexico, California, Michigan and Tennessee. QTL effective across isolates and specific to isolates have been identified. SNP markers associated with resistance QTLs were designed and validated across different Pc-resistant populations. These markers will facilitate gene pyramiding schemes in pepper recurrent selection.