

Development of commercial pepper varieties resistant to anthracnose by means of molecular breeding technology

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Anthracnose (*Colletotrichum* sp.) is one of the most destructive pests of chili pepper in anywhere the crop is grown. The damage accounts for approximately 10-20% loss in Korea. A multi-party research team has been formed to tackle the disease by breeding resistant varieties assisted by molecular technology. The project consists of mainly four parts: collection of germplasm resistant to the disease and to transfer resistant gene(s) to cultivating chilies, development of molecular markers to track down resistant gene(s), and development of commercial chili cultivars resistant to the disease. From an extensive survey, it was found that none of chili accessions in *Capsicum annuum*, which is the major cultivating chili species, was found to be resistant to anthracnose. The resistant plant materials were found only in wild species of *C. baccatum* and *C. chinense*. The wild chili species are not sexually compatible to the cultivating chili varieties. We were successful in making hybrids between wild species and cultivating chilies through embryo rescue. The hybrids were then crossed to *C. annuum* for breeding resistant varieties through a successive backcrossing. In each generation, the resistant individuals were selected after inoculation with a pathogenic isolate of *Colletotrichum acutatum*, which was identified as the causal pathogenic species in Korea. For screening large breeding population, a better inoculation method is being sought for. For tracking down resistant gene(s), molecular markers and QTLs are being developed by using several populations derived from crosses between cultivating chilies and wild species. To isolate resistant genes from chili, 206 EST clones were isolated and sequenced. Several clones were identified as the putative disease resistant genes by Northern blot analysis and transformation to chili.

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