

## cDNA Microarray Analysis of Phytophthora Resistance Related Genes Isolated from Pepper

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### Objectives

The objective is to isolate transcription factors related to a defense system against *Phytophthora capsici* infection.

### Materials and Methods

1. *Capsicum annuum* PI201234
1. The EST chips (5000 ESTs) of pepper, provided by Plant Genomics Lab.
2. Microarray with total RNA induced by *P. capsici*.

### Result and Discussion

*Phytophthora blight* is a devastating disease of pepper and occurs almost anywhere peppers are grown. Even in this year 2003, it caused about 10% loss of total yield in nationwide. *Phytophthora blight* is caused by *Phytophthora capsici* and this pathogen can infect every part of the plant by moving inoculum in the soil, by infecting water on surface, by aerial dispersal to sporulating lesions.

Management of *Phytophthora blight* currently relies on cultural practices, crop rotation, and use of selective fungicides. Since these treatments are a short-term management, a classical breeding for development of resistant pepper against the *Phytophthora* is an alternative. So far some of the resistant cultivars have been on the market, but those are limited regionally and commercially. Once the environmental condition is bad like a long term raining, none of the varieties can survive. Therefore, ultimately an elite line resistant against this disease should be developed, if possible, by biotechnology.

We have set out a series of work recently in order to develop *Phytophthora* resistant pepper cultivar. For the first time, the cDNA microarray analysis was performed using an EST chip that holds around 5000 pepper EST clones to identify genes responsive to *Phytophthora* infection. Total RNA samples were obtained from *Capsicum annuum* PI201234 after inoculating *P. capsici* to roots and soil and exposed to the chip. Around 900 EST clones were up-regulated and down-regulated depending on the two RNA sample tissues, leaf and root. From those, we have found 55 up-regulated and 45 down-regulated transcription factors that may be involved in gene regulation of the disease defense mechanism.