

database on agrochemicals is linked to the system for disease and insect diagnosis to help users search for appropriate agrochemicals to control diseases and insect pests.

**2-46. Characterization of A cDNA encoding A Novel Phenazine Compound in Hot Pepper**

**Ukjo Kim<sup>1</sup>, Sang Jik Lee<sup>1</sup>, Mi Yeon Lee<sup>1</sup>, Soon Ho Choi<sup>1</sup>, Seung Gyun Yang<sup>1</sup> and Chee Hark Harn<sup>1</sup>.**

<sup>1</sup>Biotechnology Center, Nong Woo Bio Co., Ltd., 537-17 Jeongdan, Ganam, Yeosu, Kyonggi 469-885, Korea

From the PMMV (pepper mild mottle virus)-inducible ESTs differentially expressed in *Capsicum chinense* PI257284, we isolated a full-length cDNA (CcPHZF: *Capsicum chinense* phenazine), encoding a phenazine biosynthesis protein which catalyzes the hydroxylation of phenazine-1-carboxylic acid to 2-hydroxyphenazine-1-carboxylic acid. Phenazine compound has been known to exhibit broad-spectrum of antibiotic activity against various species of bacteria and fungus. The entire region of CcPHZF is 879 bp in length and the open reading frame predicted a polypeptide of 292 amino acids. The homolog of CcPHZF is not present in database except clones of AC004044 and NM100203 from *Arabidopsis* with 58 and 59%, respectively. Genomic Southern analysis indicated that the pepper genome contains a single copy of CcPHZF. The CcPHZF was strongly induced in the pepper leaves 3 days after PMMV treatment, when HR occurs on the leaf surface. Characterization of CcPHZF is underway to investigate if the CcPHZF is related to disease resistance against pathogens.

**2-47. Development and Improvement of fungicidal spray program for apple production.**

**Hyun Jik Lee, Rae Hong Cho, Jung Sup Shin, Jung Nam Kim, Ji Hyun Yoon and Jae Youl Uhm**

Kyungpook National Univ. 1372 Sangyuck-Dong Puk-Ku Daegu Korea

; Dongbu Hannong Chemical, 175-1 Botong-Ri Jeongnam-Myun Hwasung-Si Kyungki-Do Korea

A basic spray program for apple in which fungicides are scheduled to spray at 15-day interval from petal fall to late August was formulated on the properties of several selected fungicides. In order to improve it, experimental plots, completely randomized block with 3 replications, were prepared in an orchard of 15 years old Fuji cultivar, and the spray programs in which only one chemical in the basic spray program was substituted with others were applied to each plot. It was revealed that only single substitution of the fungicide in the basic spray program makes a great differences in the control of white rot and bitter rot, and that the control property of the fungicides against the two diseases was quite variable even by the time of application. A similar trial was conducted in 2002 with a new basic spray program that was formulated with fungicides that have shown best control in each spraying time in the previous trial, similar results were obtained. Applying this method, the usefulness of certain fungicide in the spray program for apple could be properly assessed. Anthracnose of *Robinia pseudo-acacia* L. caused by *Collectotrichum* spp.