

invading DNA, such as bacteriophage and plasmid DNA. We confirmed the presence of Type I R-M related genes of Xoo strains and analyzed the relationship between R-M systems and transformation efficiency.

B-17 Effect of Ca⁺² Concentration in Nutrient Solution on Development of Bacterial Wilt and Population of *Ralstonia solanacearum* in Xylem of Tomato Seedlings. Inn-Shik Myung, Young-Ki Lee, Ki-Woong Nam, Jong Hyeong Lee, and Jong Min Baek. Plant Pathology Division, National Institute of Agricultural Science and Technology (NIAST), Rural Development Administration (RDA) Suwon 441-707, Korea

The effect of Ca⁺² concentration in the nutrient solution on the development of bacterial wilt and the population of bacterial pathogen, *Ralstonia solanacearum* in tomato seedlings was examined. Tomato seedlings were cultured in a nutrient solution containing Ca⁺² at concentration of 2, 5, 10, 15, and 20 mM, and inoculated with the pathogen by clipping method. The disease incidence and disease index were recorded for a period of 9 day. The population of the pathogen in stem of the plant was counted by plating on a medium at 4, 6, and 9 day after inoculation. That xylem vessels were clogged by the pathogen in the Ca⁺²-treated seedlings was observed by using scanning electron microscopy (SEM) at 6 and 9 day after inoculation. When the plants were cultured in the nutrient solutions containing at above 10 mM, those were resistant to bacterial wilt. The population of the pathogen in the stem and percent of clog in xylem decreased with increasing concentration of Ca⁺² in the solution. However, even in the presence of Ca⁺² at a high concentration, infection with the pathogen was observed in the xylem of the plant.

B-18 ToxJ and LysR-type regulator ToxR co-activate *Burkholderia glumae* tox operons encoding toxoflavine biosynthesis and transporter in a synergistic manner. Jinwoo Kim¹, Yongsung Kang¹, Jae-Eun Jeong¹, Yunjung Kim¹, Tomohisa Nagamatsu², and Ingyu Hwang¹. ¹School of Agricultural Biotechnology, Seoul National University, Seoul 151-921, Korea; ²Faculty of Pharmaceutical Sciences, Okayama University, Tsushima, Okayama 700-8530, Japan.

Burkholderia glumae produces toxoflavin, which is a key pathogenicity factor in rice grain rot and wilt in many field crops. We have previously presented that ToxR, a LysR-type regulator, regulates both *tox* operons (*toxABCDE* and *toxFGHI*) in the presence of toxoflavin as a coinducer. In addition, expression of the operons requires a

transcriptional activator, ToxJ, whose expression is regulated by quorum sensing. We present biochemical evidence to demonstrate that TofR, an octanoyl-L-homoserine lactone receptor, binds to the upstream of *tofI* and *toxJ* promoter regions having *lux*-box like sequences. ToxR binds to the upstream of *toxA* and *toxF* promoter regions having palindromic sequences, T-N11-A, and ToxJ binds to the *toxA* and *toxF* promoter regions. Gel shift assay and DNase I footprinting analysis demonstrate that ToxR and ToxJ function synergistically to activate expression of both *tox* operons and that the transcriptional activators exert their effect by directly binding to the upstream of their promoter regions. Our biochemical evidences demonstrate that ToxJ and ToxR co-activate transcription of *toxABCDE* and *toxFGHI* operons in a synergistic manner.

B-19 Bacterial Leaf Spot and Dry Rot of Lettuce Caused by *Xanthomonas campestris* pv. *Vitians*. Seungdon Lee, Jeonghee Lee, Hyun-Kyung Kim, Sunggi Heu and Dong-Soo Ra. Plant Pathology Division, National Institute of Agricultural Science and Technology, Suwon 441-707, Korea

During 1997 and 1998, a new disease of lettuce (*Lactuca sativa*) was observed on greenhouse-grown plants in Kwangju, Kwangmyung and Hoesung. Lesions on leaves were irregular, small, pale green to black, water-soaked, and 2 to 5 mm in diameter. Coalescing lesions sometimes caused defoliation of older leaves. Isolations made from diseased leaves on yeast extract dextrose calcium carbonate agar yielded nearly pure cultures of a yellow pigmented bacterium typical of a xanthomonad. Four bacterial strains were purified and used for further tests. Pathogenicity of strains was confirmed on 5-week-old lettuce plants injected with bacterial suspensions containing 10^8 cfu/ml of sterile water. The representative *Xanthomonas* strains isolated from lettuce were compared with a reference strain *X. campestris* pv. *vitians* for fatty acid profiles, metabolic fingerprints and 16s rDNA sequences, showing that all outcomes were indistinguishable between the representative and reference strains. The bacterium grew well between 18 and 33 °C, but optimum temperature was 30 °C on LB broth. This is the first report of bacterial leaf spot of lettuce in Korea.

B-20 Bacterial Leaf Spot of English Ivy Caused by *Xanthomonas hortorum* pv. *Hederæ*. Seungdon Lee, Jina Jo, Jeonghee Lee, Kyungsook Han¹, Sang-Tae Seo¹, Hyun-Kyung Kim, Sunggi Heu and Dong-Soo Ra. Plant Pathology Division, National Institute of Agricultural Science and Technology, Suwon 441-707, Korea. ¹Horticultural Environment Division, National Horticultural Research Institute