Waraporn Pupakdeepan 2011: Genetic Diversity of *Xanthomonas oryzae* pv. *oryzae* Strains Caused Bacterial Leaf Blight of Rice and Its Biological Control. Master of Science (Plant Pathology), Major Field: Plant Pathology, Department of Plant Pathology. Thesis Advisor: Associate Professor Sutruedee Prathuangwong, Ph.D. 151 pages

The 231 strains of a yellow pigment colony isolated from bacterial leaf blight (BLB) of rice were first characterized for pathogenicity, biological and molecular (16s rDNA) analyses that they all found to be *Xanthomonas oryzae* pv. *oryzae* (Ishiyama 1922) Swings *et al*. 1990 (Xoo). The diversity of these bacterial strains were assessed with polymerase chain reaction and repetitive DNA sequence (rep-PCR). Genetic diversity among Xoo strains revealed two-distinct groups, one majority (69.7%) was virulent that correlated with induced 13-50% leaf area infection on susceptible cv. KDML105, and another minority consisted less virulence strains of 1-12% leaf area infected. The ERIC and BOX primers were accurate to yield a specific 800 bp fragment that could be detected from virulent strains only, where the 495 bp was found in all 231-Xoo strains with BOX. The development of control strategy with the new antagonist strain *Bacillus subtilis* XA6 was prepared in different formulations. Strain XA6 grew profusely in a new MSP medium for biomass production and survived in a new powder formulation (XA6 talc-based) at $1x10^8$ cfu/g for 12 months at room temperature. This formulated product greatly decreased BLB severity on resistant Supanburi1 and susceptible KDML105 by 72 and 65% respectively and increased plant growth promotion that was correlated with highest accumulation of defense related enzymes, β -1,3 glucanase compared to ISR-B (*B. amyloliquefaciens* KPS46) and copper hydroxide. Seed and 6-foliar-spray treatments of cv. KDML105 with this XA6 talc-based formulation was also the most consistent in significantly 61% BLB reduction under field experiment that correlated with increased defense-related enzyme and 67.7 % yield increased (P=0.05).

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