Registance Mechanism of the Diamondback Moth (*Plutella xylostella*) to Prothiofos

BoYoon Seo, Dae-Weon Lee, Bu Keun Chung[1] and Kyung Saeng Boo

Lab. Insect Physiology, School of Agricultural Biotechnology, Seoul National University, Seoul, 151-742, Republic of Korea

[1]Division of Plant Environment, Gyeongsangnam-do Agricultural Research & Extension Services, JinJu, 660-370, Republic of Korea

To understand resistance mechanism of the diamondback moth (DBM, *Plutella xylostella*) against prothiofos, a resistant strain (DBM-R) has been established from the susceptible (DBM-S) strain and maintained over 100 generations under the selective pressure of prothiofos. The activity of general esterase in the DBM-R strain was 2 times higher than that in DBM-S strain, whereas there was no significant difference in glutathione S-transferase activity. Acetylcholinesterase (AChE) of the DBM-R strain, however, showed a low affinity for acetylthiocholine iodide, and its activity was 1.2-fold higher than that of the DBM-S strain. Inhibitory kinetic analysis of the resistant AChE with paraoxon exhibited the reduced bimolecular reaction constant (*ki*) by 7-fold, indicating that the resistant AChE is much less sensitive to paraoxon. The nucleotide sequences of the *AChE* gene in both strains showed polymorphism due to amino acid substitutions at several positions. In addition, *AChE* gene in genomic DNA has no intron and different length, such as 1717-bp and 1917-bp from DBM-S and 1614-bp and 1917-bp from DBM-R, showing possibly multiple copies of *AChE* genes in their genome. These results suggest that the increased AChE activity, AChE insensitivity and polymorphisms in AChE amino acid sequence contribute to the development of prothiofos-resistance in the DBM-R strain.