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Molecular mechanisms of metabolic resistance in booklice (Psocoptera: Liposcelididae)

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Abstract

The psocids from the genus *Liposcelis* are also named booklice, which are stored-product insect pests. Recently, apparent insecticide resistances have been observed in booklice. Here, we mainly focus on mechanisms of metabolic resistance associated with the three major enzymes, Cytochrome P450 monooxygenases (P450s), Estrases (ESTs), and Gluthione-S-transferases (GSTs) in booklice. We developed four comprehensive transcriptomic databases for four booklice, and a large number of detoxification genes potentially involved in insecticide resistance were identified. Totally, 49, 68, 94 and 82 P450 genes, 31, 37, 35 and 23 GST genes, 21, 19, 34 and 19 EST genes were identified for *L. bostrychophila*, *L. entomophila*, *L. tricolor* and *L. decolor*, respectively. The large number of P450s and GSTs implied that Liposcelis species could potentially develop high level of insecticide resistance. The mRNA expression levels of detoxification genes showed that these genes expressed at all tested stages, but exhibited stage-specific patterns, with the higher expression in adults and elder nymphs. Additionally, mRNA abundances of P450 genes were relatively more abundant in adult females than in adult males. The research on different strains showed that the resistance strain of both *L. bostrychophila* and *L. entomophila* had significantly higher mRNA expression and enzyme activity of the detoxification enzymes than the sensitive strain. The above data indicated that detoxification genes might be associated with metabolism insecticides in psocids.

"Remote Sensing, Predictable Storage of Agricultural Commodities and Advances in Hermetic Storage"

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