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Cloning and functional characterization of three new pheromone receptors from the diamondback moth, *Plutella xylostella*

Yipeng Liu[1,3], Yang Liu[1,*], Xingchuan Jiang[2], Guirong Wang[1,*]

[1]State Key Laboratory for Biology of Plant Diseases and Insect Pests, Institute of Plant Protection, Chinese Academy of Agricultural Sciences, Beijing, 100193, China

[2] College of Plant Protection, Anhui Agricultural University, Hefei, 230036, China

[3] College of Life Science, Hunan Normal University, Changsha, 410006, China

* Corresponding author: wangguirong@caas.cn (GW), yangliu@ippcaas.cn (YL)

Abstract

The highly specialized olfactory receptor neurons (ORNs) on the antennae of male moths can recognize blends of several pheromone components. In previous studies, a total of six candidate pheromone receptor (PR) genes were cloned and functionally characterized in the diamondback moth, *Plutella xylostella*. In the present work, we report on three novel candidate pheromone receptor genes: *PxylOR8*, *PxylOR41*, and *PxylOR45* in the same species. Gene expression analysis revealed that *PxylOR8* is specifically expressed in female adult antennae, while *PxylOR41* and *PxylOR45* are expressed in antennae in both sexes, but with a male bias. *In situ* hybridization revealed that *PxylOR8*, *PxylOR41* and *PxylOR45* are localized in long trichoid sensilla. Functional analyses on the three pheromone receptor genes were then performed using the heterologous expression system of *Xenopus* oocytes. PxylOR41 was tuned to two minor pheromone components Z9-14:Ac, Z9-14:OH, and their analog Z9-14:Ald.