

# Identification and Knockdown of the Olfactory Receptor (OrCo) in Gypsy Moth, *Lymantria dispar*

Wei Lin<sup>1, 2</sup>, Yanxue Yu<sup>1?</sup>, Ping Zhou<sup>4</sup>, Junhua Zhang<sup>1</sup>, Liduo Dou<sup>1</sup>, Qin Hao<sup>1</sup>, Hongjun Chen<sup>3?</sup>, and Shuifang Zhu<sup>1?</sup>

1. Institute of Plant Quarantine, Chinese Academy of Inspection and Quarantine, Beijing, China 100029; 2. College of Agriculture and Biotechnology, China Agricultural University, Beijing, China, 100193; 3. Division of Animal and Plant Quarantine Supervision, General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China, Beijing, China, 100088; 4. College of Plant Protection, Shandong Agricultural University, Tai'an, Shandong Province, China, 271000 ? Corresponding authors: Yanxue Yu, Institute of Plant Quarantine, Chinese Academy of Inspection and Quarantine, No. 11 Ronghua South Road, Yi Zhuang Economic and Technological Development Zone, Daxing District, Beijing, China 100176; Telephone: +86-010-53897559; Email: yuxue4607@aliyun.com. Hongjun Chen, Division of Animal and Plant Quarantine Supervision, General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China, No.9 Madian Road, Haidian District, Beijing, China 100088, Telephone: +86-010-13810048962; Email: chenjh1225@263.net. Shuifang Zhu, Institute of Plant Quarantine, Chinese Academy of Inspection and Quarantine, No. 11 Ronghua South Road, Yi Zhuang Economic and Technological Development Zone, Daxing District, Beijing, China 100176; Telephone: +86-010-53897651; Email: zhufsf@caiq.gov.cn.

### Abstract :

The gypsy moth, *Lymantria dispar*, is an important economic pest that causes large-scale damage to forests worldwide. Because of its important role in initiating and controlling insect behavior, olfaction—and olfaction-based pest management—has drawn increasing attention from entomologists. In this study, we identified the gene that encodes the olfactory receptor co-receptor (OrCo). Through amino acid sequence alignment, we found that *LdisOrCo* shares high identity with other OrCo proteins from different insect orders. Next, we performed RNA-interference (RNAi) to assess the role of OrCo in olfaction. Electroantennographic assays showed that after RNAi, the average value of males' response to sex pheromones was 0.636 mV, significantly lower than that of the positive control (average = 1.472 mV). Females showed no response to sex pheromones before or after RNAi. Finally, quantitative PCR showed a strong decrease in the expression of OrCo after RNAi, by ~74% in males and by 23% in females relative to the positive controls. These results indicate that OrCo is not only critical to odor recognition, but it may also represent a new target for development of semiochemicals that can influence insect behavior.

### Key Word :

: *Lymantria dispar*, RNA interference, OrCo, EAG, qPCR