

## **Supporting Information**

### **Functional characterization of an $\alpha$ -esterase gene associated with malathion detoxification in *Bradysia odoriphaga***

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Table S1. Primers used in cloning of *BoaE1*, qRT-PCR and RNAi

Primer Name	Sequence ( 5'-3' )	Application	Product LenGth	Efficiency	R <sup>2</sup>
BoaE1-ORF-F	CCGG <u>AATT</u> CATGAGTGATTTCGTC ATAGC	ORF application			
BoaE1-ORF-R	CCG <u>CTCGA</u> GAGTGGTGGTGGTGG TGGTGCTTCTCGCTGT				
BoaE1-qF	TTACGACTACGAACCGCTAAAG	qRT-PCR	97 bp	101.9%	0.976
BoaE1-qR	CTGGACCGAATGGGAACAATA				
18S-qF	CCTGTCTCGGATTAGGAAATG		106 bp	89.6%	0.989
18S-qR	CCCACAGCAACACTTGTAAAG				
RPS7-qF	GATCCGTTGGTCCGTGAA		104 bp	92.9%	0.951
RPS7-qR	GATTGCGTGTATTCTGGTTGG				
RPS15-qF	ATCGTGGCGTCGATTGGAT		164 bp	109%	0.997
RPS15-qR	CTCATTGGTGGGGCTTCCT				
PRL18-qF	CCAACTGGCAAGGGAACTCT		144 bp	107%	0.979
RPL18-qR	AGCTACGTCTGCGACCTCTA				
T7ds BoaE1F	<u>TAATACGACTCACTATA</u> GGATGC AAAACCACCGATCAAT	RNAi			
T7ds BoaE1R	<u>TAATACGACTCACTATA</u> GGCAAC ATCAAAAAGTGCACCG				
T7dsGFPF	<u>TAATACGACTCACTATA</u> GGCCAT GGCCAACACTTGTC				
T7dsGFPR	<u>TAATACGACTCACTATA</u> GGTTGT GTCCGAGAATGTTCC				

## **Figure legends**

**Figure S1.** Nucleotide and deduced amino acid sequence of *BoaE1* from *B. odoriphaga*. The initiation codon (ATG) and termination codon (TGA) are boxed in black. The catalytic triad are indicated by red bold letters. The active sites of the substrate binding pocket are highlighted in grey. The CarE highly conserved residues motif (Gly-X-Ser-X-Gly) are boxed in black.

**Figure S2.** Effect of RNAi treatment on sensitivity of *B. odoriphaga* larva to lambda-cyhalothrin or chlorpyrifos. NS represents no significant difference by student's *t* test.

1 TCGAGTTCAAAGAGACTTAAAGTCAAATTGCAATTCCGAATTACGTAAACGATGAGTATTCTCATAGCTACTACTCTCAGCGTAAAGTTAAAGGTGAGAAGAAACTAAC  
 M S D F V I A T T L S G K V K G V K K V T  
 120 GGTTTGGTGCAGATTTCAGTTCCAACGAATACCGTATGCCAAAACCACCGATCAATGAGCTTAGATTCACTGATCCACAGCGATAAGTCCGTGGACAGAGATTGAGATGGAACG  
 G F G A D Y F S F Q R I P Y A K P P I N E L R F S D P Q P I S P W T E I V D G T  
 240 ATCCCAACTCCGTGCTGTTCAAATCAGTAAATTGACGAAAAATGTAATCGGTGACGAGACTGCTGTATTGAATGCTACACGAAAGATCGAATCTGAAAGTAAACACCTGTG  
 I P T P C C V Q I S K L T K N V I G D E D C L Y L N V Y T K D L N P E S K T P V  
 360 ATGATTTTATCCATGGAGGGGATTCATGCCACGGATCATGCCGACCGGAAATTATGGACCTGACTACATATTACAAATAATGTTGCTGGTAACCATAAAATTATCCGTTGGAGTC  
 M I F I H **G G G** F M H G S C G P E I Y G P D Y I L Q N N V V L V T I N Y R V G V  
 480 TTGGCTTCGCCAGCTTACGGATCATCTTGAGATACCGGAAATGCTGGCTAAGGGATCAATTAAATGCAAAAGGATAACAAGAACATTGAAACTTTGGTGGAGATGCA  
 L G F A S F T D P S L E I P G N A G L R D Q L M A I K W I N K N I E H F G G D A  
 600 GATAATATAACATTGTCGCCAAAGTCTGGAGCTAATTCCGGTCACTTTGATGTTGCGAAAATGCGAAAGGATTATTCAAAGGGCTATGTAATGCTGGCACTGCAATAACA  
 D N I T L F **G Q S A G A N S** V H F L M L S E N A K G L F K R A I V M S G T A I T  
 720 TCATCGGGTTAAATCGAAAATAATTACACTCTACGGTGGCAGAAGTCTGGGTGGCAGGACATGATTGCCAAAAGGGTCATTGAAATTTCAGCACTGCAACCGCTAAAGAG  
 S S G L K S K N N Y T L R L A E V L G W S G H D C Q K G A L E F L R L R T A K E  
 840 TTAATCGAGGCAACCTAAATTAAATCCGAAAAGAACGTTAGATTGATATTGTCCTACGGTGGCAGGATGAGCCGTATGCTACAGAAAGGTGATCATACCAATGGATCCA  
 L I E A Q P K L I T E K E R L E L I L F P F G P V I E P Y A T E R S I I P M D P  
 960 ATAATAATGAGCAAGACAGCCTGGAGTAAGACTTAGATATGATCATGGGGAACATGGCACGAGGGATTAGTGTATTACAAAGGTAAAATCAGCACCAGAAATCCTCAGAAACCC  
 I I M S K T A W S K D L D M I I G G T S D **E** G L V I Y K R L K S R P E I L Q K P  
 1080 GATTGTTGCAAGTTATTTACCCATGGACTTGGTTGATAACCGATGACGACAAGGGAAAGAGATCGCTTGCAATTAAACATTATTGTTGGGAACTGCACATGTCATAAT  
 D L L Q V I L P M D L V D N T D D D K A K E I A C K L K Q F Y L G N C T M S I N  
 1200 CGATGTGACGGCTTCTGAAAGCTTATGACCGACAAATTATATTACATCGAATATTCCGAACTACCGCTGCCAACCGAGTCGGTAGTGGTAAACCTATTCTATCGGTCACTGTC  
 R C D G F L K L **M** T D K L Y L H R I F R T L T L R N E C G S G K T Y F Y R F S V  
 1320 GATTCAACCAACAAACCACTACAAATTGTCATGTCGGCATGAATGAAAAGGATGTTCCCATGCCGATGATAATTGATCTTTCAAGAATCAAAGCGTAAGATTCCACCCAGG  
 D S P T N N H Y K L F M C G M M N V K G C S **H A D D I S Y L F K N Q S G K I P P R**  
 1440 TATTCAATGGAATATCGAACTATACAAACGCTGGTTGGCGCTTCACAAGATTTGCATCCGATGCCAACCGAGTCGGTAGTGGTAAACCTATTCTATCGGTCAATAACCTC  
 Y S M E Y R T I Q T L V G A F T R F A S D G N P N D S R N S A L V W E P V N N L  
 1560 GAAAAACCGTACAAATGCTTAACATAGTCATGAGGAGTTCTGGATTTCGGAAAGATGATGAAATTTGGGATTCACTGACAGCGAGAA**TGA**AGAAAATAGAT  
 E K P Y K C L N I V D E G V S F V D F P E D D R M K F W D S L Y S E K  
 1680 AATTGAAGAGGATGAGTGGCTTGAGAAAATGAAAGAGGATGAGTGGCTTG

Figure S1

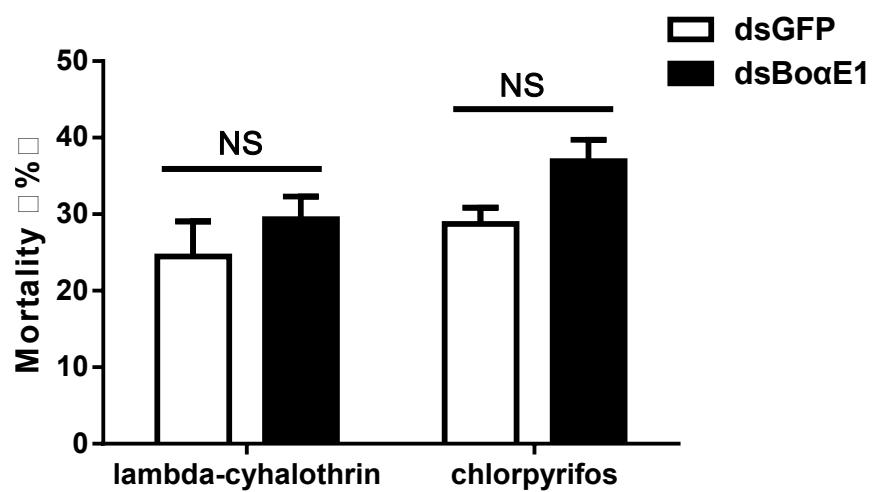


Figure S2