## Molecularcharacterization and functional analysis of cytochrome P450mediated detoxification CYP302A1 gene involved in host plant adaptation in Spodoptera frugieprda

Muhammad Hafeez<sup>1</sup>,<sup>2</sup> Xiaowei Li<sup>2</sup>, Limin Chen<sup>2</sup>,<sup>6</sup> Farman Ullah<sup>3</sup> Jun Huang<sup>1</sup> Zhijun Zhang<sup>2</sup> Jinming Zhang<sup>2</sup> Junaid Ali Siddiqui<sup>4</sup> Shu-xing Zhou<sup>2</sup> Xiao-yun Ren<sup>2</sup> Muhammad Imran<sup>5</sup> Mohammed A. Assiri<sup>5</sup> Yonggen Lou<sup>1</sup>\* and Yaobin Lu<sup>2</sup>\*

<sup>1</sup> State Key Laboratory of Rice Biology and Ministry of Agriculture Key Lab of Molecular Biology of Crop Pathogens and Insects, Institute of Insect Sciences, Zhejiang University, Hangzhou, China

<sup>2</sup> State Key Laboratory for Managing Biotic and Chemical Threats to the Quality and Safety of Agro-products Institute of Plant Protection and Microbiology, Zhejiang Academy of Agricultural Sciences, Hangzhou, China

<sup>3</sup> Department of Plant Biosecurity, College of Plant Protection, China Agricultural University, Beijing, China

<sup>4</sup> College of Agriculture, College of Tobacco Science, Guizhou University, Guiyang 550025, China

<sup>5</sup> Department of Chemistry, Faculty of Science, King Khalid University, P.O. Box 9004, Abha 61413, Saudi Arabia

<sup>6</sup> Integrated Plant Protection Center, Lishui Academy of Agricultural and Forestry Sciences, Lishui, China

\*Correspondence:

1. Professor Yonggen Lou yglou@zju.edu.cn

2. Professor Yaobin Lu luybcn@163.com

## Table S1. Primers used in this study for RTq-PCR and RNAi

Gene name	Sense primers	Anti-sense primers	
dsCYP302A1	5'- ggatectaatacgacteactatag	5'-ggatectaatacgacteactatag	427
	GAGACTGAGAAGCACATTTC -3'	GCCATCTTCAGGTTGTTC-3	427
RTq-PCR	5'- TGAACAACCTGAAGATGGCG-3'	5'- AACCATGACTCCAATGACGTC-3	91
S30	CACCCTCGGTGTTAGACGTT	CCACCGGGAAAGTGATACTGT	119
GAPDH	CGGTGTCTTCACAACCACAG	TTGACACCAACGACGAACAT	111

The small capital letter shows the T7 RNA polymerase promoter sequence.



**Fig. S1** Alignment of the deduced amino acid sequences of CYP302A1 (Spodoptera frugiperda), (Spodoptera litura), (Spodoptera littoralis), (Spodoptera exigua) and (Helicoverpa armigera). Identical amino acid residues, conserved residues and Conserved motifs of cytochrome P450 proteins are boxed.



dsCYP302A1 fed larvae

DEPC water fed larvae

**Fig. S2 A, B, C & D** Consumption of rice plants (A) and corn plants (B) by *S. frugiperda* larvae after treated with diet containing dsCYP302A1 and DEPC-treated water followed by feeding on rice and host plants.