8th International Conference on Sustainable Solid Waste Management

Identification of cytochrome P450s genes in an endoparasitoid wasp and their expression patterns under stress of insecticides

Xiao-rong Xing , Meng -wen Yan , Fu-an Wu, Jun Wang, Sheng Sheng*

INTRODUCTION

Insect parasitoid wasps are key agents in biological control practice of insect pests in the agroecosystem. With the widespread application of insecticides, parasitoid wasps may also be under risk along with their hosts or even exposed to insecticides directly at their free-living stages. It is of great importance to evaluate the effect of insecticides on the nature enemies in the agroecosystem to coordinate the chemical and biological control practices. In insects, cytochrome P450 monooxygenases (P450s) have received considerable attention for their roles in the detoxification of insecticides.

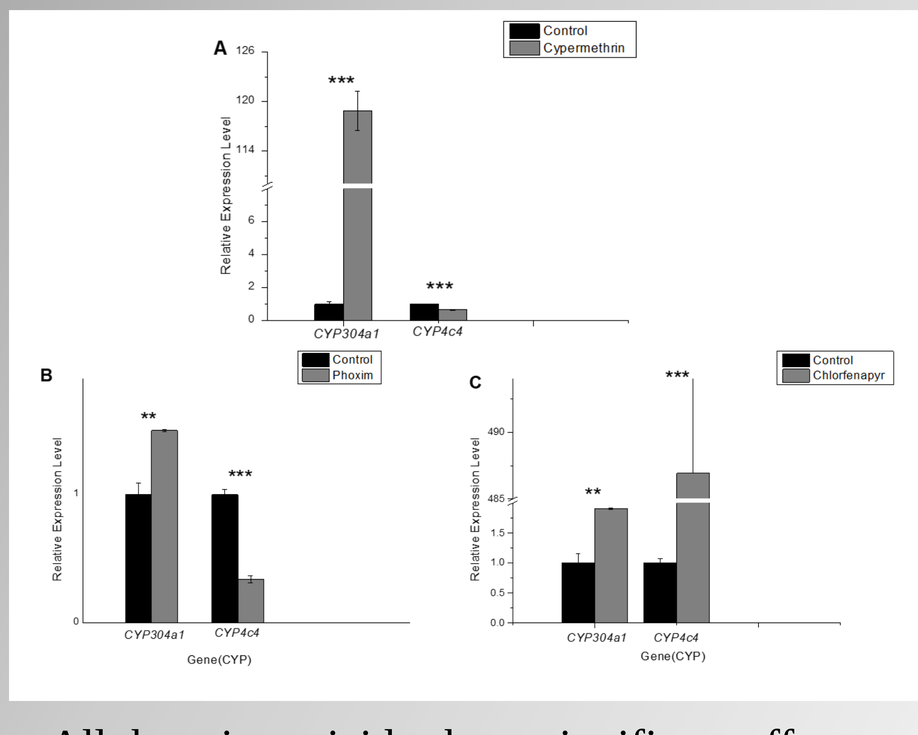
METHODS

P450 genes were identified from the previously constructed transcriptome data-base of *M. pulchricornis* (GenBank accession number: SRR8981255). the LC10 of phoxim, cypermethrin was 0.1 mg/L and 2.0 mg/L, chlorfenapyr was 10% field application dose (4 mg/L). Total RNA was extracted using RNAiso Plus reagent from the whole bodies of wasps that survived from insecticide stress above. Then the gene expression levels were verified by qRT-PCR validation.

RESULTS

Identified a dozen of CYP genes with full-length ORFs in *M. pulchricornis*

clan	Gene name	Encoded protein length/aa	Protein name	E value
2	MpulCYP305d1	492	probable cytochrome P450 305a1	0
	MpulCYP304a1	505	probable cytochrome P450 304a1	0.00E+00
3	MpulCYP9e2	504	cytochrome P450 9e2	0
	MpulCYP9a5	318	cytochrome P450 9e2-like	6.00E-120
	MpulCYP6b3v1	512	cytochrome P450 6k1	0
	MpulCYP6b1	522	cytochrome P450 6B5-like	0
	MpulCYP6a3	504	probable cytochrome P450 6a14	0
4	MpulCYP4g2	557	cytochrome P450 4g15	0
	MpulCYP4c4	518	cytochrome P450 4C1	0
mitochondrial	MpulCYP302a1	302	cytochrome P450 302a1, mitochondrial	1.00E-141
	MpulCYP301a1	513	probable cytochrome P450 49a1	0
	MpulCYP315a1	222	cytochrome P450 315a1, mitochondrial	9.00E-92



All three insecticides have significant effects on the expression of CYP genes

CONCLUSION

Cytochrome P450s contributed to the detoxification process of parasitic wasps when they were under the stress of commonly used insecticides.

Acknowledgments: This work was supported by the National Natural Science Foundation of China (31500312), the Key Research and Development Program (Modern Agriculture) of Zhenjiang (NY2019021), and the Special Fund for China Agricultural Research System (CARS-18).