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Genetic mutations associated with chemical resistance in the cytochrome P450 genes of invasive and native *Bemisia tabaci* (Hemiptera: Aleyrodidae) populations in China

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Abstract

Abstract *Bemisia tabaci* (Gennadius) is a species complex, and its two most damaging biotypes B and Q are globally distributed pests. Despite increasing biological and economic impacts, little is known about the evolutionary mechanisms that favor their competition with native populations. Here, we investigated the genetic mutations in the *P450* gene of the invasive B, Q biotypes and the native Cv population. Four mutations associated with chemical resistance, Pro-Leu, Ala-Ser, Ser-Phe and Trp-Leu, were found in the cytochrome *P450 CYP6C* and *CYP9F* genes of the B and Q biotypes. Bioassay results also revealed that both the B and Q biotypes have about 12–47 times more resistance to acephate, beta-cypermethrin, methomyl, and 5–7 times more resistance to imidacloprid insecticide than Cv population. Our results provide a molecular approach for better understanding and monitoring the pesticide resistances of invasive and native *B. tabaci* populations in China.

Introduction

In the last two decades, there has been an increased awareness of the adverse changes in local biodiversity due to invasive species, leading to substantial economic damage in many countries (Pimentel *et al.*, 2000; Pimentel *et al.*, 2005). Recently, a few studies on the evolutionary genetics of invasive species have been explored, which revealed that the successful invasion of some alien species might depend more on the ability to respond to natural selection than on broad physiological tolerance or plasticity, and invasion may thus inadvertently increase the invasive species' evolutionary potential and allow for its rapid