

## Investigation of mutations associated with pyrethroid resistance in populations of the New World Screwworm fly, *Cochliomyia hominivorax* (Diptera: Calliphoridae)

N.M. da Silva<sup>1,2</sup> and A.M.L. de Azeredo-Espin<sup>1,2</sup>

<sup>1</sup>Laboratório de Genética Animal,  
Centro de Biologia Molecular e Engenharia Genética,  
Universidade Estadual de Campinas, Campinas, SP, Brasil

<sup>2</sup>Departamento de Genética e Evolução, Instituto de Biologia,  
Universidade Estadual de Campinas, Campinas, SP, Brasil

Corresponding author: N.M. da Silva

E-mail: normams@unicamp.br/normamsilva@yahoo.com.br

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**ABSTRACT.** *Cochliomyia hominivorax* larvae are known for their parasitic habit in living vertebrates, causing considerable economic losses to livestock industry. This ectoparasite has been controlled mainly by applying insecticides, but this method usually results in the selection of resistant individuals. The resistance mechanism known as knockdown resistance (kdr) is a generic term for amino acid substitutions in the sodium channel associated with pyrethroid resistance, and substitutions in residue 251 of the carboxylesterase E3 have been associated with organophosphate and pyrethroid hydrolysis. We looked for L1014F kdr and W251S mutations in the sodium channel and E3 genes, respectively, in *C. hominivorax* populations. Ten populations obtained from its current distribution were investigated using the polymerase chain reaction-restriction fragment length polymorphism technique. No mutant individuals were found for the kdr mutation. However, the W251S mutation was found in all populations investigated. Results from

a bioassay with cypermethrin (a pyrethroid) indicated that the survival at the lowest concentration (Fisher exact test,  $P=0.0003$ ) and an intermediate concentration ( $P = 0.024$ ) were associated with the W251S mutation. This correlation was not significant at the highest concentration tested ( $P = 0.221$ ). We suggest that the W251S mutation in the *C. hominivorax* carboxylesterase E3 is also associated with pyrethroid hydrolysis. This information may contribute to the elaboration of improved management programs for this ectoparasite.

**Key words:** *Cochliomyia hominivorax*; Insecticide resistance; kdr; Carboxylesterase