

Evolution and genomics quickly provide with useful clues for insect pest management: the case of *Drosophila suzukii*

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ABSTRACT

Present economies are facing the recurrent introduction of pests and parasites from distant area. One notable example is *Drosophila suzukii*, whose recent outbreak in western countries and peculiar ecological behaviour had made it an emerging model for pest management and biology. Here we review recent findings on *D. suzukii* and present new results demonstrating how a genomic overview using NGS is a cost effective and quick way to obtain source of information for applied agricultural management practises. First we show how paleogenomics is a powerful tool to quickly describe the evolutionary history behind a species pest origin by showing that *D.suzukii* is intimately linked with an ecological pre-adaptions to temperate climates. Second, we show how genomics can quickly provide with a detailed description of potential endosymbionts such as Wolbachia with field control potentialities. Third, we show how the genome is an effective repository for quickly obtaining genes such as gustatory and light receptors (presented here for the first time) which are key for deciphering and control pest behaviour. Forth, we show how evolutionary genomics (dN/dS studies) can identify genes under peculiar selection that can point toward peculiar aspects of the pest biology such as enhanced immune response to parasitoids or insecticide resistance. Overall, our results shows that a “light” genome sequencing strategy analysed on an evolutionary framework is a cost effective practice for quickly instruct over the biology of invasive pests and accelerate the definition of its management.