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**Temperature-induced phenotypic plasticity in the ovipositor of the invasive species *Drosophila suzukii***

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**Abstract**

*Drosophila suzukii* (Matsumura, 1931) is a highly successful invasive dipteran which represents a serious threat for global fruit industry. Among other adaptive traits, *D. suzukii* owes its success to the derived morphological features of its ovipositor, which allows the insect to exploit the exclusive ecological niche of fresh fruit, thus avoiding competition with other closely related species. With the aim of investigating temperature-induced phenotypic plasticity of *D. suzukii* ovipositor, we reared this insect in four different laboratory conditions, represented by the combination of two developmental temperatures and two diet regimes for the larvae. We recorded the effects of these two factors on ovipositor size and shape and overall body size through a combination of distance-based and geometric morphometric analyses. Results showed that insects attain the largest body sizes at lower temperature, whereas the diet does not determine significant difference in size. However, the effect on size of the two factors is less pronounced in the ovipositor, which shows a negative allometry with respect to body size in all treatments. At higher temperature, ovipositor shape tends also to co-vary with its own size. Neither temperature nor diet have significant effect on ovipositor bilateral fluctuating asymmetry. These results confirm the hypothesis that in *D. suzukii* the toughened valve of the ovipositor are subjected to effective morpho-functional constraints, while probably being under strong selection by reason of their mechanical role.

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