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BOOK OF ABSTRACTS

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Does *Drosophila suzukii* represent an additional factor of risk of sour rot disease development in wine grape?

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Highlights
- The development of sour rot on grape berries is strongly favored by wounds on the berry surface
- SWD can be vector of microorganisms, also including causal agent of sour rot, therefore SWD infestations can quickly spread sour rot on the cluster
- Intact berries are much less susceptible to sour rot, even in case of SWD infestation

Introduction

Spotted wing drosophila (SWD) *Drosophila suzukii* (Matsumura) is a global pest attacking various berry crops included grapevine. SWD can lay eggs on unwounded ripening wine grape berries. Although wine grapes are in most cases not ideally suited for SWD population development, the fly can feed, oviposit and develop to adults on wine grapes (Asplen et al., 2015). Oviposition intensity increases during the ripening period and is correlated to physiological changes occurring during grape berry development, i.e. increase in sugar content, decrease of acidity levels and skin penetration force (Ioriatti et al., 2015). High populations of *D. suzukii* potentially present on wine grapes during the harvest period may result in a significant risk considering the vectoring of spoilage bacteria. To assess this hypothesis, laboratory bioassays were performed to assess the actual ability of SWD to vector spoilage bacteria to intact wine grape and to trigger sour rot disease development.

Material and methods

Three varieties, Pinot noir, Schiava and Cabernet sauvignon either intact or damage sterilised berries were offered as oviposition substrate to SWD adults from a lab-colony. SWD flies have been previously kept for two days in a cage in contact with cotton impregnated with a suspension of bacteria to let them carrying a bacterial load similar to that present on SWD trapped in vineyard. After 4 days, SWD adult survival and oviposition on berries were assessed, the flies were removed while the grape barriers have been further kept in the same plastic boxes under controlled climatic conditions for 10 days. Berries were then crashed and the homogenised materials were deposited onto sterile Petri plates containing a proper synthetic growth media to perform qualitative and quantitative characterisation of microflora developed on the grape berries. Volatile acidity values of the assembled grape samples of each variety were assessed and considered as an indicator of sour rot incipient development. To confirm laboratory results, an artificial SWD infestation of bagged grape clusters of

the cultivar Schiava were set up in three vineyards in the Trento Province. Oviposition and subsequent larval development was evaluated and their relationship with production of acetic acid volatile considered.

Results and discussion

Results demonstrated that SWD can vector spoilage bacteria through contact and/or feeding on damaged berries. Sour rot developed because of contamination of wounded berries by a microbiota transported by contaminated SWD, which disseminated spoilage bacteria from damaged or infected berries. Moreover, while oviposition on intact sound berries was not a sufficient condition for triggering sour rot development, the successive larval development constituted an additional way for spreading spoilage bacteria such as *Acetobacter* spp. in wine grapes during the harvest period. We also demonstrated both under controlled laboratory and field conditions, that inoculative infestation with SWD and consecutive larval development within grape berries can promote the increase of acetic volatiles, as an indicator of increased sour rot levels. However, we think that the presence of SWD eggs in the grape berries is not "per se" an issue for the wine growers, provided egg laying and successive larval development do not cause skin ruptures that promote microorganism infection. On the other hand, since sound grape berries are less susceptible to the development of microbiota associated with sour rot and spoilage, a number of factors affecting skin integrity (rainfall, wind, temperature, diseases, insect pests, viticultural practises, etc.) can strongly influence grape microbiota that are primarily responsible for development of grape sour rot.

References

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