

# Vineyard Practices to Strengthen Grape Skin Thickness to Limit *Drosophila suzukii* Infestation

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## Summary

- Certain vineyard practices might enhance the skin thickness of berries and therefore limit grapes' susceptibility to *D. suzukii*.
- An early defoliation treatment, three copper sprays and one kaolin application were tested to see their effects on penetration force.
- Neither the early defoliation nor the copper and kaolin applications significantly enhanced penetration force at harvest.

## Introduction

*Drosophila suzukii* has become a pest of great economical importance in recent years. Recent research has shown that the penetration force required to break the skin of a grape berry is closely related to *D. suzukii* infestation rates in grape berries. Thus it follows that if one were able to enhance the grape skin thickness of berries than one could effectively delay or reduce *D. suzukii* infestation.

The aim of this research is to examine the effect of early defoliation as well as copper and kaolin sprays on the penetration force of the berries.

## Material and Methods

The full combinations of the three tested factors (early defoliation, copper and kaolin sprays) resulted in eight treatments, which were applied in a completely randomized block design to each of 4 rows of Mara in Nyon, Switzerland.

The early leafing was conducted by removing the six basal leaves from each shoot and all lateral shoots at fruit set. Three copper sprays (Bordeaux mixture) were applied at an application rate of 1.5 kg / ha between fruit set and veraison. Kaolin (Surround, Stähler Suisse SA) was applied at a rate of 2% once after veraison.

Twenty five berries were collected from the eight treatments post veraison and shortly before harvest. *D. suzukii* infestation was estimated and the penetration force of each berry was measured.



Figure 1. Photos of the three treatments conducted. A: The kaolin directly after being sprayed. B: A photo of the vines that underwent early defoliation. C: The grapes after their last copper spray treatment.

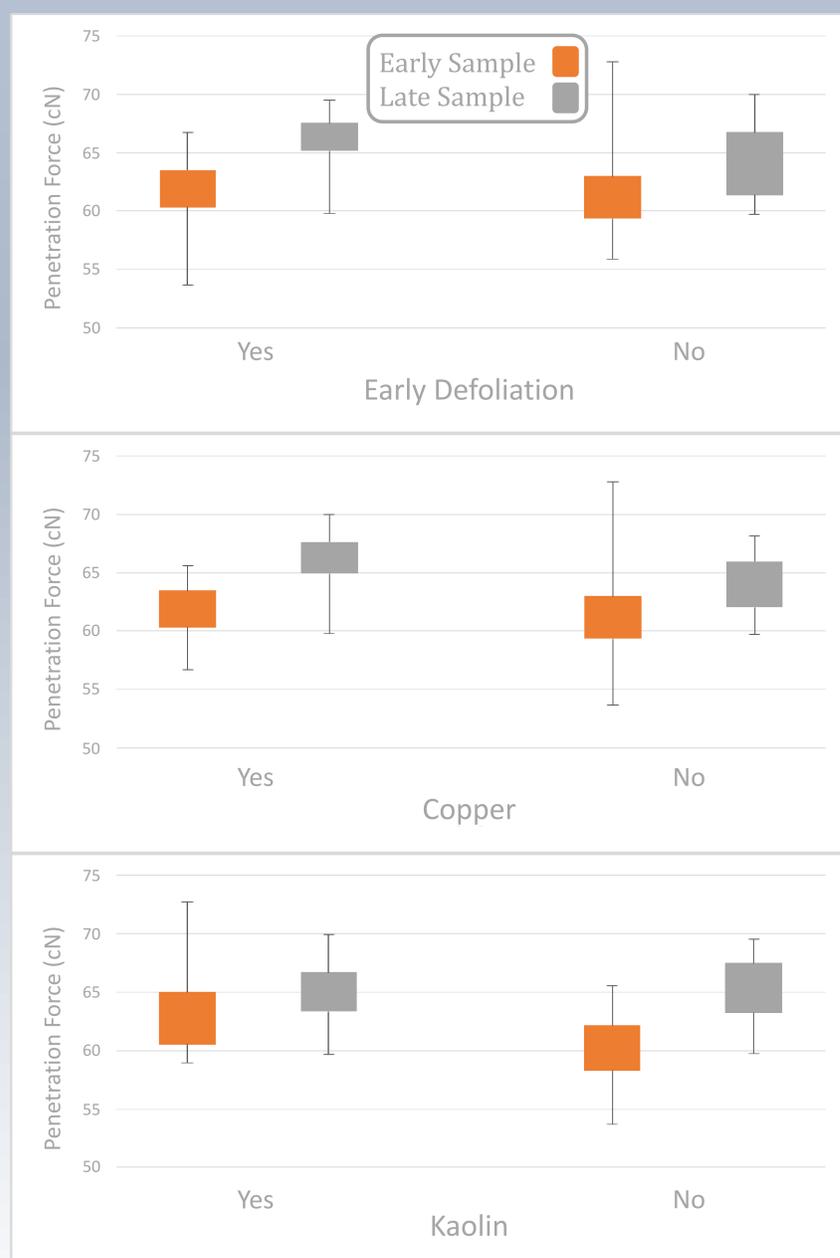


Figure 2. Graphical representation of the three different treatments and their different values between the two dates sampled.

## Results and Discussion

### Impact on *Drosophila suzukii* infestation

None of the sampled berries were infested by *D. suzukii* in the experimental vineyard.

### Impact on penetration force

The **early defoliation** had no effect in the first ( $p = 0.911$ ) and second sample ( $p = 0.110$ ). However, all vines in the experimental vineyard did receive some base level of lateral shoot removal and leaf removal earlier in the season. Thus stronger differences in penetration force might be possible if this treatment were applied to a vineyard with no canopy management.

The **copper sprays** were not significant in neither the first ( $p = 0.909$ ) nor the second date collected ( $p = 0.169$ ). The copper treatment was applied at such an amount that any standard vineyard practice would likely to be above it. However, it is possible that the treatments could have been applied at a more optimal time in the season.

The **kaolin treatment** significantly increased the penetration force by 2.6 cN directly after application ( $p = 0.027$ ). However, this effect was gone in the second sample tested ( $p = 0.818$ ). Thus kaolin may have some immediate effect on increasing penetration force but no influence it in the long term.

None of the interactions among the three factors were significant, consequentially there were no synergistic effects seen when treatments were applied with one another.

## Conclusion

There seems to be no long term effect of any of the three treatments for strongly enhancing penetration force of berries in order to control *D. suzukii*. However, treatments cannot be ruled out to have any effects as they could be taken to further extremes, either by a higher rate or a more optimal date of application.