

Innovative Solution to protect vineyard against climate variability

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INTRODUCTION

Climate change in Switzerland is increasing climatic variability, exposing grapevines to alternating drought and high humidity, leading to significant physiological stress. These conditions reduce yield and quality as plants prioritize survival over production. Although biostimulants can help mitigate stress, their effectiveness remains variable and they mainly target plant metabolism rather than the physical causes of stress.

To address this, AgroSustain SA developed a physical protection approach (Tornado®) that forms a barrier on plant surfaces, reducing stress exposure while maintaining key physiological functions.

MATERIALS AND METHODS

- Field trials were conducted over 3 consecutive years with Agroscope in Changins (Switzerland) mainly on Chasselas, a drought-sensitive cultivar, with additional trials in Italy and France on other cultivars.
- Randomized design with up to 15 vines per treatment and multiple replicates. :
 - Untreated control vines
 - A reference organic fungicide treatment
 - Tornado®-treated vines
- Tornado® is a foliar-applied sealing agent composed of plant-based oils and food-grade emulsifiers, forming a durable hydrophobic barrier on leaves and berries that reduces water loss while maintaining gas exchange and photosynthesis.
- Applications on average 11 times per season (May–August)
- Physiological stress indicators, yield components, and grape quality parameters were monitored throughout the trials.



RESULTS AND DISCUSSION

- Tornado® significantly reduced stress-related hormones (up to -68%), indicating lower abiotic stress and reduced activation of defense mechanisms.
- Under drought conditions, treated vines showed increased yield (+2 t/ha) without affecting grape quality, along with improved nitrogen status.



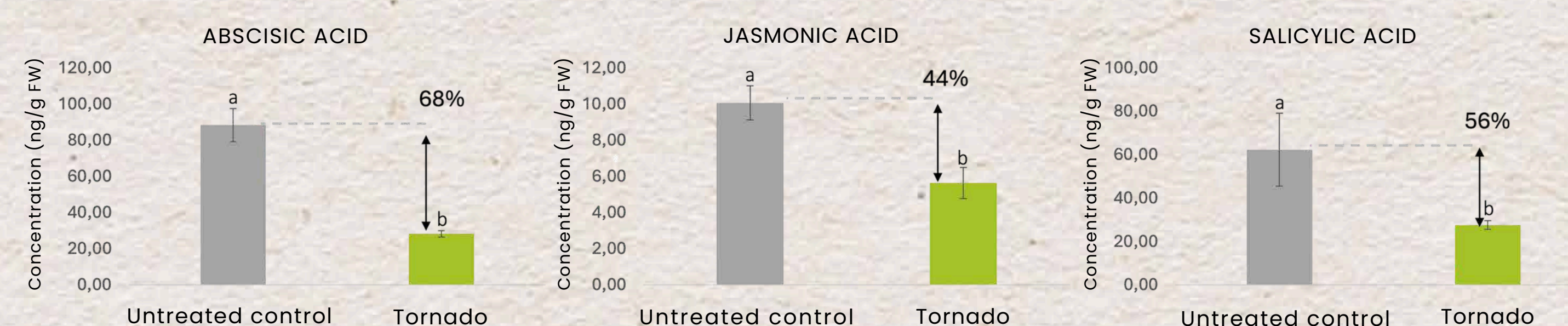
Tornado



Untreated control



Biol. ref.



CONCLUSION

Results over three consecutive years demonstrate the robustness of the sealing-based approach in mitigating abiotic stress, particularly drought. By reducing water loss and stress perception, it helps maintain a balanced physiological state and supports plant productivity.

This leads to increased yield and improved nutrient assimilation without affecting grape quality. Repeated applications at key phenological stages are recommended to ensure consistent protection under variable climatic conditions.