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TOWARD A SUSTAINABLE VITICULTURE IMPROVED GRAPEVINE PRODUCTIVITY AND TOLERANCE TO ABIOTIC AND BIOTIC STRESSES BY COMBINING RESISTANT CULTIVARS AND BENEFICIAL MICROORGANISMS

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Anna Kicherer, et al.

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Toward a sustainable viticulture: Improved grapevine productivity and tolerance to abiotic and biotic stresses by combining resistant cultivars and beneficial microorganisms

Ait Barka E., **Aziz A.**, Sanchez L., Trolat-Aziz P., Jacquard C., Cl ment C., Gaveau-Vaillant N., Tzortzakis N., Topfer R., Kicherer A., Escalona J.-M., H FTE M. REY P., Gardiman M., De Nardi B., Grando M.S., Fusco L., Maciejczak M., Vermunt A., Falc o Salles J., Agstner B., Taglietti F., and other members of Vitismart consortium

GOALS: to improve resistance/tolerance strategies of grapevine cultivars to pathogens and to mitigate the undesirable effect of climatic change

Outcomes:

- Identification of susceptible and resistant genotypes for their tolerance/resistance to pathogens



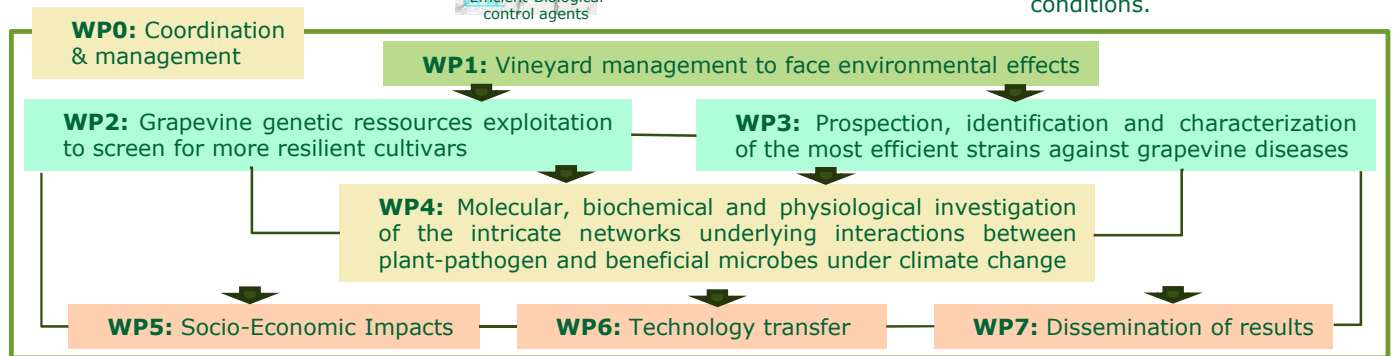
- Identification of efficient Biocontrol agent (BCA) against main grapevine diseases



- Establishment of the best association between bacteria and resilient cultivars in order to deliver a new generation of grapevines adapted to climate change



- Investigate the physiological and molecular responses of grapevine inoculated with selected beneficial bacteria, under heat and water deficit conditions.

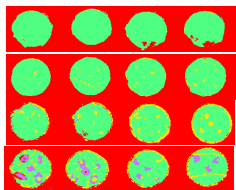


Water shortage
High temperatures

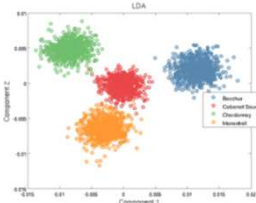
Plasmopara viticola
Botrytis cinerea

WP 2: Resilient cultivars

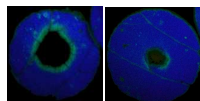
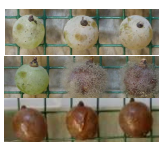
Hyperspectral imaging to early detect DM
Downy mildew: Leaf disc assays with 27 different genotypes (susceptible; resistant and breeding lines). The hyperspectral tool consists of five different models to achieve best prediction performance.



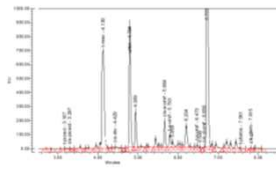
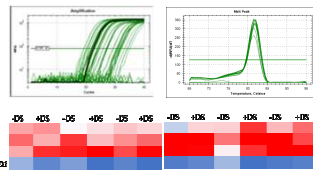
Calardis blanc
Calardis Musqu 
Solaris
Diana



Grey mold: Mapping of physical barriers against Botrytis/Drought



Photosynthetic parameters



➤ Identification of susceptible and resistant genotypes to biotic stress

Induced Tolerance

Physiology, primary metabolism, mineral status....

Hormones, minerals ...

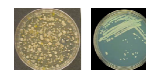


Beneficial microbes

Induced Resistance

Priming of plant immune system

MAMPs



WP 4: Mechanisms underlying the tripartite interaction under climate change

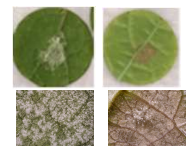
WP 3: Efficient microbes

Characterization of microbiome from resilient cultivars by molecular tools



Microbial co-occurrence in the rhizosphere and endosphere using 16S rRNA based metagenomics, metatranscriptomics

- **Identification of efficient strains**
- *Pseudomonas fluorescens* sp.
- *Paraburkholderia phytolimans*
- *Pythium oligandrum*



Induced systemic resistance

➤ Establishment of the best association between bacteria and resilient cultivars