



BOOK OF ABSTRACTS

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SESSION 1. RESILIENT VITICULTURAL PRACTICES FOR SUSTAINABLE ECOSYSTEMS ORAL, SHORT & FLASH

2025-796: THE FEM GRAPEVINE CROSSBREEDING PROGRAM FOR RESISTANCE TO THE MAIN AMPELOPATHIES: TOWARDS CLIMATE-RESILIENT VARIETIES.

Vezzulli Silvia, Bettinelli Paola, Nicolini Daniela, Zatelli Alessandra, Dalla Serra Monica, Dorigatti Cinzia, Betta Giulia, Filippi Raffaele, Campestrin Andrea, Calovi Marco, Clementi Silvano, Tomasi Tiziano, Costantini Laura, Zulini Luca, Stefanini Marco: *Fondazione Edmund Mach, Italy, silvia.vezzulli@fmach.it*

The technique of crossing, free or controlled, has always been a source of variability allowing the selection of new varieties with improved fitness. Therefore, one promising strategy towards a sustainable viticulture is crossbreeding for resistance traits to biotic stresses under climate change conditions to reduce pesticide usage and improve resilience.

With this awareness and vision, the Edmund Mach Foundation (FEM) began its grapevine genetic improvement program in the 1990s. Later, in 2010 with the exploration of the genetic pool of resistance loci to downy and powdery mildew, a group of accessions was selected as donors.

Next, genotypes with stacked (“pyramided”) loci were generated through marker-assisted parental selection (MAPS) with up to seven loci combining resistance to both mildews. Then, upon protocol optimization highly efficient marker-assisted seedling selection (MASS) was established, allowing since 2019 to overcome phenotypic screening and revealing inter- and intra-population effects.

Upon multi-year agronomic surveys, grape quality composition and wine tastings, in 2018 four new varieties were registered for their novel organoleptic characteristics and tolerance to gray mold. In 2020 four (mid)-resistant varieties to mildews were patented and in 2025 other four are in the process. At the same time, the resistance to other “emergent” ampelopathies, as black rot, is being introgressed. Various collaborations are in place across the national territory for the exploitation of the superior parental lines.

Lately, the genetic and phenotypic characterization of the FEM germplasm (ca. 3,000 accessions) has been completed, so that the scouting process within such biodiversity is continuously ongoing towards the development of varieties coupling disease resistance with climate resilience.

LE PROGRAMME DE CROISEMENT DE LA VIGNE DE LA FEM POUR LA RESISTANCE AUX PRINCIPALES AMPELOPATHIES : VERS DES VARIETES RESISTANTES AU CLIMAT.

La technique du croisement, libre ou contrôlé, a toujours été une source de variabilité permettant la sélection de nouvelles variétés à l'aptitude améliorée. Par conséquent, une stratégie prometteuse pour une viticulture durable est le croisement pour des traits de résistance aux stress biotiques dans des conditions de changement climatique afin de réduire l'utilisation de pesticides et d'améliorer la résilience.

C'est avec cette conscience et cette vision que la Fondation Edmund Mach (FEM) a lancé son programme d'amélioration génétique de la vigne dans les années 1990. Plus tard, en 2010, avec l'exploration du pool génétique des loci de résistance au mildiou et à l'oïdium, un groupe d'accessions a été sélectionné comme donneurs.

Ensuite, des génotypes avec des loci empilés (« pyramidés ») ont été générés par le biais de la sélection parentale assistée par marqueurs (MAPS) avec jusqu'à sept loci combinant la résistance aux deux mildious. Ensuite, après optimisation du protocole, une sélection de plantules assistée par marqueurs (MASS) très efficace a été mise en place, permettant depuis 2019 de surmonter le criblage phénotypique et révélant des effets inter- et intra-population.

Suite à des études agronomiques pluriannuelles, à la composition de la qualité du raisin et à des dégustations de vin, quatre nouvelles variétés ont été enregistrées en 2018 pour leurs nouvelles caractéristiques organoleptiques et leur tolérance à la pourriture grise. En 2020, quatre variétés (moyennement) résistantes au mildiou ont été brevetées et en 2025, quatre autres sont en cours de brevetage. Parallèlement, la résistance à d'autres ampélographies « émergentes », comme la pourriture noire, est en cours d'introgression.

Diverses collaborations sont en place sur l'ensemble du territoire national pour l'exploitation des lignées parentales supérieures.

Récemment, la caractérisation génétique et phénotypique du germoplasme FEM (environ 3 000 accessions) a été achevée, de sorte que le processus de recherche au sein de cette biodiversité se poursuit en permanence en vue du développement de variétés associant la résistance aux maladies et la résilience au climat.

IL PROGRAMMA DI INCROCIO DELLA VITE FEM PER LA RESISTENZA ALLE PRINCIPALI AMPELOPATIE: VERSO VARIETÀ RESILIENTI AL CLIMA.





SESSION 1. RESILIENT VITICULTURAL PRACTICES FOR SUSTAINABLE ECOSYSTEMS ORAL, SHORT & FLASH

La tecnica dell'incrocio, libero o controllato, è sempre stata una fonte di variabilità che ha permesso la selezione di nuove varietà con una migliore fitness. Pertanto, una strategia promettente per una viticoltura sostenibile è l'incrocio per i tratti di resistenza agli stress biotici in condizioni di cambiamento climatico, per ridurre l'uso di pesticidi e migliorare la resilienza. Con questa consapevolezza e visione, la Fondazione Edmund Mach (FEM) ha iniziato il suo programma di miglioramento genetico della vite negli anni Novanta. Successivamente, nel 2010, con l'esplorazione del pool genetico dei loci di resistenza alla peronospora e all'oidio, è stato selezionato un gruppo di accessioni come donatori. Successivamente, sono stati generati genotipi con loci sovrapposti ("piramidali") attraverso la selezione parentale assistita da marcatori (MAPS) con fino a sette loci che combinano la resistenza a entrambe le muffe. In seguito, dopo l'ottimizzazione del protocollo, è stata stabilita una selezione dei semenzali assistita da marcatori (MASS) altamente efficiente, che ha permesso dal 2019 di superare lo screening fenotipico e di rivelare gli effetti inter- e intra-popolazione. A seguito di indagini agronomiche pluriennali, composizione della qualità dell'uva e degustazioni, nel 2018 sono state registrate quattro nuove varietà per le loro caratteristiche organolettiche inedite e la tolleranza alla muffa grigia. Nel 2020 sono state brevettate quattro varietà (mediamente) resistenti alle muffe e nel 2025 altre quattro sono in corso di registrazione. Allo stesso tempo, si sta introducendo la resistenza ad altre ampelopatie "emergenti", come il marciume nero. Sono in atto diverse collaborazioni su tutto il territorio nazionale per la valorizzazione delle linee parentali superiori. Ultimamente è stata completata la caratterizzazione genetica e fenotipica del germoplasma FEM (circa 3.000 accessioni), in modo che il processo di scouting all'interno di tale biodiversità sia continuamente in corso verso lo sviluppo di varietà che accoppiano la resistenza alle malattie con la resilienza al clima.

2025-800: ASSESSMENT OF THE IMPACT OF VITICULTURAL PRACTICES ON BIODIVERSITY AT THE FARM SCALE: MONITORING INDICATORS AND FEEDBACK FROM CHÂTEAU LA PEYRUCHE (BORDEAUX/FRANCE)

Luc Talini: *Every1Counts, France, luc.talini@every1counts.life*

Over a period of 12 months, we collected and aggregated environmental and biodiversity data at Château La Peyruche, a 50-hectare vineyard located in Bordeaux, France.

Data were gathered from three main sources:

- Open source databases: Utilization of public databases to contextualize local observations.
- Field data: Collection using innovative sensors (cameras, sound recorders, and ultrasonic recorders) as well as soil analyses through environmental DNA (eDNA).
- Internal farm data: Information on agricultural practices, agroecological infrastructures, and existing biodiversity inventories within the vineyard.

The aggregation of these data sources enabled the production of:

- Biodiversity assessments detailing the current state of flora and fauna within the vineyard.
- Biodiversity indicators that were compared with other ecosystems, providing a global perspective on the ecological health of the vineyard.
- Statistical analyses highlighting the positive impact of agroecological infrastructures on local wildlife.

These findings underscore the importance of an integrated, multi-source approach to evaluating the impact of viticultural practices on biodiversity. They also provide practical insights for optimizing sustainable management strategies in viticulture.

Keywords: Sustainable viticulture, Biodiversity, Ecological indicators, Environmental DNA, Agroecology, Agroecological infrastructures, Ecosystems, Statistical analyses

ÉVALUATION DE L'IMPACT DES PRATIQUES VITICOLES SUR LA BIODIVERSITÉ A L'ÉCHELLE D'UNE EXPLOITATION : SUIVI D'INDICATEURS ET RETOURS D'EXPERIENCE AU CHATEAU LA PEYRUCHE (BORDEAUX/FRANCE)

Pendant une période de 12 mois, nous avons collecté et agrégé des données environnementales et de biodiversité au Château La Peyruche, un domaine viticole de 50 hectares situé à Bordeaux, en France.

Les données ont été recueillies à partir de trois principales sources :

