

## **Abstract**

The master project was part of Duravitis program, a multidisciplinary project (adaptation of grapevine to temperature elevation) launched by SupAgro/INRA Montpellier in 2011.

The main target of the present work was to explore the research capacity provided by a new plant material (microvine), which will be the main plant model, used in this project.

A first task was to phenotype a segregating population of microvine (with a focus on organic acid accumulation in the berry). It could be demonstrated that the dwarf grapevine is an appropriate model to study berry development as it mimics the annual berry development of field plants without the usual drawbacks of perennial crops (long juvenile stage, size of adult plant, heterogeneity of fruit production, annual reproductive cycle...).

Results show a very high variability throughout the population in the content and ratio of the two main organic acids (malic and tartaric acid). Samples were drawn at the herbaceous phase of berry development. Kinetic analysis of plants exhibit different accumulation pattern for malic acid with a high variability in the length of the herbaceous phase.

In order to reduce energy waste for artificial lights and subsequent air conditioning an additional task was to evaluate the feasibility of growing microvine with 100 % of LED illumination compared with greenhouse conditions.

Regarding the impact on the reproductive and vegetative system, the experiments showed that LED lights are suitable to perform experiments in confined environments. Plants exposed to LED light showed similar growth speed with an earlier fruit set compared to the control in the greenhouse. Plants exposed to LED's showed reduced organ size under LED light.