TITLE: **CHOICE - Optimizing CHerry physiOlogIcal performanCE through the correct choice of multifunctional covers**

RESEARCH PROJECT

Sweet cherry represents a high value crop, whose cultivation is highly increasing in Europe. To reduce the risks related to both cracking and Drosophila suzukii, growers are forced to invest on protective covers. Despite a wide range of covers are available on the market, which differ for shading level, type of use and water permeability, very little is known on how they change the orchard microclimate and the trees physiological and productive performance. Therefore, despite these covers represent one of the most expensive investments when setting up a new orchard, there is still no real hints on the criteria that should drive growers’ choice. This project aims at providing growers with a rational approach to optimize their cherry orchard microenvironment and physiological performance, through the correct choice of multifunctional covers, based on the vigor of their orchard and the specific environmental conditions of the growing area. This main objective will be achieved through the following specific steps: 1) Describing how different multifunctional covers (type and shading level) influence the orchard microclimate and consequently, the main physiological processes related to production performance, depending on the orchard vigor; 2) Modelling the effect of the type of cover on: i) canopy microclimate, ii) the most important physiological processes underpinning plant production (carbon assimilation and water use). 3) Validate the model in commercial orchards having different vigor and located in different environments. The set up of the optimal cover will allow growers to optimize their production and investment with positive impacts on their revenue. In addition, when correctly applied, covers can represent an adaptation tool to climate change. In fact, their shading effect can reduce evapotranspiration and thus irrigation, without affecting productivity. Results are improved water use efficiency and water saving, as well as improved carbon storage.

PLAN OF ACTIVITIES

-Monitoring the response of canopy microclimate under different multifunciontal covers.

-Monitoring the response of plant physiological performance in terms of: i) water relations, ii) leaf gas exchanges, iii) vegetative and fruit growth, under different multifunciontal covers.

-Monitoring fruit growth in real time with automatic fruit gauges

-Assessing the effect of different multifunctional covers on yield and quality of the fruit production;