Project LIFE-FITOVID- Implementation of Demonstrative & Innovative Strategies to reduce the use of plant protection products in viticulture.

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Pesticides are used in viticulture to obtain quality grapes and high worthwhile productions. They are essential to maintain a good prophylaxis in vineyard. Among them, fungicides are the more applied chemical compounds to control fungal pathogens causing devastating diseases, as the case for grapevine downy and powdery mildews. These diseases are more difficult to control in endemic areas, as every growing season appear and are reiteratively treated along it. This fact generates resistance in pathogens, supposing a higher dose for future treatments and more aggressive fungicides; to more exposition of growers to these compounds, decreasing their quality of life because of the latent risks; to an increasing presence of toxic molecules in grape, must and wine, making possible the presence of them in humans by consumption of these products; to affect negatively the surrounding environment, by soil and water flows pollution.

In this context, the LIFE project Fitovid entitled "Implemention of Demostrative & Innovative Strategies to reduce the use of plant protection products (PPP) in viticulture" (LIFE13 ENV/ES/000710) starts in September of 2014. The project is performed in two endemic regions for downy and powdery mildew placed in the Basque Country (North of Spain; Figure 1) that differ in climatic and geographic characteristics, and can be considered as representative of other European regions with similar characteristics, such as, mostly, areas classified under zones C according to Council Regulation (EC) No 479/2008 (i.e. Bordeaux, Languedoc-Rousillon, Portugal, part of Slovenia, Bulgaria, etc.) or coldest and more humid areas such as the zones A or B (U.K., Alsace, Czech Republic, Slovakia, etc.).

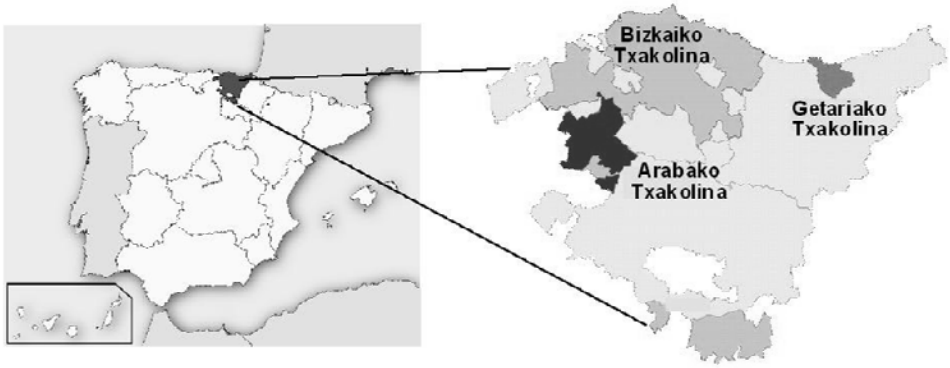

Figure 1. Area where the project is conducted

As a main action included in the project, related with spray application techniques, a voluntary pre-inspection campaign of about 150 sprayers will be arranged. Also a significant number of sprayers/farmers will be selected for a complete follow up during season about the sprayer's use procedure, and the implementation of Best Management Practices. Training sessions will be arranged in the two selected zones in order to demonstrate the benefits of the inspection process and increasing the general knowledge and awareness about Sustainable Use Directive. An

important objective has been also defined as demonstrating the benefits of a well efficient application process by good calibrated and adjusted sprayers and beneficial of spray inspections. This point is put in value to winegrowers, by showing the effectiveness of the spray application using a well-adjusted and inspected sprayer. Information is a key factor in the general objective of improving pesticide phase-use. Farmers are more willing to "accept" information when given personally and adjusted to site-specific conditions than when received through general letters and flyers, etc.

Other than the inspection of sprayers' process, there are complementary actions and strategies programmed in the project in order to reduce the number of spray applications. In particular: 1) Monitoring different meteorological parameters in order to identify the treatment time point and also the corresponding disease risk. This strategy includes the installation of weather stations that transmits in real time the registered data, allowing the establishment disease risks emitted by weather stations or more common methods such as Goidanich or degree-day accumulation, defining the moment for fungicide application.2) Monitoring spore concentrations, by collecting samples by passive spore traps, which remains a good disease control strategy that, integrated with the use of meteorological data, provides a valuable tool to establish the basis for an accurate, modern Integrated Pest Management strategy in the vineyard.3) Creating a prototype to detect the pathogen before disease symptoms appear using techniques ofhyper spectral imaging. This technology is suitable to be deployed on field as a portable system allowing the detection of the disease even when it is still unseen and, in the future, as part of the farming machinery for automated detection and spraying.

The intended reduction of pesticides will contribute to a better quality of life of the applicator, as the time of contact with this kind of unhealthy chemical molecules will be reduced. A reduction in the fungicide load will favour to the microbiota to develop rapidly for the degradation processes and it will make possible to increase the bacteria population for wine fermentation. Economic costs will be decreased so as the inputs to disease control, as number of tasks will decrease along the season, saving in fungicides, water, oil, machinery wearing and workforce.

From a short term perspective, as far as the economic effects of the project are concerned, the direct economic positive impacts expected will be linked to two key issues for the wine industry and wine or grape growers. First of all, the better calibration of agriculture machinery for spraying, and the better planning and anticipation through a more appropriate schedule, that will allow a better spraying to a better target, should contribute to reduce, at least, one third of the quantity of the PPP used to prevent mildew, and thus, one third their correlative costs. Considering the strictly economic aspect, fungicide applications represent important costs: it was reported for Rioja region in Spain that fungicide application means over 320 euros per ha per growing season (without taking into account the cost of motor oil, nor the workforce). In regards to the incidence of fungicide treatments in grape and wine quality, we could mention several effects of their use, as residues in grapes, musts and wines influence on fermentation and organoleptic characteristics of wine and the health and hygienic quality and toxicological effect on the consumer.