**INTRODUCTION**

The Grapevine Powdery Mildew (GPM) caused by *Erysiphe necator*, is the main disease of the Douro Wine Region (DWR), having in this region an endemic behaviour. This region have around 45000 ha of vineyards, divided in three sub-regions clearly distinct from the climatic point of view (Fig. I).

In DWR, this disease have greater importance, because of the aggressive manifestation of the symptoms. It overwinters at the form of chasmothecia, since the “drapeaux” (flag shots) are rarely seen, and it is assumed that the first infections are caused by ascospores (Fig. II).

**DEVELOPMENT**

This work report a first approach to the application of a mechanistic model to simulate the development of the disease in a parcel of vineyard (cv. Aragonez, syn. Tinta Roriz, Tempranillo) of a winefarm of the DWR (Upper Corgo), with the aim of, in the future, adapt strategies of treatment to efficiently control GPM, saving economic resources and the environment. The model applied was developed by the University of Piacenza (Italy) and its part of a Decision Support System named vite.net® and provided by Horta srl (www.horta-srl.com). The model tested in 2014 in the Douro area simulates the ascospores maturation curve, the infection periods, the efficiency of each single infection event, the progress of the latency period (i.e. the period occurring between infection and sporulation) and possible onset of symptoms (i.e. sporulating ascosporic infection sites). ADVID provided data about weather, phenology (budbreak) and onset of the first symptoms of the disease. Simulated infection were compared with reality for the first validation step.

The application of a model or a DSS for supporting farmers decision process about the application of disease strategy management (i.e. fungicide application) is one of the approaches foreseen by the Directive 128/2009/CE “Sustainable use of Pesticides”. In the powdery mildew pathosystem, the model for ascosporic infection allows to highlight the most risky periods triggering epidemics and, thus, to promptly apply fungicides overcoming the outdated approach of calendar based applications from pre-flowering to bunch closure and obtaining more efficient results in terms of crop protection.

**PRELIMINARY RESULTS**

In DWR, the emission of first ascospores always occurs before budbreak (BBCH stage 05) and usually end by the ripening phase (BBCH stage 69-71) as shown in Fig. III.

In 2014, first ascospores of *E. necator* were captured on early March while the grapevine budbreak occurred on March 17 th. The model simulated the end of ascospores release at beginning of June (Fig. IV) and, actually, last ascospores were captured on 4 June. The model simulated five infections from 1 to 26 April, with the last symptoms onset predicted on 3 May (Fig. IV). The first symptoms on leaves were actually observed on 5 May (Fig. III).

Powdery mildew incidence and severity continuously increased during the season and reached a very high level at bunch closure. Disease symptoms were observed on leaves and bunches until harvest (mid September) (Fig. V) when numerous chasmothecia were formed. Preliminary results obtained during the 2014 season showed a good correlation between simulation performed by the model and real observations.

Future perspective are about increasing the number of experimental sites for extend the monitored area in the Douro Region, extending the validation to other diseases and pests and increasing the automation of the data analysis using the DSS vite.net® and, finally, setting up phytotoxic trials. The latter activity is performed setting up field trials where a plot is managed according the ‘traditional’ protection strategy and a plot is managed following the information (i.e. about fungicide application) provided by the model or the DSS.