



Thesis title: Calibration and development of a model to forecast phenology and grape maturation for six grapevine varieties in the Friuli Venezia Giulia region

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Date & location of the oral examination (if known) :

September 19, 2017 UNIVERSITA' DEGLI STUDI DI UDINE

Confidential: Yes No

Abstract (max 300 words)

Topic position & objectives:

The goal of the thesis was to create a phenology and maturity model capable of modeling and forecasting phenology and maturity stages. The objectives of the study are create a viticulture phenology model; that can predict key phenological events within a ± 3 day window, predict key phenology stages for cool, average and warm seasons and integrate maturity trends into the model to predict harvest dates at 20 and 22 brix.

Methods:

Twelve years of phenological, maturity and metrological data were used from 2005-2012. A modified BBCH scale was used in the collection of data to determine the key phenology stages of the study. The project uses the concept of thermal time, to predict the phenological timing and maturity of six varieties in the Friuli Venezia Giulia region of Italy. The model evaluates the timing, cumulative growing degree days, base temperatures and forecasting, for flowering, veraison, Brix 20 and Brix 22, though the interaction of six phenophases.

Results:

GDD were determined per phase and then used to calculate the best base temperature per phase. GDD per phase and base temperature were modeled and then used to forecast phenological stages. Vine phenology and plant growth are highly influenced by temperature. The relationship can be modeled using mathematical terminologies in order to quantify the effect of temperature on the development rate of *V. vinifera*.

Main conclusions:

Modeled results show a high degree of accuracy for the prediction of flowering, followed by maturity stages Brix 20 and 22. The stage of veraison was less influenced by temperature and found to be driven more by the genetic characteristics of the varietal. The phenological model will also be useful for growers to understand the possible impact of global warming and, using different "scenarios" identify the best strategies in order to mitigate the negative effects of increased temperatures.

Keywords (5): Phenology model, degree days, phenology, grape maturity

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