

THE SUITABILITY FOR VITICULTURE AT VARYING ALTITUDES: A STUDY OF GRAPEVINE RIPENING IN THE ITALIAN ALPS

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Abstract:

Context and purpose of the study – Planting vineyards in cooler climates has been used over recent years as a strategy to counter the climatic shifts caused by climate change. A move towards higher altitudes in hilly and mountainous wine regions may provide a solution to deleterious effects that increased ambient temperatures have on wine quality. Until now, the influences of higher altitudes and their climates, as well as their effect on vine growing cycles, still holds a lot of scientific uncertainty.

The transnational EU-funded project REBECCA (Interreg V-A IT-AT: ITAT1002, duration: 2017-2019) has the objective to develop a regional valuation method to rate the suitability for viticulture in South Tyrol (Italy) and Carinthia (Austria). Preliminary surveys were performed regarding the effects of altitude on ripening performance of the cultivar Pinot Noir.

Materials and methods – Thirty South Tyrolean vineyard plots, ranging from 220 to 1145 m a.s.l., were used to examine the relationship between altitude and ripening performance of Pinot Noir. Physiological data were collected and maturity tests performed for the 2017 and 2018 vintages. Data collected over a 10-year period (2007-2017) from three 'typical' Pinot Noir vineyards (ranging from 355 to 610 m a.s.l.) were used to determine theoretical 'reference' ripening days (hereon referred to as 'day of year,' or 'DOY') for three different sugar ripeness values (16°, 17° and 18° Brix). A DOY for each of the three sugar ripeness values was also identified for each of the 30 vineyards. The DOY's of the thirty vineyards were then compared to the 'reference' DOY's for each of the three sugar ripeness values to determine if their ripening performances are characteristically 'typical.' Collected acidity parameters for all 30 vineyards were also examined relative to each DOY. To determine the influence of temperature on the maturation process at different altitudes, the respective growing degree day (GDD) was calculated for each sample date using the Winkler formula. Correlations were then used to explore the effect of GDD on sugar content and acidity.

Results – Between 300 and 800 m.a.s.l., the current study's vineyards had the same advancement in ripening (total titratable acidity, malic acid, tartaric acid and pH) as that of a typical South Tyrolean Pinot Noir vineyard between 2007 and 2017. A strong linear relationship ($R^2=0,811$; $r=0,9$) between the sugar/acid index and the respective GDD was found across all altitudes sampled. At higher altitudes, less GDD lead to a more rapid increase in sugar content and slower decrease in total acidity.

Keywords: Climate change, viticulture, ripening performance, Pinot Noir, GDD

1. Introduction.

