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Climate change impact on phenological stages of grapevine and Huglin index in Croatia

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The aim of this study was to determine the impact of climate change on phenological cycle of grapevine in Croatia, to determine the areas which are suitable for growing more or less demanding varieties of grapevine as well as defining areas that are going to became suitable for wine growing in near future. Data of seven phenological stages for 14 varieties of grapevine from 11 phenological stations across Croatia have been analyzed for this purpose. Huglin index has also been calculated for 97 meteorological stations between 1981 and 2010, for 45 stations between 1961 and 1990 and for 5 meteorological stations between 1901 and 2010. On most of the phenological stations considered, dates of leaf unfolding and beginning of first flowers occur earlier in the last three decades compared to the standard climatological period 1961-1990 as a result of an increase in spring air temperatures. The beginning of ripening occurs later than before, but the period in which the grape is maturing is shorter (full ripening occurs earlier) so the quality of wine is affected. This happens because ripening in warmer conditions results in increase in amount of sugar in the grapes and thus the amount of alcohol in wine is also increasing. Comparison of Huglin index calculated for the last three decades with the one calculated for the standard climatological period as well as the secular trends of Huglin index show a need to change grapevine varieties grown in the eastern Croatia. In the near future it will become possible to grow thermally more demanding black varieties of grapevine in continental part of Croatia, while earlier varieties of grapevine could be grown in mountainous parts of Croatia.