

Recommended grapevine varieties for the vineyards zone Vrsac and trend meteorological elements

Cépages recommandés pour la région viticole de Vrsac et tendances des paramètres météorologiques

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Abstract: The aim of this paper was to analyze trends of the meteorological elements and determine suitability of growing grapevine cultivar in viticulture region.

Trend analyses were done, based on the data for South-Banat sub-region, an important resource for the production of grapes and wines in Pannonia plain (Vršac: H = 83 m, $\varphi=45^{\circ}09'N$, $\lambda=21^{\circ}19'E$). Trend of significance for the 95% level of confidence, for mean air temperature and sunshine duration, was obtained for the May-June period. For those elements, trend was increasing as well as for the precipitation in September.

Vineyard personnel are beginning to change list of some cultivars and develop new techniques for producing better fruit. These technologies such as tailoring vine care on a row-by-row and even plant-by-plant basis may prove of value in adapting vineyard to climate change. Based on trend analysis and obtained results, correction of the list of the recommended wine and table grapevine cultivars for this vinegrowing region was done. We are recommending the following mid-early season grapevine cultivars: Pinot Nero R-4, Gammy 222, Pinot gris R-6 and VCR-5, Pinot Blanco VCR 1, Chardonnay VCR 4, Riesling Renaro R2, Riesling 21, Riesling 198, Riesling Italico SK 61, SK 54 and SK 13, Sauvignon Blanc R1, Traminer Gewurz R-1, VCR-6. From the list of the table cultivars we are recommending Muscat of Banat, Muscat of Hamburg clone 192, 197, 198 and Becman.

From the new grapevine cultivars, created at the Faculty Agriculture in Zemun, Department for Viticulture, we are recommending cv. Godominka (self-pollination of Dymiat) Negotinka (Pinot Noir x Zacinak). By choosing grapevine rootstocks, priority has the fooling rootstocks Teleki 5C G-52, SO4 G-47 and Kober 5BB G-114.

Key words: climatic changes, grapevine cultivar list, trends

Introduction

Climatologic investigations that were done throughout the world are showing significant values changes of basic meteorological elements (John, 1991; Moonen *et al.*, 2002; Sara *et al.*, 2005; Soon *et al.*, 2000b). Planet global warming in last two decades is considering as a consequence of the human factor (Vinikov and Grody, 2003; WMO, 1996). It was shown that variation in the solar energy emission could cause climatic changes in periods of the even few decades (Soon *et al.*, 2000b). In the temperate zone latitudes, until 2,030, increasing of the air temperature during the winter months of 2°C, and during the summer months of 3°C, is expecting. Considering the terrain configuration as well as altitude in region is situated (110-506 m alt) and having in mind grape quality higher altitude is of less good quality as sugar content, skin colour and higher content of total acids (Cvetković *et al.*, 1999). The amount of precipitations during the summer period will decrease for 5-15%, and the soil humidity, in the same period, will decrease for 15-25% (John, 1991).

Material and methods

The authors used the meteorological data for Vršac (H=83m, $\varphi=45^{\circ}09'N$, $\lambda=21^{\circ}19'E$), as a representative location of South-Banat wine growing sub-region.

Analysis of the temperature trends was done for: the mean year temperature (t_{year}), the mean temperatures for the period April – September (t_{4-9}), the mean temperatures for the period May – June (t_{5-6}); the year amount of precipitations (R_{god}), the amount of precipitations for the period April – September (R_{4-9}), the amount of precipitations for the period May – June (R_{5-6}), the amount of precipitation in September (R_8); sunshine duration for the period April – September (S_{4-9}), sunshine duration for the period May - June (S_{5-6}).

Trends evaluation was done by Kendal test (WMO, 1961), where trend of 95% on the level of confidence is accepted. This test is recommended for the time series (Mališić, 2002).

Where test determined no significance for the time series on the established level of confidence, the normal values from the series, for period 1981-2000, were compared with the normal series for period 1951-1970.

Results and discussion

Test results for trends of the time series: more exactly series of the data (1981-2000) are in accordance with results obtained by different team experts (Ventura *et al.*, 2002; Sara *et al.*, 2005). Trend of the air temperature increasing was positive for the all investigated periods of the year, but trend was significant only for the mean temperature during the period May – June, and for the sunshine duration for the same period. Both significant trends are increasing and showed graphically (figures 1 and 2).

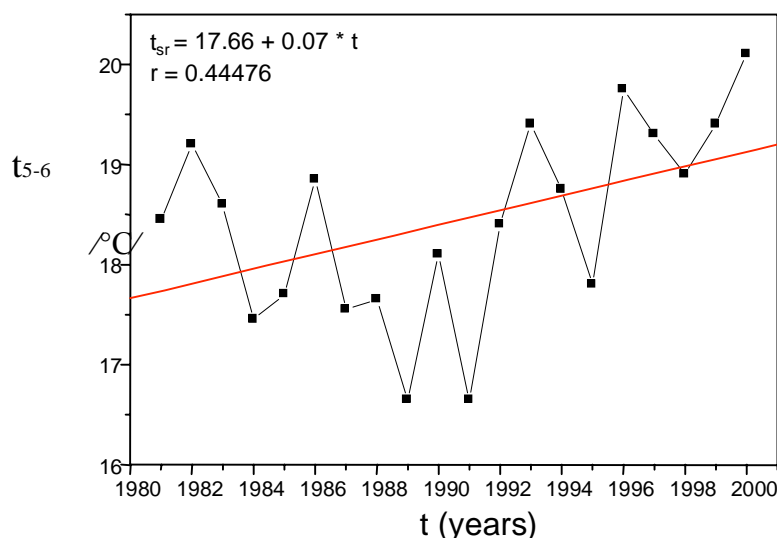


Figure 1 - Trend of the mean air temperature for the period May-June (Vršac)

Based on line equation, the more exactly trends, the values of mentioned two meteorological elements, can be predicted.

Analysis of the meteorological series, whose trends are not on 95% level of significance, showed decreasing of the annual amount of precipitation, the amount of precipitation for the period April – September and the amount of precipitation for the period May – June, which is unfavourable for growing grapevine in this region.

The amount of precipitation in September is increasing, so it is necessary to correct the list of recommended grapevine cultivars for this vine growing region (Avramov *et al.*, 2000; Sivčev and Petrović, 2004; Radinović, 1981; Nakalami *et al.*, 1997).

Based on the air temperature trend analysis, the amount of precipitation and the sunshine duration in South-Banat viticulture sub-region, we are recommending for growing the following mid-early season grapevine cultivars: Pinot Nero R-4, Gammy 222, Pinot Gris R-6 and VCR-5, Pinot Blanco VCR 1, Chardonnay VCR 4, Riesling Renaro R2, Riesling 21, Riesling 198, Riesling Italico SK 61, SK 54 and SK 13, Sauvignon Blanc R1, Traminer Gewurz R-1, VCR-6.

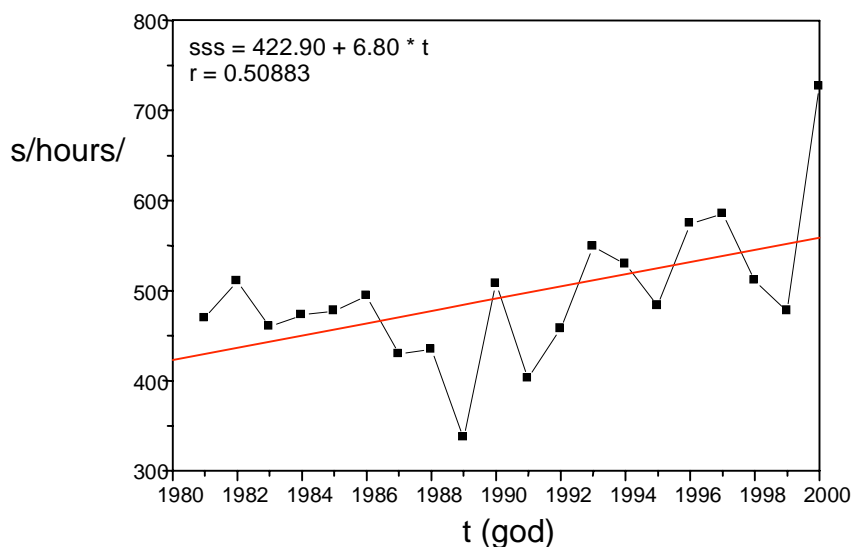


Figure 2 - Trend of the sunshine duration for the period May-June (Vršac)

From the list of the table cultivars we are recommending: cv. Muscat of Banat (Quinn of Vineyard x Muscat Hamburg) and Muscat Hamburg 192, 197 and 198.

From the new grapevine cultivars, created on Faculty of Agriculture in Zemun, Department for Viticulture, we are recommending cv. Godominka B (self pollination of Dimyat) and Negotinka N (Pinot Noir x Začinak).

By choosing grapevine rootstocks, priority has the following rootstocks: Teleki 5C G-52, SO4 G-47 and Cobber 5 BB G-114.

Conclusion

Climatic changes on global level have consequences in changing meteorological and climatologic conditions in vine growing area. Planet global warming and predicted decreasing of amount of precipitation in temperate zone latitudes created necessity of climatic changes analysis that are important in wine growing area. Dissemination of the wine making craft typically occurred by transplanting grapes from areas where vineyards were successful to local with a similar climate.

Meteorological data for Vršac (H=83m, $\phi=45^{\circ}09'N$, $\lambda=21^{\circ}19'E$), as a representative location of South-Banat wine growing sub-region were analysed.

Aim of this paper is to analyze trends of the meteorological elements and determine significant trends for 95% of level of confidence. Significant trends are used for the important forecast for certain grapevine cultivars. The time series of the meteorological elements, that not satisfied significant criteria, were analysed, by comparing it with the normal values of the older time series.

Statistically significant trends were obtained for the air temperature and the sunshine duration for the period May – June. Precipitation trend for September is increasing, while for the other examined periods during the year of investigation, was decreasing. The air temperature has increasing trend for all the examined periods during the year, but trends were not significant on level of 95%.

Based on trend analysis and obtained results, correction of the list, of the recommended wine and table grapevine cultivars for this vine growing region, was done.

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