Prediction of 'Kyoho' grape veraison by growing season temperature

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Abstract

The grape veraison is a period of rapid change of internal biomaterial, which is closely related to fruit quality change. Therfore, management of grape tree before and after the veraison period is very import for improving the fruit quality, so it is necessary to predict the veraison. We investigated the veraison of 'Kyoho' grape cultivated at a temperature gradient of 2.5~6.0℃ higher than the atmospheric condition and developed an prediction model of veraison according to temperature after full bloom. The veraison of 'Kyoho' grape was accelerated with higher temperature during the whole growing period, and it was accelerated about 5.1 days when temperature rose by 1℃. However, after the bloom, the veraison accelerated by about 2.2 days per 1℃ increase. As a result of integrating the temperature from full bloom to veraison in various temperature factors, the coefficient of variation of the daily maximum temperature was the lowest and the mean of integrated daily maximum temperature was 1,681.3℃. Root mean square error(RMSE) of the veraison predicted by applying the integrated daily maximum temperature of 1,681.3℃ was 1.3. I think that it is possible to predict the veraison of 'Kyoho' grape by using the predicted air temperature after full bloom.

Image

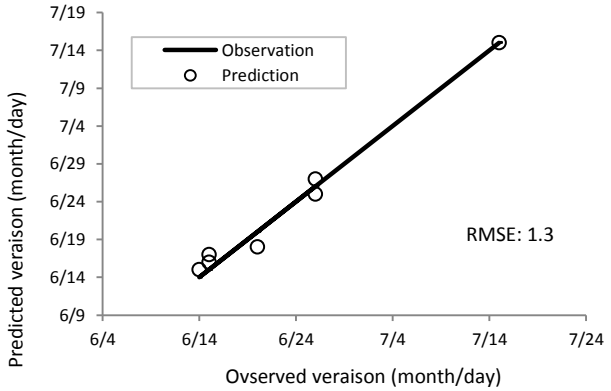


Figure 1: Difference between the observed and the predicted veraison of 'Kyoho' grape.

Recent Publications

1. Boss PK, Davies C, and Robinson SP (1996) Analysis of the expression of anthocyanin pathway genes in developing *Vitis vinifera* L. cv Shiraz grape berries and the implications for pathway regulation. Plant Physiol. 111:1059-1066.
2. Coombe BG, and Mccarthy MG (2000) Dynamics of grape berry growth and physiology of ripening. Austral. J. Grape and Wine Res. 6:131-135.
3. Han DH (2005) The effects of abscisic acid application time and times on fruit coloration of 'Kyoho' grapes. J. Life Sci. 15(2): 298-303.
4. Kliewer WM (1964) Influence of environment on metabolism of organic acids and carbohydrates in vitis vinifera. I. Temperature. Plant Physiol. 39(6):869-880.
5. Sugiura T, Shiraishi M, Konno S, and Sato A (2017) Prediction of skin coloration of grape berries from air temperature. J. Jpn. Soc. Hort. Sci. Preview.



Jeom Hwa Han is conducting research on the fruit physiology and ecology to cope with climate change at the Rural Development Administration of Korea. She developed a model for prediction of full bloom date of 'Niitaka' pear based on air temperature (2008) and predict full bloom date using this model every year in Korea. Recently, she has a great interest in developing models for estimation of dormancy breaking and yields of deciduous fruit trees.

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Notes/Comments: