

EFFECTS OF SEVERE SHOOT TRIMMING AT DIFFERENT PHENOLOGICAL STAGES ON THE COMPOSITION OF MERLOT GRAPES

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Abstract:

Context and purpose of the study - High concentration of sugars in grapes and alcohols in wines is one of the consequences of climate change on viticulture production in several wine regions. One of the options to alleviate this potential problem is to perform severe shoot trimming of the vines to limit the production of carbohydrates. Two different studies were performed in order to investigate the effects of severe shoot trimming on the composition of Merlot grapes; in a first study severe shoot trimming was performed at three different phenological stages (at berry set, at the beginning of veraison and at the end of veraison), while in a second study two trimming treatments (standard shoot trimming and severe shoot trimming performed at the end of veraison) were combined with two shoot densities in order to evaluate the relative impact of these treatments on Merlot grape composition.

Material and methods - In a study conducted during years 2013 and 2014 severe shoot trimming (65 cm shoot height) was performed at berry set (berries 2-4 mm in diameter), at the beginning of veraison (when <5% of berries had changed color), and at the end of veraison (when >80% of berries had changed color). These treatments were compared with a standard canopy treatment (125 cm shoot height). Another study was conducted during years 2015 and 2016, where standard canopy treatment (125 cm shoot height) and severe shoot trimming at the end of veraison (65 cm shoot height) were combined with two shoot densities per vine (obtained with 35% shoot thinning vs. untreated).

Results - Severe shoot trimming at all the three investigated stages reduced sugars in grapes, although this effect was the greatest in the two veraison treatments. Severe shoot trimming at berry set and at the beginning of veraison reduced also the concentration of total anthocyanins in grapes, while severe shoot trimming at the end of veraison obtained similar values of total anthocyanins to the standard canopy treatment. Photosynthetic active radiation in the cluster zone was greater in all treatments with severe shoot trimming because of greater light penetration from the upper part of the canopy. We hypothesize that greater light penetration around clusters in combination to the intensive accumulation of anthocyanins during the first weeks of berry ripening, enabled the treatment of severe shoot trimming at the end of veraison to obtain similar values of total anthocyanins to the standard canopy treatment. No effects on yield components, titratable acidity, pH and total phenolics in berries were observed in any of these treatments. In a study where standard and severe shoot trimming were combined with two shoot densities, a consistent effect on the reduction of grape sugar concentration was achieved only with late severe shoot trimming. Higher shoot density reduced sugars in grapes only in one season, while at the same time reduced the concentration of total anthocyanins in berries.

Keywords: Severe shoot trimming, Shoot thinning, Brix, Anthocyanins, Phenolics.

1. Introduction.

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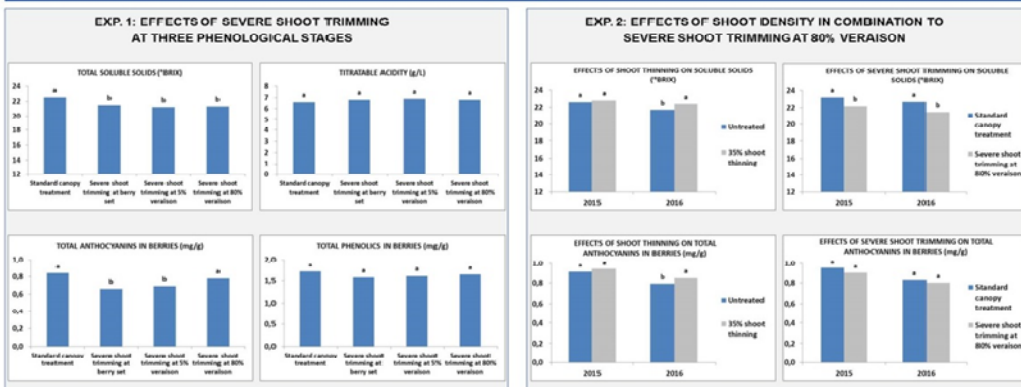


Figure 1. Severe shoot trimming performed at the end of veraison.



Figure 2. Regulation of shoot density by thinning of 35% of shoots.

Results



Conclusions

Severe shoot trimming at all the three investigated stages reduced sugars in grapes, while at berry set and at the beginning of veraison it reduced also the concentration of total anthocyanins in grapes. On the other hand, severe shoot trimming at the end of veraison obtained similar values of total anthocyanins to the standard canopy treatment. We hypothesize that greater light penetration around clusters in combination to the intensive accumulation of anthocyanins during the first weeks of berry ripening, enabled the treatment of severe shoot trimming at the end of veraison to obtain similar values of total anthocyanins to the standard canopy treatment.

In a study where standard and severe shoot trimming were combined with two shoot densities, a consistent effect on the reduction of grape sugar concentration was achieved only with late severe shoot trimming. Higher shoot density reduced sugars in grapes only in one season, while at the same time reduced the concentration of total anthocyanins in berries.

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