



Thesis title:

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Date & location of the oral examination (if known) :

Confidential: **Yes** **No**

Abstract (max 300 words)

Topic position & objectives:

The aim of this study was to test the effects of leaf removal, shoot thinning and interaction of leaf and shoot removal on vine canopy climate, yield, vine balance and skin flavonoids of *Vitis Vinifera*. cv. Merlot in a warm climate.

Methods:

Pre-bloom leaf removal, shoot removal and interaction of leaf and shoot removal were tested separately as three individual trails. Field data was collected at pre-bloom, fruit set, post-fruit set, veraison and harvest, while berry samples for berry composition were collected at veraison and harvest. Field data including stem water potential, number of count and non-count shoot, shoot length, leaf area per shoot and per vine and percentage of PAR transmittance were tested for vine growth and canopy microclimate. Brix, titratable acidity, juice pH, skin anthocyanins, flavonols and proanthocyanidins were processed for berry composition.

Results:

Pre-bloom defoliation did not improve vine canopy microclimate, vine balance or berry compositions. Early shoot thinning reduced cluster number per vine and yield through controlling shoot density, while no effects on vine balance or berry composition were found. Interaction of leaf and shoot removal decreased shoot number per vine and hence number of cluster and yield. It also improved Brix and total skin flavonols and altered composition of skin anthocyanins.

Main conclusions:

Vegetative compensation due to lateral growth was induced by all three treatments, explaining why treatments had limited effects on canopy microclimate. All the treated and untreated vines had higher yield efficiency than suggested values, which meant excessive leaf area was produced per unit fruit yield. High vigor and unlimited irrigation might be the reason. From this one-year study, leaf or shoot removal alone was not recommended in this vineyard, because they did not improve berry composition. These two practices also required more labor-cost. For combination of leaf and shoot removal, it showed positive effects on sugar level and total skin flavonols, but it adversely affected on yield.

Keywords (5):

Leaf removal, shoot thinning, canopy microclimate, vine balance, flavonoid