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Thesis title:
Influence of the row orientation on the berry temperature and the berry compounds

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In times of climate change, adaption possibilities in viticultural aspect are necessary to prevent reductions of yield and wine quality. The influence of the row orientation on the berry temperature and the berry compounds was examined by the use of infrared thermography. Berry temperature measurements absolved on vines planted in north-south, east-west and northeast-southwest orientations demonstrated variances due to the exposure and duration to the solar radiation interception. Berry temperatures were recorded in their average, maximum and minimum temperature during day along the vegetative cycle. Highest daily average temperatures where measured on berries located on the south canopy side of the east-west orientation, lower average temperatures on the south-east exposed berries of the northeast-southwest orientated rows and the lowest temperature on the north-south orientated berries on both canopy sides. The north facing berries never reached high temperatures and experienced a different microclimate (east-west and northeast-southwest). Similar behaviour was noticed for the maximum temperatures.

Further evaluations of photosynthesis rate, microclimatic conditions and the influences of light and temperature demonstrated the impact on the amount of the final berry compounds Brix, malic acid, α -amino acids, phenolic compounds and the berry colour. Warmer berries showed higher sugar contents and lower amount of malic acid, whereas the amount of α -amino acids reacted light sensitive. Phenolic compounds depended on the interception of solar energy and on the exposure to full sunlight. Differences in all their concentrations were strongly depending on the row orientation, the canopy exposure and the location of the berries within a cluster. The vegetative cycle 2011 demonstrated a changing climate, with high variability in the condition. The most suitable row orientation under the received conditions was the east-west orientation. Sugar, malic acid and α -amino acids, but also of phenolic compounds noticed highest concentrations. A further important fact was the reduction of the intensity of Botrytis affection per bunch. Trials on row orientations should be further verified especially under warm and constant climatic conditions during the ripening period.

Keywords (5) : berry temperature, row orientation, berry compounds, temperature effect, light effect

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