



**Leaf removal and “greenness” in wines:
Impact of severity and timing of basal Leaf removal on 3-isobutyl-2-
methoxypyrazine concentrations in red wine grapes**

Justin Scheiner, Gavin Sacks, Bruce Pan, Said Ennahli, Libby Tarlton, Alice Wise, Steven Lerch,
and Justine Vanden Heuvel

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Background. The compound IBMP (3-isobutyl-2-methoxypyrazine) is associated with “green” and “herbaceous” aromas in some Bordeaux grape varieties. Humans are very sensitive to this compound; in small amounts, it contributes to aroma complexity. However, at high levels it contributes to excessive “greenness” and can diminish the perception of “fruitiness” in wines. IBMP is made in the grape berry, and the final levels of IBMP in grape juice are determined by their accumulation prior to veraison. Research has shown that light exposure before veraison can reduce accumulation of IBMP, but the impact of the timing and extent of leaf removal have not been assessed. Our goal was to examine the effect of these factors on IBMP levels in Cabernet franc from the Finger Lakes and Merlot from Long Island.

Experimental design. Three levels of leaf removal were tested: a control without leaf removal, 50% leaf removal (1st, 3rd, and 5th leaves of each shoot removed), and 100% leaf removal (first 5 leaves of each shoot removed). Leaf removal was performed at berry set, 30 days after berry set, and 50 days after berry set in 2007 and 2008. For the Cabernet franc site in year two of the study, leaf removal was also performed at 15 days after veraison. IBMP levels were measured in berries at harvest.

Results. The timing and severity of leaf removal affected the concentration of IBMP at harvest, compared to the control without leaf removal (example in Table 1). In Cabernet franc in both 2007 and 2008, 100% leaf removal at berry set and 30 days after berry set significantly reduced IBMP in grapes at harvest. In Merlot on Long Island, all treatments were effective in decreasing IBMP.

Table 1. The effect of the timing and severity of leaf removal on the concentrations of IBMP at harvest compared to the control without leaf removal (Cabernet franc vineyard, Finger Lakes, New York, 2007).

Leaf removal treatment	Timing of leaf removal	IBMP concentration relative to clusters without leaf removal
50%	berry set	↓↓
100%	berry set	↓↓↓
50%	30 days after berry set	↓↓
100%	30 days after berry set	↓↓↓
50%	50 days after berry set	↓
100%	50 days after berry set	↓

Conclusions

- Leaf removal reduced IBMP accumulation, resulting in lower IBMP concentrations at harvest.
- Early season leaf removal (berry set to 30 days after berry set) had the greatest effect on reducing final IBMP concentration.
- Removal of the first five leaves on each shoot had a greater effect than 50% leaf removal.

The bottom line: Early season basal leaf removal (from berry set to 30 days post-berry set) reduced IBMP levels in mature berries compared to the controls without leaf removal or leaf removal later in the season.