

Timing of leaf removal

By D. Molitor and others.

J. Int. Sci. Vigne Vin, 45(3):149-159. 2011

Summarized by Bibiana Guerra, Nov. 2012

- Clusters in the interior of the canopy grow under reduced light, reduced wind, and increased humidity, all of which favor the development of fungal diseases. By reducing the percentage of interior clusters (PIC), leaf removal in the cluster zone (LR) is an effective practice to reduce Botrytis bunch rot. What is less well-known is the ideal timing to perform the leaf removal. The goal of this study was to investigate the effect of the precise timing of leaf removal on 1) canopy morphology, 2) cluster structure, and 3) bunch rot susceptibility in several white varieties, including Sauvignon blanc, Pinot gris, Riesling, and Auxerrois.
- To find out which was the most effective timing for the leaf removal, researchers compared performing the leaf removal at one of the following phenological stages:

- fully separated inflorescences (pre-bloom)
- 30% cap fall
- 80% cap fall
- pea size
- berry touch
- onset of veraison
- control= no leaf removal

Leaf removal was a thorough operation consisting of manually removing 1) the two basal leaves of each shoot, plus 2) the secondary leaves (arising from secondary shoots), as well as 3) the interior leaves, in the fruit zone on the North (or East) side of each row. The experiment took place in the cool conditions of the Luxembourg wine-growing region (49.54 N, 6.35 E). The experimental design was a randomized block with four replicates per treatment consisting of 10 vines per replicate.

Results.

- **Effect of LR timing on cluster exposure, or PIC.** Researchers used the *point quadrat* to assess the effect of the leaf removal timing on cluster exposure. This technique consists of inserting a metal rod at the height of the fruit zone every 10 cm of length of canopy, then recording all the contacts made - whether leaves or clusters. The percentage of interior clusters (PIC) was then calculated as the portion of clusters flanked by at least one leaf. PIC values in an ideal canopy should stay below 40%. When PIC was assessed at the beginning of veraison, all timings of leaf removal were able to significantly decrease PIC in all varieties. However, later assessments showed some “re-closure” when leaf removal was performed early (pre-bloom), and this was most apparent in Sauvignon blanc. On the other hand, late leaf removal (veraison), failed to provide low PIC values during most of the cluster development. Overall, **berry touch seemed an ideal timing to optimize sunlight penetration.**

- **Effect of LR timing on cluster structure, or Density index.** Researchers evaluated cluster structure by visually calculating a density index (1= most loose; 5=most compact). In addition, they calculated the parameter “weight of cluster per unit of rachis length” as a second indicator of cluster density. Riesling had already low density index values in the control treatment and none of the leaf removal treatments were able to further decrease this index. All other varieties showed a positive response when LR was conducted before *veraison*. More specifically, the lowest values for all parameters studied describing cluster morphology (density index, cluster weight, berry weight, cluster weight per unit of rachis length) were achieved when leaf removal took place at **30% cap fall**. The reduction of cluster density by LR is likely due to a lack of carbohydrate supply, which in turn, would lead to the increased abortion of inflorescences and young berries.

- **Effect of LR timing on Botrytis severity.** Disease was assessed by visually examining 100 random clusters per plot close to harvest. Leaf removal was ineffective in decreasing Botrytis infection in Pinot gris. In the other varieties, disease severity was significantly lower when leaf removal was performed **between 30% cap fall and berry touch**. Early leaf removal (pre-bloom) was ineffective in decreasing Botrytis. The authors attribute the reduction in disease caused by LR to the combined effects of decreased cluster compactness, and increased sun exposure and wind. In addition, these conditions would lead to a better absorption of fungicides.

- **Effect of LR timing on berry composition and yield.** The highest sugars were observed when LR was performed between 80% bloom and pea-size. The lowest sugars were observed when LR was performed around veraison. This was probably due to a shortage of assimilating leaf area during a critical grape developing period. In general, yield had a tendency to be lower in the LR treatments, but this parameter was not significantly affected by the LR operation.

- **In summary,** manual leaf removal in the cluster zone proved to be very efficient in controlling bunch rot in Sauvignon blanc, Pinot gris, Riesling and Auxerrois. The authors recommend this practice in any bunch rot protection strategy, be it conventional or organic viticulture. The period between bloom and berry touch seemed an ideal timing to perform the LR – towards the latter end for Sauvignon blanc. In contrast, the LR operations performed pre-bloom or close-to-veraison were much less efficient.

Author: Bibiana Guerra, PhD, Viticulture & Enology Technical Writer, guerra.wineink@gmail.com