

## **Shoot Thinning: Good for the vines, but good for the wines?**

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In an ideal vineyard, a grower could simply prune the vines during the dormant season and know that they were perfectly balanced. During the growing season, the right number of shoots would emerge uniformly only in the places that you wanted them to be, with the proper number of clusters to balance that growth, while getting just the right amount of light exposure and air movement around the fruit to prevent disease and develop good color, balanced acidity, and great flavors.

Unfortunately, those vineyards are virtually non-existent in our area, so growers need to use various tools and techniques to manipulate the vineyard canopy and the amount of crop in order to achieve the quantity and quality of crop that they need, while also maintaining healthy vines. One of those tools is shoot thinning, whereby excess shoots or shoots growing in the wrong places are removed from the vine.

In situations where there is excessive shoot growth, shoot thinning can be beneficial for several reasons, including:

- Improving bud fruitfulness by reducing shading in the interior of the canopy;
- Reducing disease pressure;
- Improving fruit exposure to sunlight, which can impact color and flavor development (possibly); and
- It is a relatively fast and inexpensive way (whether by hand or machine) to make adjustments to the canopy structure to bring it closer to “balance.”

### *Reduces Shading, Improving Bud Fruitfulness*

If a large number of shoots are growing in a particular region of the vine, such as the head region (see photo), it creates a situation where many of the leaves and developing buds next to them, which will produce the following year's crop, receive very little sunlight. The lack of sun exposure on those developing buds reduces the amount of tissue that can develop into clusters (called 'cluster primordia') within the buds, and thereby reducing the potential crop for the following year.



Without intervention, this can lead to a bit of a vicious cycle as the reduced crop on the vines results in more vegetative growth, which can cause more canopy shading, and so on. Removing excess shoots can help to improve sun exposure on these buds, which will promote cluster formation for the following season.

### *Reduces Disease Pressure*

Not only does shoot thinning allow better sunlight penetration into the canopy, it also helps to improve air movement around the leaves and clusters, which helps to dry the canopy

faster and make is less of an attractive landing for new disease infections to establish and spread. In a trial conducted in a Vignoles vineyard in 2011, vines that had been shoot thinned on both mid-wire and top wire training systems had lower levels of botrytis and other associated bunch rots. If you recall, we had a lot more rain at the end of the season that year than we typically do, and significant botrytis infections were the norm. Shoot thinning allowed the fruit to dry out better in between those rain events, which reduced the amount of botrytis in those clusters, as well as the amount of sorting that was required to remove the overly rotted clusters at the winery.

*Vignoles clusters from mid-wire (VSP)-trained vines with no thinning (left) and shoot thinning (right).*



Source: "Vignoles Harvest: Shoot Thinning, Training System and Botrytis" by Tim Martinson. <http://www.fruit.cornell.edu/shared/pdfs/Vignoles.pdf>

### *Influence color and flavor development(?)*

We know that the amount of sun exposure that clusters receive can have an impact on color in red varieties, as well as the development of flavor and aroma compounds in aromatic varieties like 'Traminette.' Justine Vanden Heuvel from Cornell, along with Gavin Sacks, Tim Martinson and others, has looked at the impact of canopy management practices like shoot and cluster thinning and leaf pulling in hybrid varieties like Corot noir and Marechal Foch, as well as in Riesling. While each of these studies found that shoot thinning by itself could have an impact on the canopy architecture and cropload balance, its impact on fruit chemistry and sensory characteristics of the final wines was inconsistent. In her work with Corot noir, for example, Justine found that cluster thinning had more of an influence on the fruitiness of the final wines than did shoot thinning. In varieties

### *Relatively fast and inexpensive practice*

When it is done early in the growing season, shoot thinning can be accomplished relatively quickly and inexpensively once a person gains some experience with the practice. In a trial looking at the impact of shoot thinning and harvest timing in Marechal Foch, Tim Martinson calculated that the practice would take about 1.6 hours/acre, depending on the vine density of the vineyard.

There are also mechanized options for shoot thinning on larger acreages as well. The model produced by OXBO Corporation is probably the best known, and has been demonstrated in the Finger Lakes and Lake Erie regions in previous years. This system uses a set of soft

rubber “fingers” to remove the shoots (see photo). The number of fingers, rotation speed and tractor speed can all be varied to adjust the number of shoots that are removed.



It is generally recommended that shoot thinning be done when shoots are between 6-12” long. As shoots elongate past that point, the base of the shoot starts to lignify which makes it more difficult to remove the shoots cleanly. In general, try to target about 4-5 shoots per foot of canopy in VSP-trained vinifera varieties. Hybrid varieties that are trained on high-wire systems can have somewhat higher numbers depending on variety, while native varieties like Concord can have as many as 15

shoots per foot of row in highly productive vineyards.

Shoot thinning removes both reproductive and vegetative growth from the vine, but usually results in an overall reduction of both yield and cropload (yield to pruning weight ratio) (Sun et al. 2012), and therefore is most beneficial in situations where vines are overcropped. If vines already have a low yield to pruning weight ratio (i.e., are undercropped), it’s much less likely that thinning will have any significant impact on fruit quality. However, the other benefits mentioned here – reducing shading and crowding which can improve bud fruitfulness and reduce disease pressure – might be significant enough on their own to potentially justify the practice. The only way to know for sure is to try some thinning in a couple of rows and see if any resulting benefits can justify the cost of the practice.

#### Resources:

Martinson, T. *Vignoles Harvest: Shoot Thinning, Training System and Botrytis*.

<http://www.fruit.cornell.edu/shared/pdfs/Vignoles.pdf>

Martinson, T. and J. Vanden Heuvel. *Shoot Density and Canopy Management For Hybrids*.

<http://www.fruit.cornell.edu/grape/pdfs/Canopy%20Management%20for%20Hybrids%20-2007.pdf>

Sun, Q., G. Sacks, S. Lerch, J. Vanden Heuvel. 2011. *Impact of Shoot Thinning and Harvest Date on Yield Components, Fruit Composition, and Wine Quality of Marechal Foch*. American Journal of Enology and Viticulture 62:32-41.

Sun, Q., G. Sacks, S. Lerch, J. Vanden Heuvel. 2012. *Impact of Shoot and Cluster Thinning on Yield, Fruit Composition and Wine Quality of Corot Noir*. American Journal of Enology and Viticulture 63:49-56.

Perez, J. and W. M. Kliewer. 1990. *Effect of Shading on Bud Necrosis and Bud Fruitfulness of Thompson Seedless Grapevines*. American Journal of Enology and Viticulture 41:168-175.