

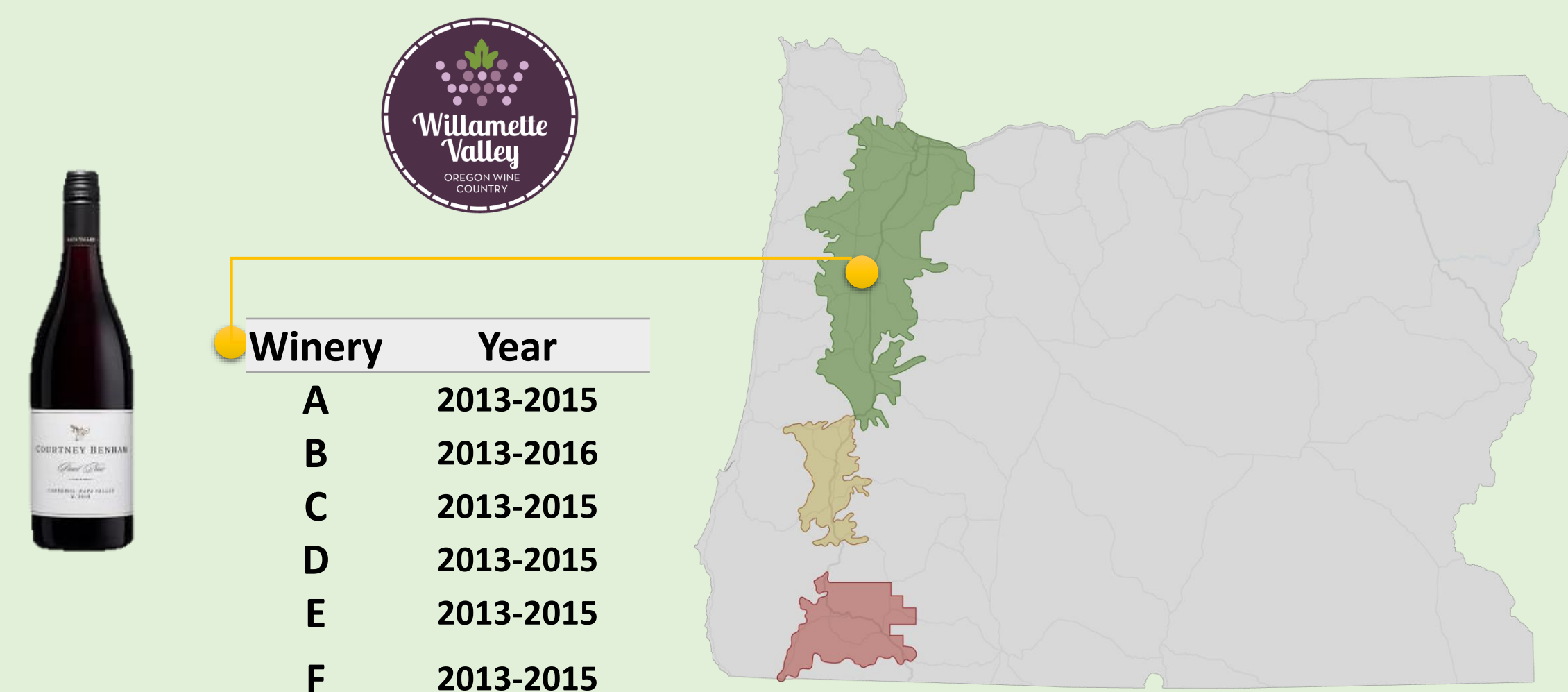
Introduction

Cluster thinning is a common practice used in premium wine production to reduce yield, as it is thought to improve fruit quality. The impact of cluster thinning at lag phase of berry development on Pinot noir wine quality was studied in this work over multiple vineyards and seasons in Oregon's Willamette Valley.



Methods

Pinot noir wines from six commercial wineries in Oregon were provided during 2013-2016. Crop level was adjusted using cluster thinning at lag-phase of berry development using a cluster number per shoot regime or ton per acre targets and compared to a full crop control (no thin). Cluster thinning treatments were applied in a randomized complete block design with three field replicates in each vineyard. After harvest, fruit from field replicates were combined to produce the wine at the commercial wineries. This work was part of a larger Statewide Crop Load Project conducted by co-PI, Skinkis, from 2012-2021. Volatile aroma profiles were determined by GC-MS. Phenolic compounds were measured by HPLC-DAD.



High Thinning	Middle Thinning	Low Thinning
1 cluster/shoot	1.5 cluster/shoot	No Thin
1.75 ton/acre	2.5 ton/acre	3.25 ton/acre
2 ton/acre	--	3 ton/acre
2.25 ton/acre	2.81 ton/acre	3.54 ton/acre
0.71 ton/acre	1.01 ton/acre	1.31 ton/acre

Results

Volatile aroma profile

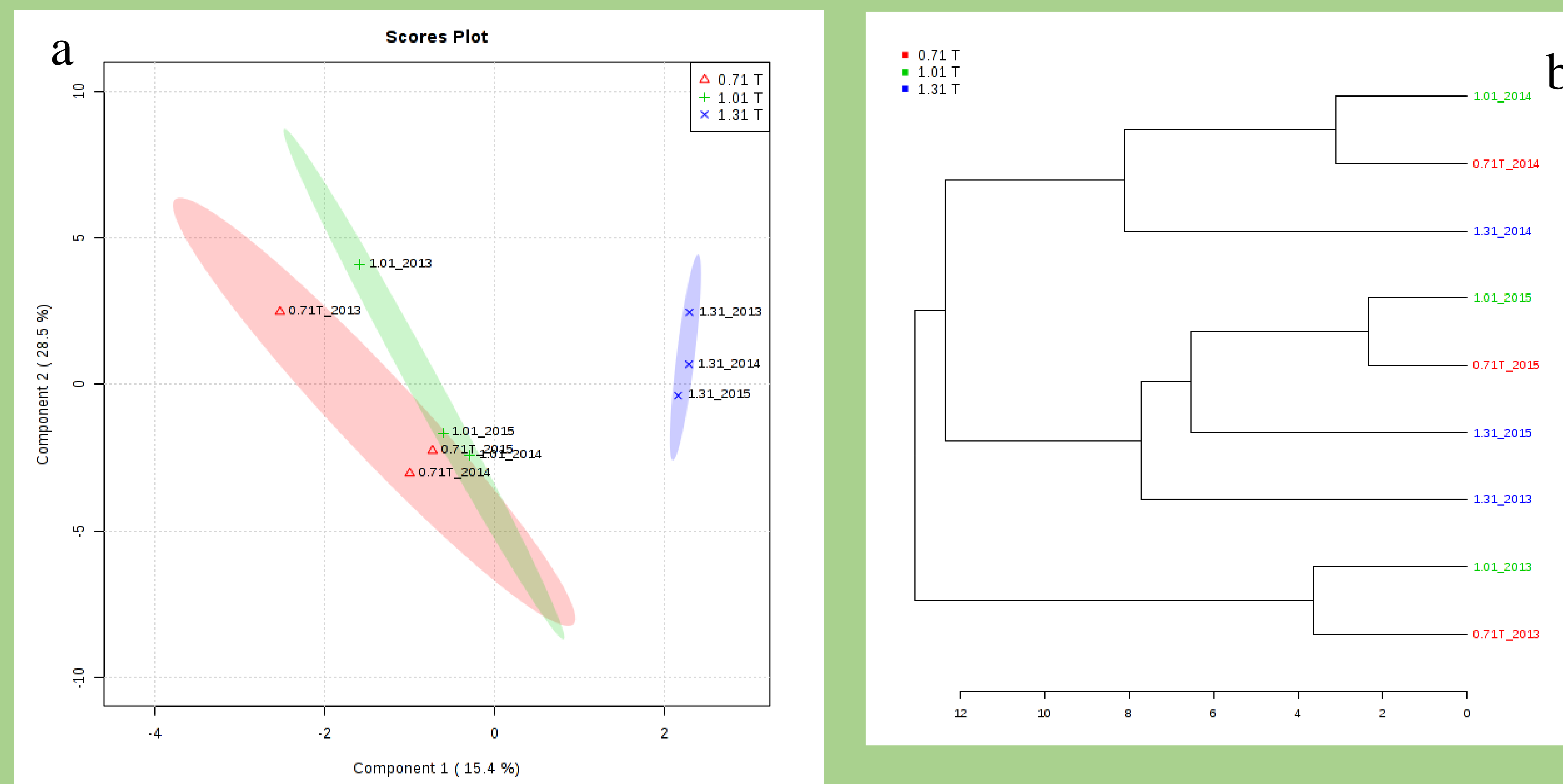


Fig. 1 PLSDA (a) and dendrogram (b) of volatile compounds in wines from Vineyard A with different cluster thinning treatments during 2013-2015 (concentration is the average of three years; T: tons per acre). High (red) and medium (green) thinning treatments are not well separated (a), however significant difference compared to low thinning (blue).

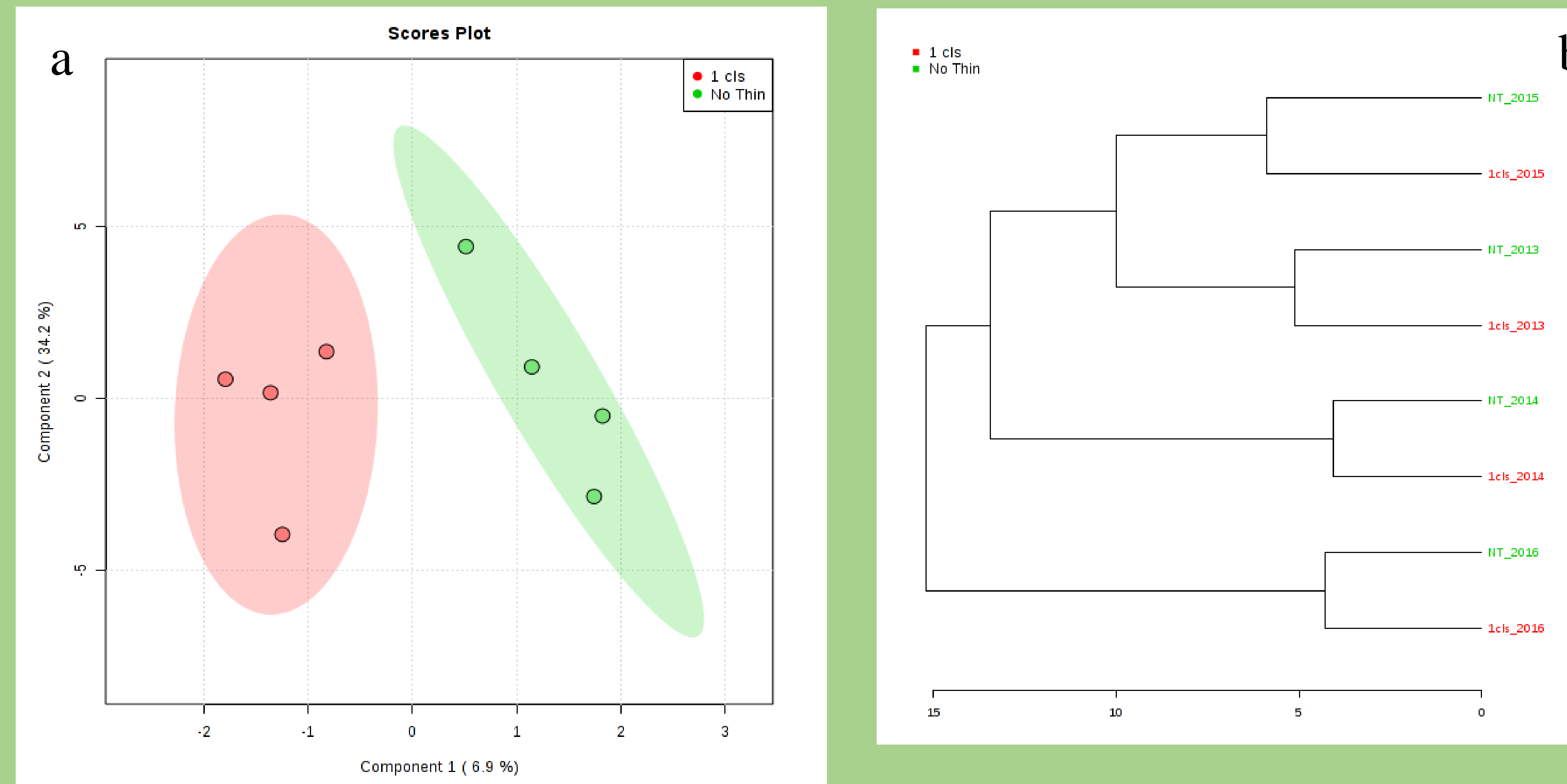


Fig. 2 PLSDA (a) and dendrogram (b) of volatile compounds in wines from Vineyard B with different cluster thinning treatments during 2013-2016 (cls: cluster per shoot; NT: no cluster thinning). Cluster thinning treatments are well separated between high (red) and low (green)(a). Dendrogram (b) shows greater effect among years than thinning treatments.

Results

Phenolics

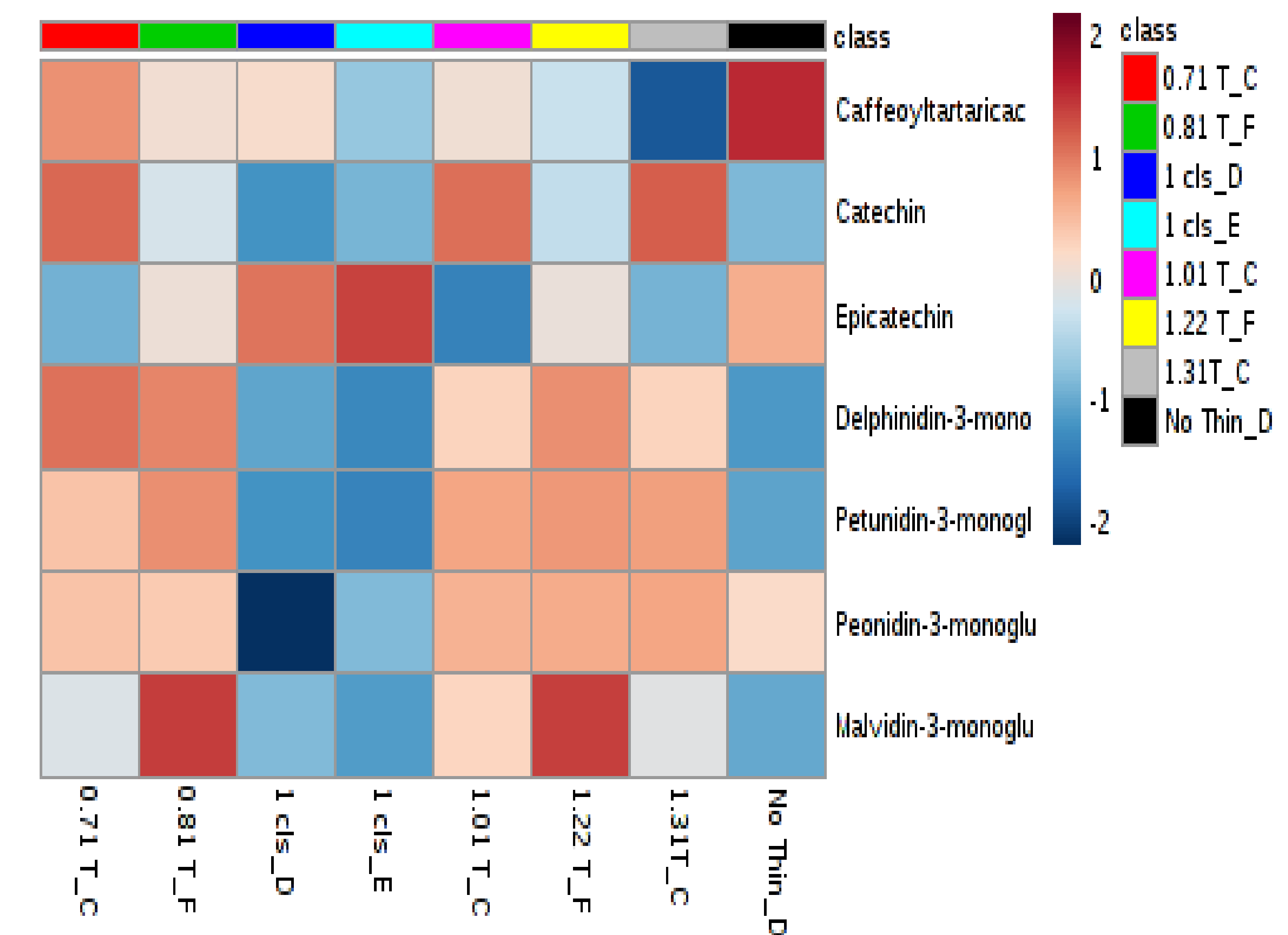


Fig. 3 Heat map of phenolics in 4 vineyards (C, D, E, F) wines with different cluster thinning treatments during 2013-2015 (concentration used in heat map is the average of three years; T: tons per hectare; cls: cluster per shoot)

Conclusions

- The vintage year had a greater impact than the crop level on phenolics, there were no consistent effects of cluster thinning treatments across the years for a given vineyard's wine. The lack of differences by crop thinning have been observed in the fruit from the paired viticulture study. In that study, vines were not found to be over-cropped and likely had sufficient resources to ripen fruit each year.
- Differences between vintage years and vineyards are expected with different vine ages, climate, soils, etc.
- Certain wine volatile compounds were affected by the cluster thinning treatments, but no consistent trend was found across the years.