Impact of changes in pruning practices on vine growth and yield

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VITES QUALITAS

Context

A gradual decline in vineyard plots has been observed over the past twenty years in vineyards worldwide. The causes of this gradual decline are multiple. Climate change, changes in practices or an increase of certain diseases such as grapevine trunk diseases are particularly suspected to be driving this change.

In this context, the objectives of our study in order to increase the longevity of the vines are to measure the impact of different methods of pruning on i) the vegetative expression of the vine ii) the yield and quality of the berries.

Experimental Design

	France, Simple Guyot		Spain, Double Cordon Royat	
	Cabernet franc grafted onto **3309 C** at the density of 2m or 2.5m * 1m		**Tempranillo** grafted onto **110R** at the density of 2.8m or 3m * 1.2m	
	Adult vines	Young vines (planted in 2019)	Young vines (planted in 2019)	Adult vines
	2 plots in Madiran and Irouleguy	2 plots in Madiran and Irouleguy	2 plots in Rioja and Navarra	2 plots in Álava and Navarra
	4 modalities * 4 blocks with 20 plants/block	3 modalities * 3 blocks with 30 plants/block	3 modalities * 3 blocks with 20 plants/block	4 modalities * 3 blocks with 20 plants/block
Modalities	1- Agressive pruning without protection wood or respecting the sap flow 2- Respectful pruning with protection wood and respecting the sap flow 3- Respectful pruning with protection wood and respecting the sap flow + suckering 4- Vinegrower pruning	1- Agressive pruning without protection wood or respecting the sap flow 2- Respectful pruning with protection wood and respecting the sap flow 3- Vinegrower pruning		1- Agressive pruning without protection wood or respecting the sap flow 2- Respectful pruning with protection wood and respecting the sap flow 3- Respectful pruning with protection wood 4- Vinegrower pruning

Results

Adult vines

- ✓ No difference of total vegetative expression between modalities on adult vines (Fig. 1 and 2).
- ✓ 30 to 50% more suckers for the respectful pruning than the aggressive modality in France (Fig. 1) and between 15 and 20% in Spain (data not shown).

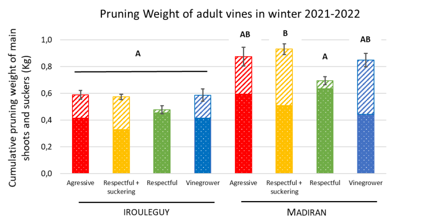


Figure 1: Pruning weight measured during winter 2021-2022 in France*; Dotted = weight of main shoots and Striped = weight of suckers

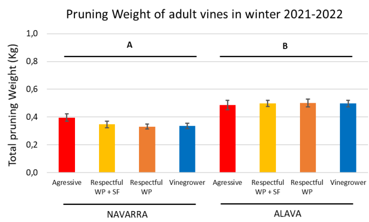


Figure 2: Pruning weight measured during winter 2021-2022 in Spain*

- ✓ No major effect on the yield over the first two years following the implementation of the new pruning practices (Fig 3 and 4).
- ✓ The proportion of clusters from suckers were higher on the respectful pruning method in Madiran (Fig 3).

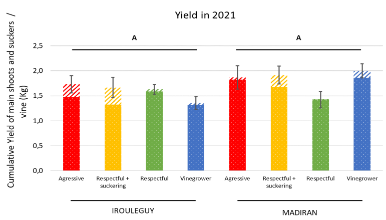


Figure 3: Yield / vine in 2021 in France*; Dotted = weight of main shoots and Striped = weight of suckers

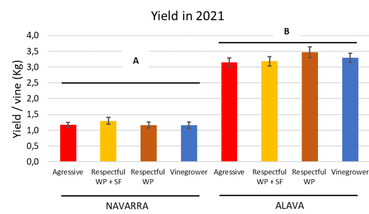


Figure 4: Yield / vine in 2021 in Spain*

* Error bars represent SE, statistical significance was determined by ANOVA and Tukey post-hoc test (p<0.05)

Young vines

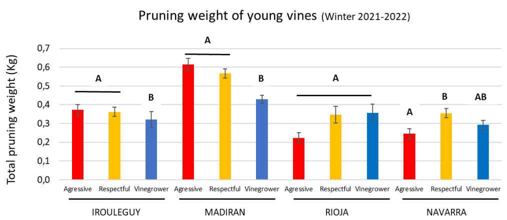
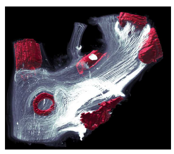


Figure 5: Pruning weight measured during winter 2021-2022 on young vines*

- ✓ In France, no difference on total pruning weight between agressive and respectful modalities was observed (Fig 5).
- ✓ The more suckers were removed on respectful modality, the greater vigor of main shoots was achieved.
- ✓ In Spain, results depended upon the experimental site, with no difference on total pruning weight in La Rioja and lower vegetative expression in the aggressive pruning conducted in Navarra (Fig 5).

Conclusion & Perspectives

- These trials showed very low or no difference between modalities concerning vine vigor after 2 years
- Respectful pruning increased the number of suckers on trunks and arms
- Respectful pruning including spring desuckering increased the vigor of main shoots
- No effect on yield was observed after 2 years
- These trials must be maintained for several years to measure the impact of these practices on the vine over the long term
- Complementary techniques such as hydraulic conductivity measurement and tomography could contribute to better understand the implications of different pruning practices.



Visualization 3D of vessels by tomography

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Interreg POCTEFA

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