SURVEY ASSESSING DIFFERENT PRACTICES FOR MECHANICAL WINTER PRUNING IN SOUTHERN FRANCE VINEYARDS

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Abstract:

Context and purpose of the study – Winter pruning is today the longest operation for hand workers in the vineyard. Over the last years, mechanical pruning practices have become popular in southern France vineyards to respond to competitiveness issue especially for the basic and mid-range wine production. Wine farmers have developed different vineyard management techniques associated with mechanical winter pruning. They sought to be precise or not to control the buds number per vine. They maintained the vertical trellis system or grew the vine on a free cordon. They transformed the vineyard in minimal pruning system. The purpose of this survey was to assess a state of the practices in southern France vineyards, around 255 000 ha, which 2/3 are producing basic and mid-range wines.

Material and methods - The survey was built on two steps. The first one was a qualitative follow-up with individual interviews on targeted winegrowers or cooperative's technical managers who have been leaders in mechanical winter pruning development. These interviews allowed to build the second step survey. This second step consisted in a quantitative approach with an online questionnaire for winegrowers. It was composed by 43 to 63 closed-ended questions, with different fields such as farm characteristics, vineyard and soil management, vine-plot description and mechanical pruning operations. Statistical treatments were run with Addinsoft XLStat software.

Results – Results showed that there are three main mechanical pruning (mechaP) practices: a precise and a hedge mechaP, leaving lengths of branches respectively inferior or superior to 20 cm above the cordon line, and at last a minimal pruning system with few trimming operations on the canopy. Precise mechaP appears to be the most used technique with around 80% of the responses followed by the minimal pruning system, 15% of the responses, and the hedge mechaP with 5%. 56% of the estates are using mechanical pruning combined with trellised vertical shoot positioning (VSP) system, 22% with the free cordon system and 22% are using both systems.
Economic save is the main motivation to develop mechaP, due to the time save with winter pruning, followed by the difficulty to find handwork forces. The main gain observed by the producers due to mechaP is the increase and the regularity of the yield that impact positively the turnover per hectare. Finally, they consider that mechaP allows a better staff management due to time savings during the winter operations in the vineyard and a global increase of the economic value of the production.

Keywords: survey, mechanical pruning, minimal pruning, southern France vineyard

1. Introduction.

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MATERIAL AND METHODS

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Picture 1: Precise mechanical pruning system on free cordon (South-west France PGI vineyard).

RESULTS

- 400 winegrowers participated and 68% are cooperative producers. 29% did mechanical pruning and around 20% of the non-users consider the possibility to evolve their practice. Mechanical pruning occurred mainly in large estate (>20 hectares).
- There were three main mechanical pruning (mechaP) practices: a precise and a hedge mechaP, leaving lengths of branches respectively inferior or superior to 20 cm above the cordon line, and at last a minimal pruning system with few trimming operations on the canopy (fig1).

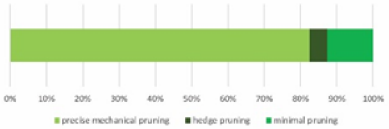

Figure 1: Distribution of each type of mechanical pruning system among winegrowers.

- Economic save was the main motivation to develop mechaP, due to the time save with winter pruning, followed by the difficulty to find handwork forces (fig2).

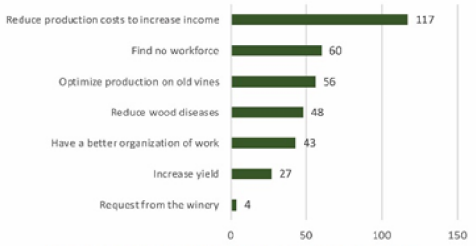

Figure 2: Types of motivation to establish a mechanical pruning system.

- Winegrowers used mechaP on converted adult vines instead of specific plantation (fig3) while experimental results pointed some difficulties for technical management.

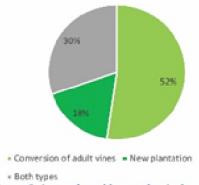

Figure 3: Type of vineyard used by mechanical pruning wine growers.

- Trellising system was preserved especially with converted vines and free cordon implanted with new plantations (fig4). 21% of the estate used both systems and generally began mechanical pruning with converted vines.

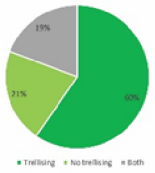

Figure 4: Proportion of mechanical pruning winegrowers using a trellising system.

- Extra handwork after precise mechanical pruning was mostly between 10 and 20 hours per hectare (48%) and 39% were under 10 h per hectare (fig5). This show that the machine must be efficient in order to control the number of buds per plant.

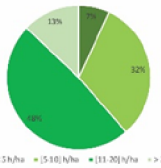

Figure 5: Percentage of winegrowers using different extra handwork durations after precise mechanical pruning system.

CONCLUSION

This survey gives a photography of the mechanical pruning systems developed in France. This allow technicians and advisors of wine sectors to target the points they have to consider when helping wine growers in the new training system approach.

Bibliography:

Olingeleffer. 1984. Production and growth on minimally pruned Sultana vines. Vitis, 23, 42-54.

Dufourcq, T., C. Gaviglio, F. Lopez, B. Mille and P. Sacchanin (2015). Expérimentation de systèmes de conduite innovants et mécanisables en Midi-Pyrénées pour la production de vins «entrée de gamme», millésime 2014. IFV Sud-ouest, rapport d'expérimentation: 14p.

Goma-Fortin N., Lebon E., Trambouze L. (2013). Transformation du système de taille Royat en une taille mécanisée précise : conséquences sur les caractéristiques agronomiques du vignoble. Ciencia et Technica Vitivinicola vol. 28, 9671-676.

Hannin et al., 2009. Produire rentable : nouveaux itinéraires viti-vinicoles en Languedoc-Roussillon. Actes du colloque EUROVITI - IFV, Montpellier, 2 et 3 décembre 2009, p62-69.

Intrieri, C. and S. Poni (1995). «Integrated evolution of trellis training systems and machines to improve grape quality and vintage quality of mechanized Italian vineyards.» American Journal of Enology and Viticulture 46(1): 116-127.

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