LONG TERM INFLUENCE OF A COVER CROP IN THE AGRONOMIC AND OENOLOGICAL PERFORMANCE OF CV. CHARDONNAY

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Abstract:

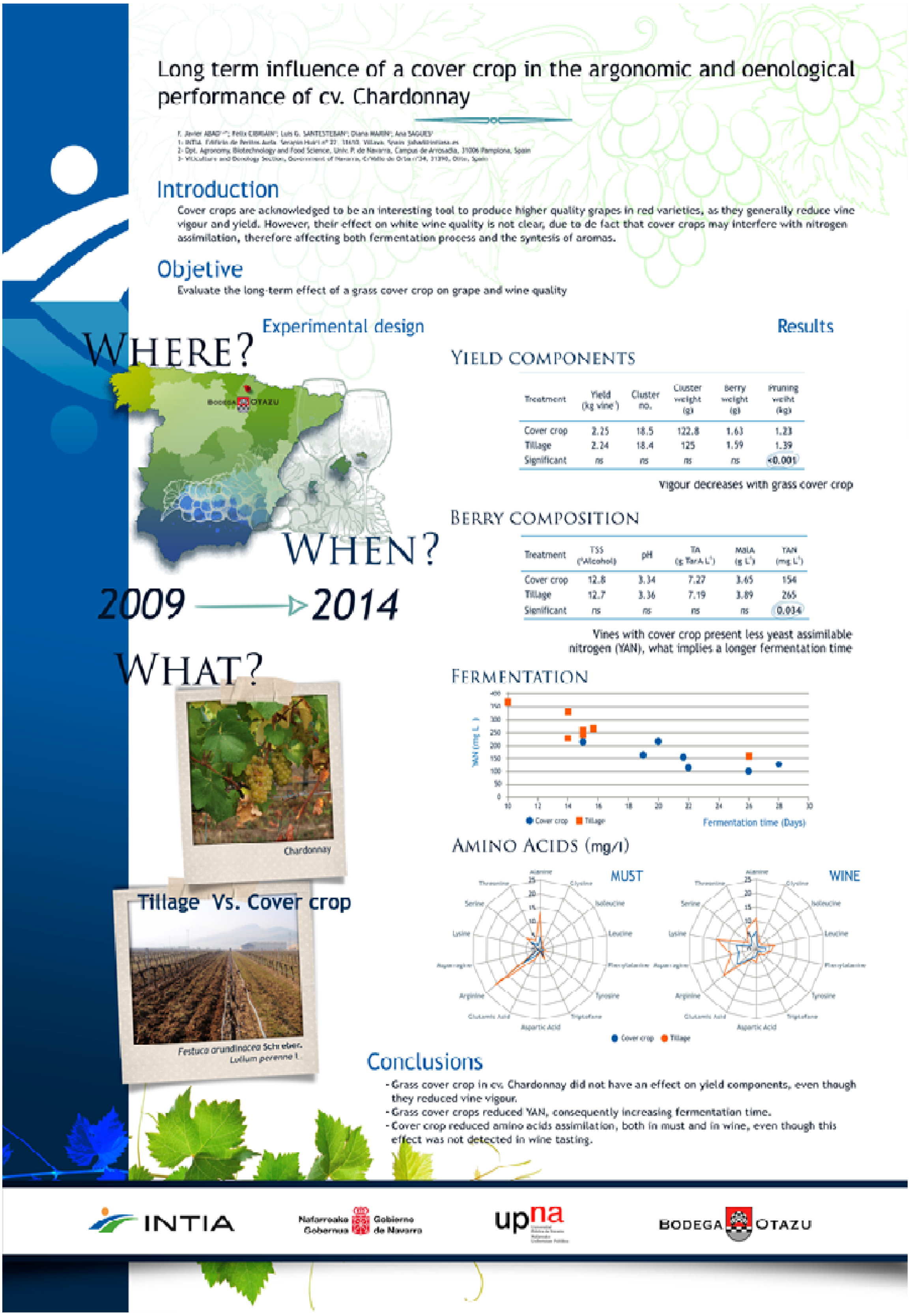
Context and purpose of the study- Cover crops are acknowledged to be an interesting tool to produce higher quality grapes in red varieties, as they generally reduce vine vigour and yield. However, their incidence in white wine quality is not clear, since higher nitrogen availability can play an important positive role, and cover crops may compete for this nutrient. The possible reduction in available nitrogen can also modify the fermentation processes, as well as the synthesis of aromas in the wine. The aim of this work was to evaluate the long-term effect of a grass cover crop on grape and wine quality.

Material and methods - The study was conducted in a cv. Chardonnay vineyard located in Otazu (Navarra, Spain). During the 10 years prior to the experiment, the vineyard had been managed with a *Festuca arundinacea* and *Lolium rigidum* cover crop. In order to evaluate its incidence, at the beginning of the experiment, part of the rows were tilled, and the agronomic and oenological performance of both soil management strategies compared, with a detailed evaluation of the effects on must and wine amino acids.

Results - After 5 years of evaluation, the presence of the cover crop was shown not to affect yield, cluster number or berry weight, but it decreased pruning wood weight and leaf nitrogen content. Regarding grape composition, no differences were observed in terms of sugar content, pH and titratable acidity but cover-cropped vines produced grapes with lower yeast assimilable nitrogen and amino acid content. These differences implied a longer fermentation time (21 vs. 16 days), and differences in the wine profile.

Keywords: Amino acids, Wine, Tillage, *Vitis vinifera* L.

1. Introduction.


Long term influence of a cover crop in the argonomic and oenological performance of cv. Chardonnay
Introduction
Cover crops are acknowledged to be an interesting tool to produce higher quality grapes in red varieties, as they generally reduce vine vigour and yield. However, their effect on white wine quality is not clear, due to de fact that cover crops may interfere with nitrogen assimilation, therefore affecting both fermentation process and the syntesis of aromas.
Objetive
Evaluate the long-term effect of a grass cover crop on grape and wine quality
Experimental design
WHERE?
BODEGA OTAZU
WHEN?
2009 → 2014
WHAT?
Chardonnay
Tillage Vs. Cover crop
Festuca arundinacea Schreber.
Lolium perenne L.
Results
YIELD COMPONENTS

Treatment	Yield (kg vine⁻¹)	Cluster no.	Cluster weight (g)	Berry weight (g)	Pruning weiht (kg)
Cover crop	2.25	18.5	122.8	1.63	1.23
Tillage	2.24	18.4	125	1.59	1.39
Significant	ns	ns	ns	ns	<0.001

Vigour decreases with grass cover crop
BERRY COMPOSITION

Treatment	TSS (°Alcohol)	pH	TA (g TarA L⁻¹)	MalA (g L⁻¹)	YAN (mg L⁻¹)
Cover crop	12.8	3.34	7.27	3.65	154
Tillage	12.7	3.36	7.19	3.89	265
Significant	ns	ns	ns	ns	0.034

Vines with cover crop present less yeast assimilable nitrogen (YAN), what implies a longer fermentation time
FERMENTATION
YAN (mg L⁻¹)
Fermentation time (Days)
Cover crop
Tillage
AMINO ACIDS (mg/l)
MUST
WINE
Cover crop
Tillage
Conclusions
- Grass cover crop in cv. Chardonnay did not have an effect on yield components, even though they reduced vine vigour.
- Grass cover crops reduced YAN, consequently increasing fermentation time.
- Cover crop reduced amino acids assimilation, both in must and in wine, even though this effect was not detected in wine tasting.
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