Should Water Supply by Irrigation be soon a Technique to Manage Aromatic Potential of Colombard in South-Western France Gascony Vineyard?

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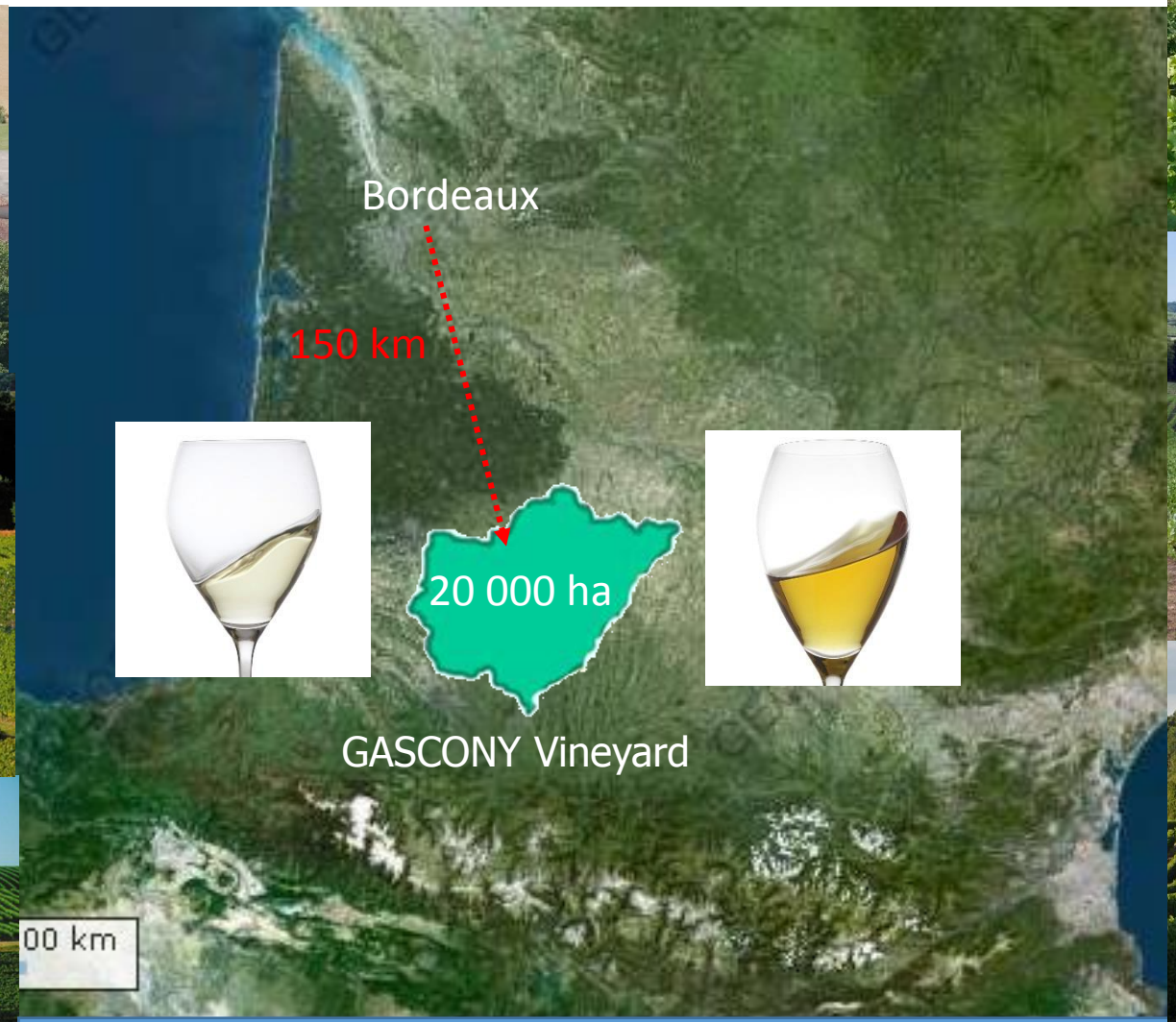
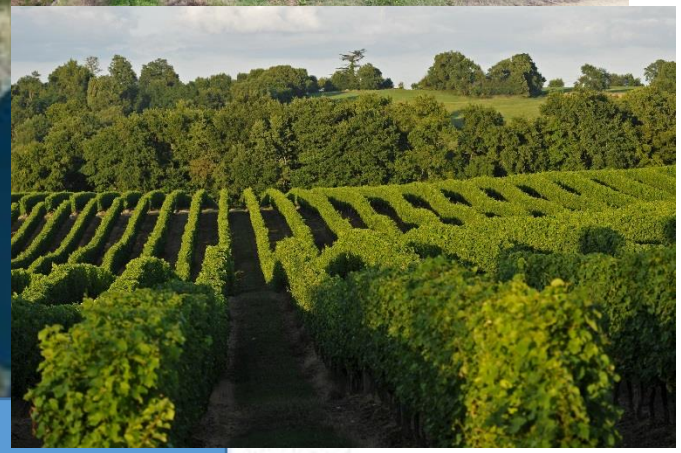

Bordeaux
150 km
20 000 ha
GASCONY Vineyard
00 km



Context : situation of the vineyard

« new world vineyard »

brand wine, high yield, big estates, export

Rentability depends on yield and aromatic intensity

?

Climate changing context

!

Availability for water supply

Purpose

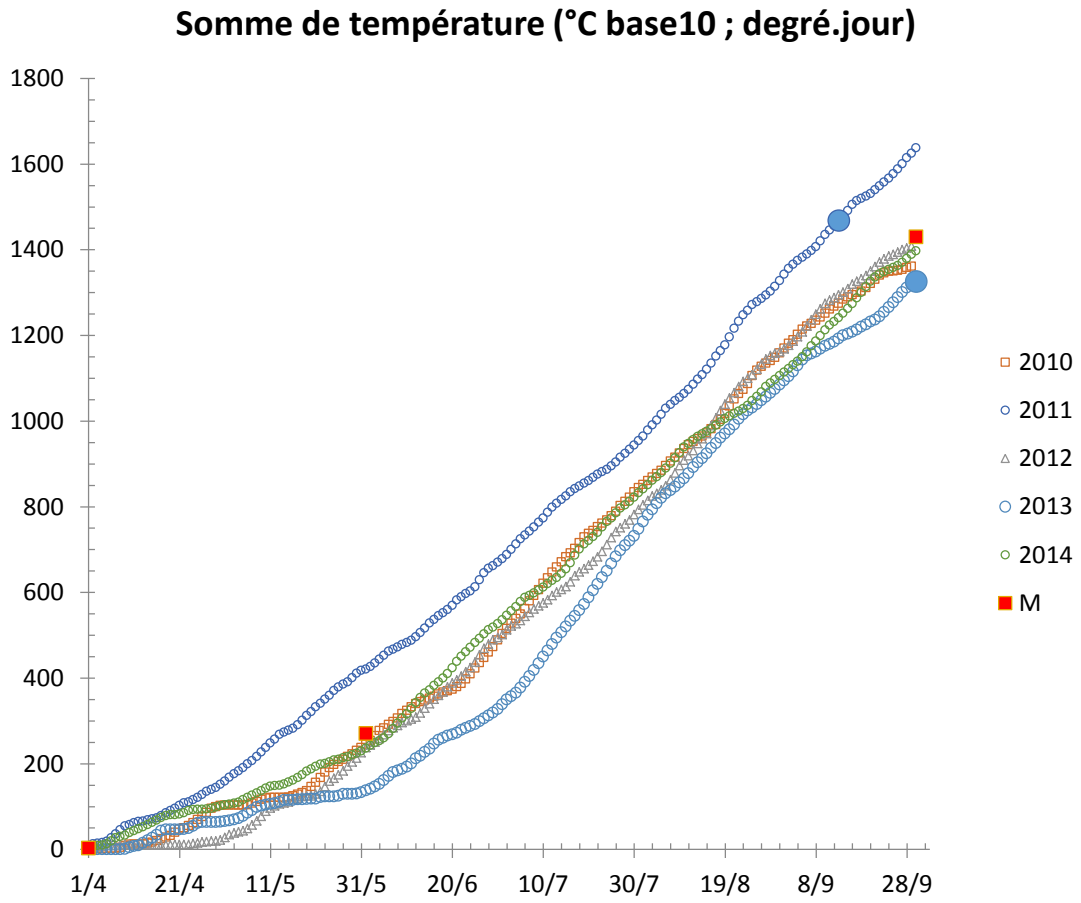
- Does irrigation improve varietal thiols composition of white wine ?
  - Test irrigation strategies on *Vitis vinifera* cv Colombard
  - Provide references on adaptation technique
  - Encourage or not the technique?

Materials and methods

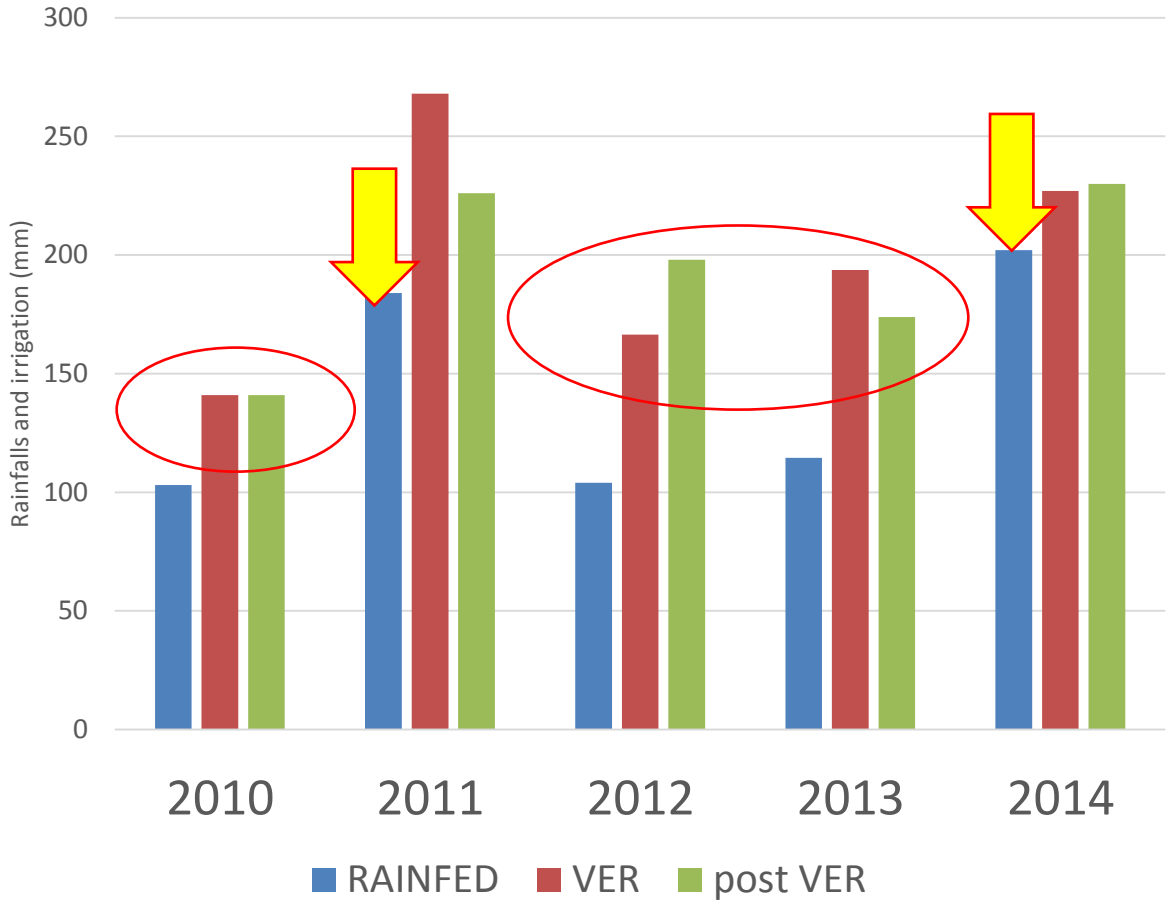
- A Colombard plot of 300 grapevines on grass cover soil (35%) and with 150mm TTSW content
- 5 years experimentation 2010- 2014
- 2 irrigation strategies (pre and post veraison) + rainfed control
- Water status :
  - Measurements of stem water potential on 6 vines per (modality x date)
  - δ13C on grapes at harvest
  - FTSW by WaLIS model
- Harvest date : several dates (from 1 to 3 per vintage) defined by duration veraison-harvest
- Varietal thiols composition in wine
  - Analysis of 3MH and A3MH by NYSEOS (http://www.nyseos.fr/)

Climatic variations : 2010-2014

Sum od DD from 04/01 to 09/31



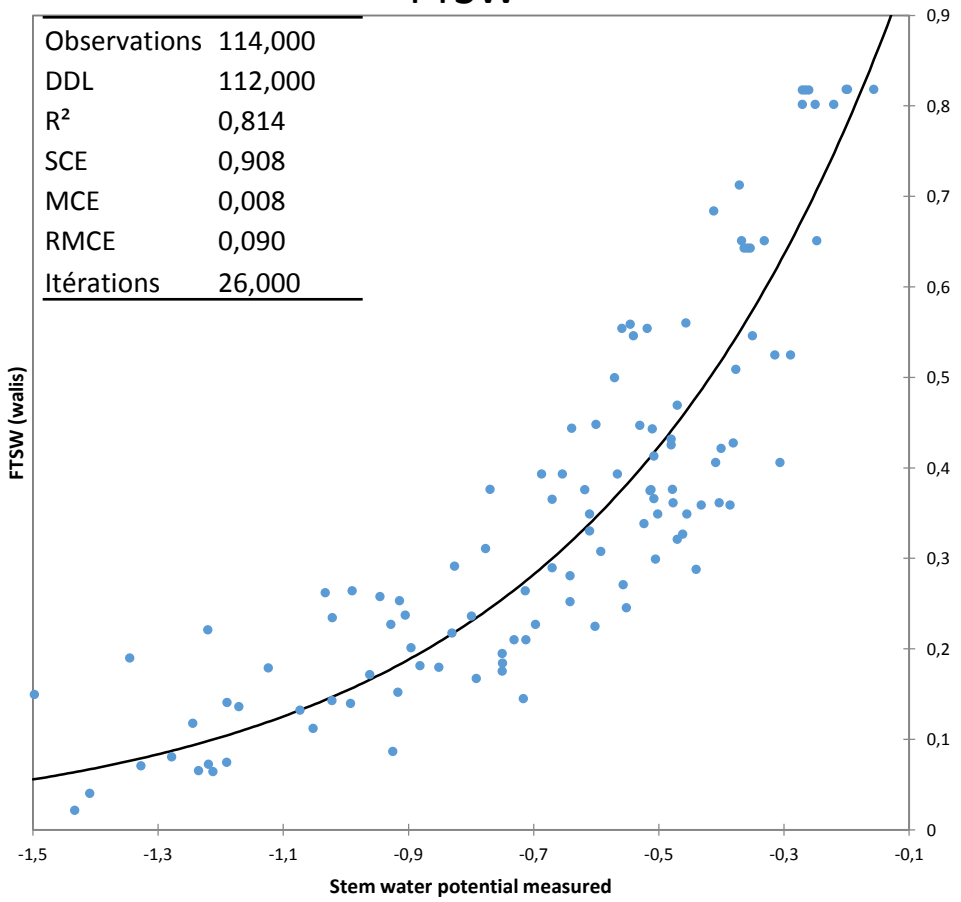
Rainfalls and water supply by irrigation from Flowering to Harvest ($\bar{x}$ =114 days)



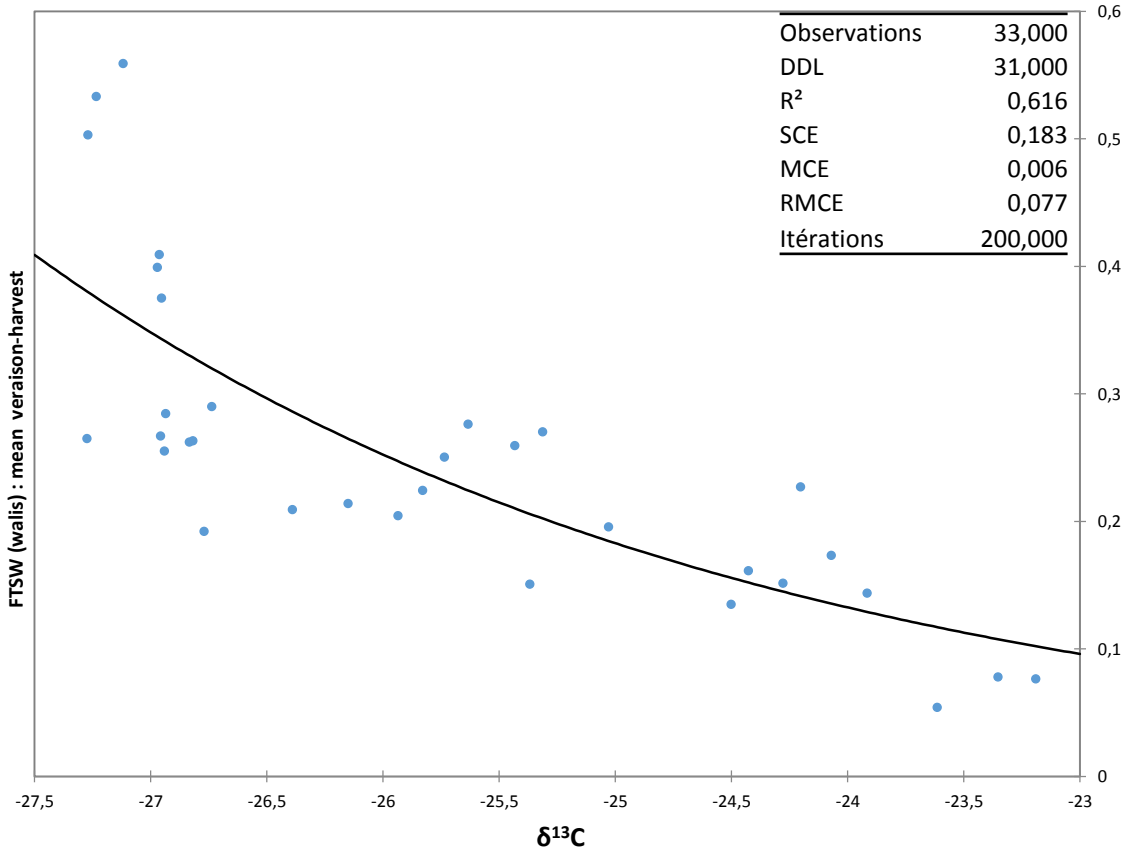
Use of soil water balance model WaLIS : https://walis.vignevin.com

(Celette, Ripoche et al. 2010)

Relation between Stem water potential and FTSW



Relation between $\delta^{13}C$ and mean FTSW from veraison to harvest



Use of mean FTSW from VERAISON to HARVEST as variable to compare different grapevine water status on the trial

Creation of 4 classes including water status and harvest date

Water status from veraison to harvest

Comfy : FTSW ∈]20% - 56%] (mean = 30%)

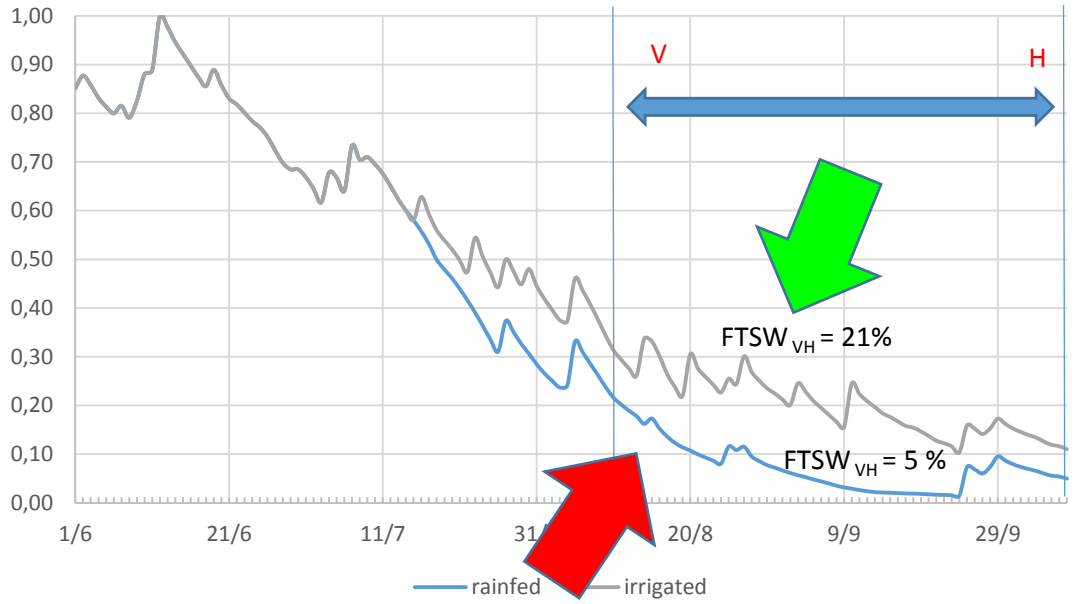
Deficit : FTSW∈ [5% - 20%] (mean = 13%)

Date of harvest

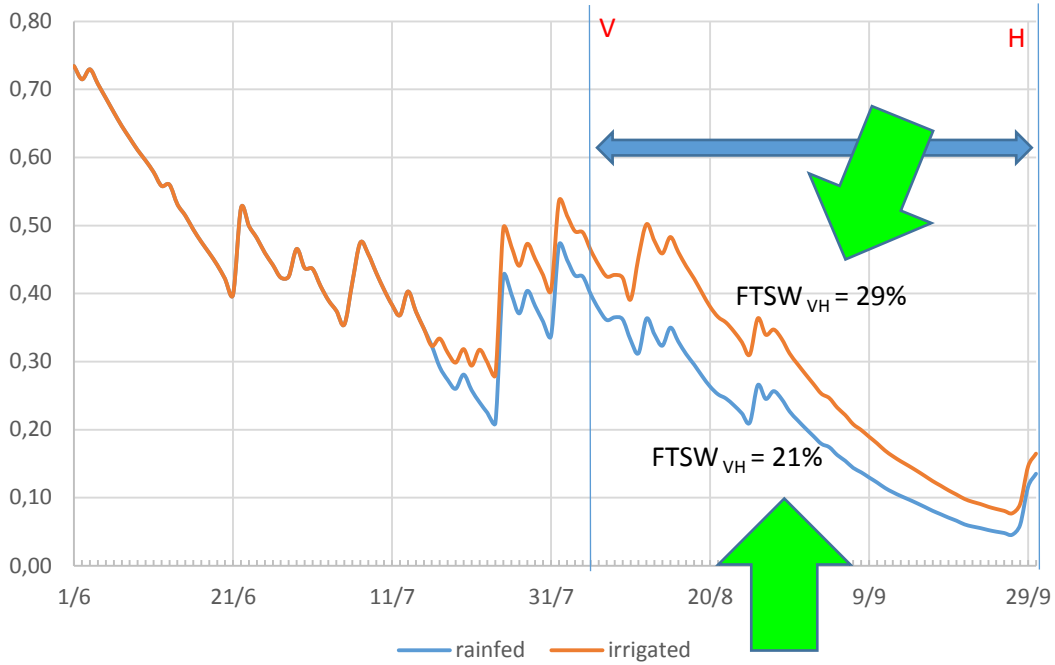
Early : [38 – 45] days after veraison (mean : 42d.)

Late: [49 – 59] days after veraison (mean : 54d.)

FTSW 2012



FTSW 2014



Valeurs	E-COMFY	L-COMFY	E-DEFICIT	L-DEFICIT	Pr > F
Water supply F-R (mm)	197	207	111	131	< 0,0001
FTSW V-H	34%	27%	13%	13%	0,000
$\delta^{13}C$	-26,4	-26,5	-24,3	-24,1	< 0,0001

Comfortable water status + late harvest date impact varietal thiols composition of Colombard wine

Varietal thiols	E-COMFY	L-COMFY	E-DEFICIT	L-DEFICIT	Pr > F
3MH (ng/l)	1001 b	**1573 a**	723 b	837 b	0,005
A3MH (ng/l)	90 b	**258 a**	58 b	82 b	0,000
3MH+3MHA (nmol/l)	8,0 b	**13,2 a**	5,7 b	6,7 b	0,002

Few differences on yield components

not significant

Valeurs	E-COMFY	L-COMFY	E-DEFICIT	L-DEFICIT	Pr > F
RDT kg/m²	1,8	1,7	1,5	1,7	0,214
NbGRAP	24	20	22	24	0,070
PMG	0,245	0,266	0,224	0,231	0,052
PMB	1,9	2,1	2,0	2,0	0,429
PBT kg/m²	0,26	0,25	0,21	0,24	0,123
MS kg/m²	0,498	0,461	0,409	0,461	0,146

Yield
Number of grapes/vine
Grape weight
Berry weight
Pruning weight
Dry matter

Effets on must composition

Valeurs	E-COMFY	L-COMFY	E-DEFICIT	L-DEFICIT	Pr > F	
S	154	170	158	183	< 0,0001	
rdt S	219	220	185	241	0,189	
AT	7,5	6,4	6,9	5,7	0,001	
S/AT	21	27	23	32	< 0,0001	
MH2	**7,7 a**	6,9 ab	6,5 ab	5,8 b	0,012	←
pH	2,9	3,0	3,0	3,2	< 0,0001	
AA	119 b	**142 a**	101 b	110 b	0,000	←
NH4	81	85	69	75	0,839	
YAN	201	227	170	185	0,063	

Malic acid ↗
Amino acids ↗

Conclusion

- Keys to manage water status in relation with varietal thiols in Colombard :
  - Know Total transpirable Soil water availability
  - Reach a mean value of FTSW above 20% from veraison to harvest with a delayed harvest
  - Use model from the office or leaf water potential from the field

- Irrigation would be necessary to improve aromatic potential
  - Not yet in most cases but…
  - This experiment gives some critical point …useful for the future

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