



Champagne Adaptation to climate change

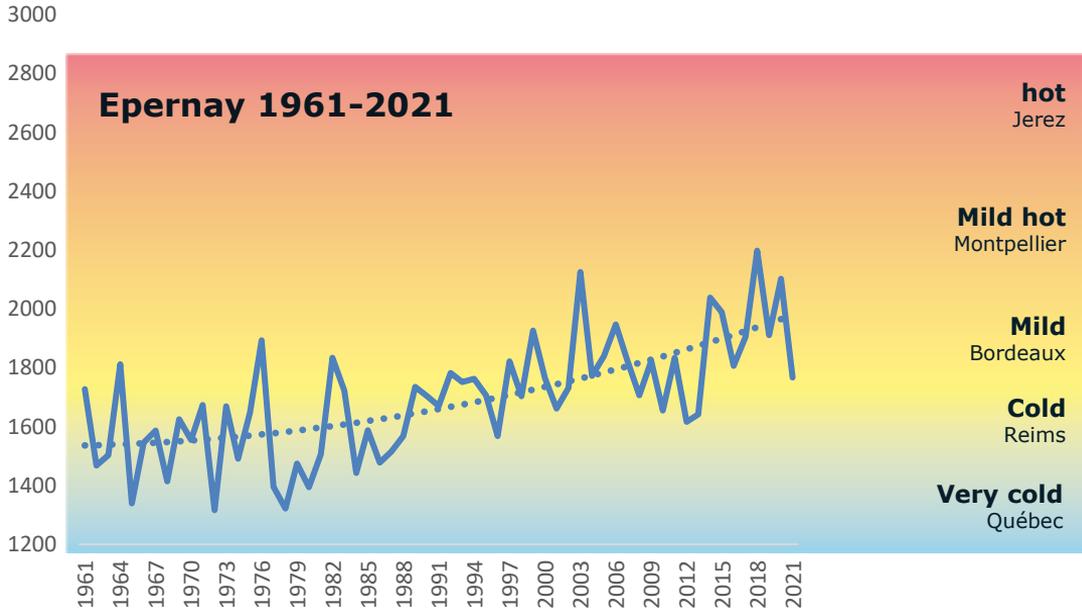
Sébastien Debuissou
Responsable Service Vigne



The fact



Climat	Huglin	Exemple
Very hot	>3000	Canaries
hot	2400 to 3000	Jerez Maury
Mild hot	2100 to 2400	Provence Languedoc
Mild	1800 to 2100	Côtes du Rhône Bordeaux Val de Loire
cold	1500 to 1800	Bourgogne Champagne Alsace
Very cold	<1500	Moselle Québec



Coulures and millerandages
1971 1978 1980 1981 1985
2012



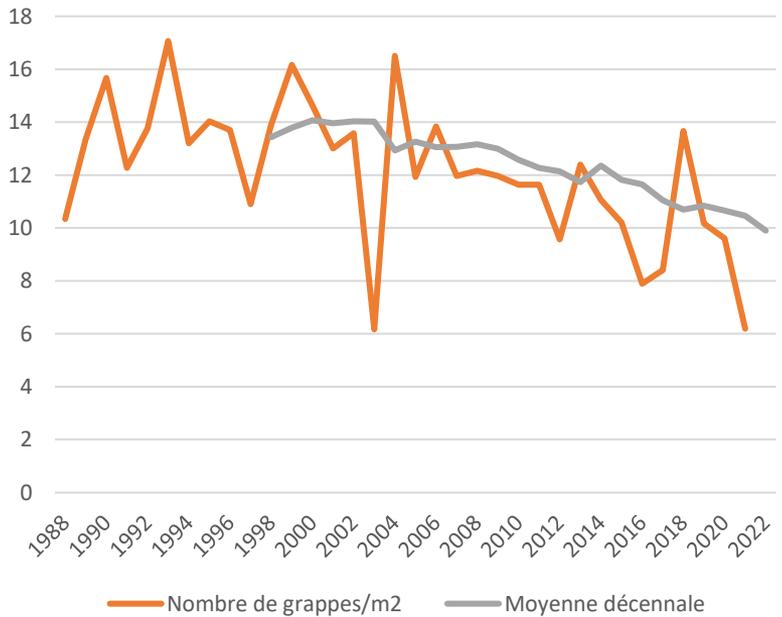
Carbon metabolism



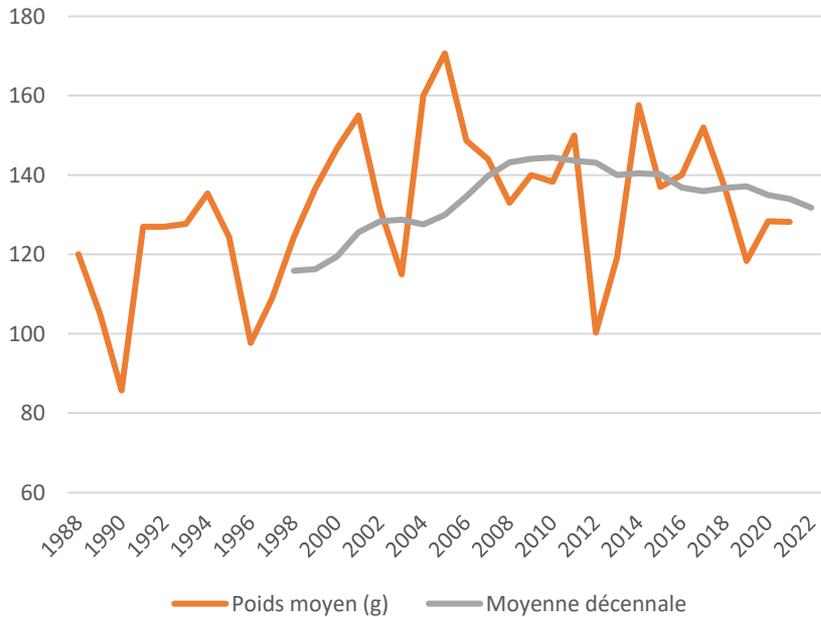
And the bunches of grapes ?



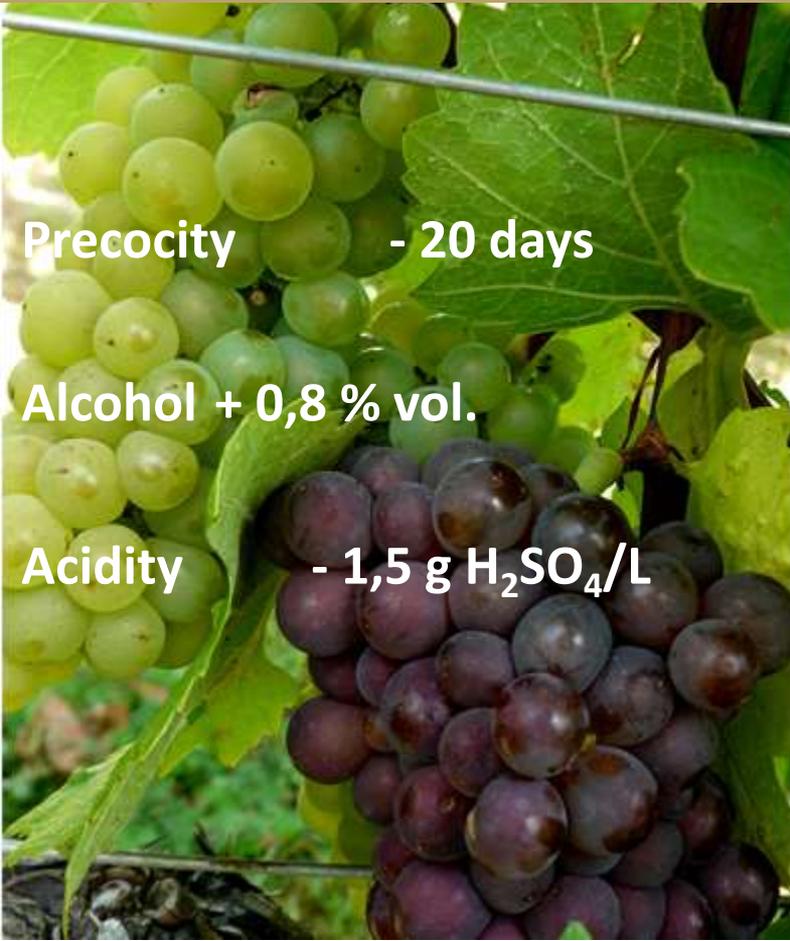
Bunch numbers by m²



Bunch weight (g)



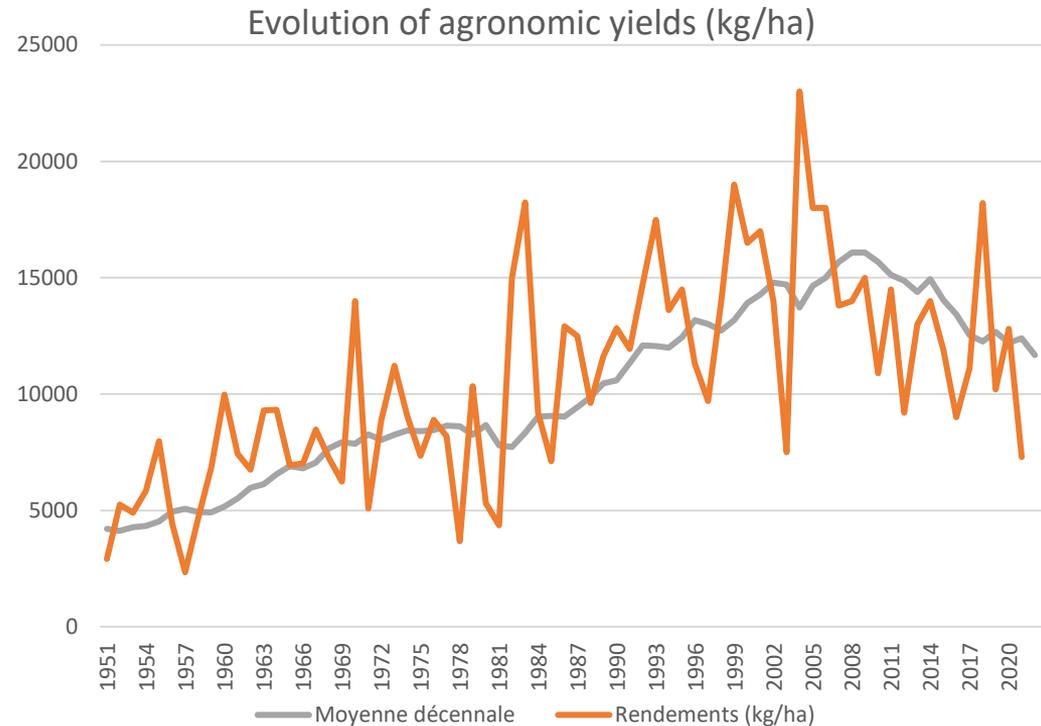
Yield up, but it's over



Precocity - 20 days

Alcohol + 0,8 % vol.

Acidity - 1,5 g H₂SO₄/L



	Average	Min.	Max.
Frost	8,2 %	<0,5%	30 % (2021)
Hail	1,2 %	<0,5%	3 % (2012)
Downy Mildiou	4,9 %	<0,5%	25 % (2021)
Powdery mildew	0,8 %	<0,5%	2 % (2020)
Botrytis	5,3 %	<0,5%	18 % (2017)
Grapes scalding	2,8 %	<0,5%	11 % (2019)

Over the past 10 years, weather and parasitic pressure have reduced harvest potential by an average of 27%.

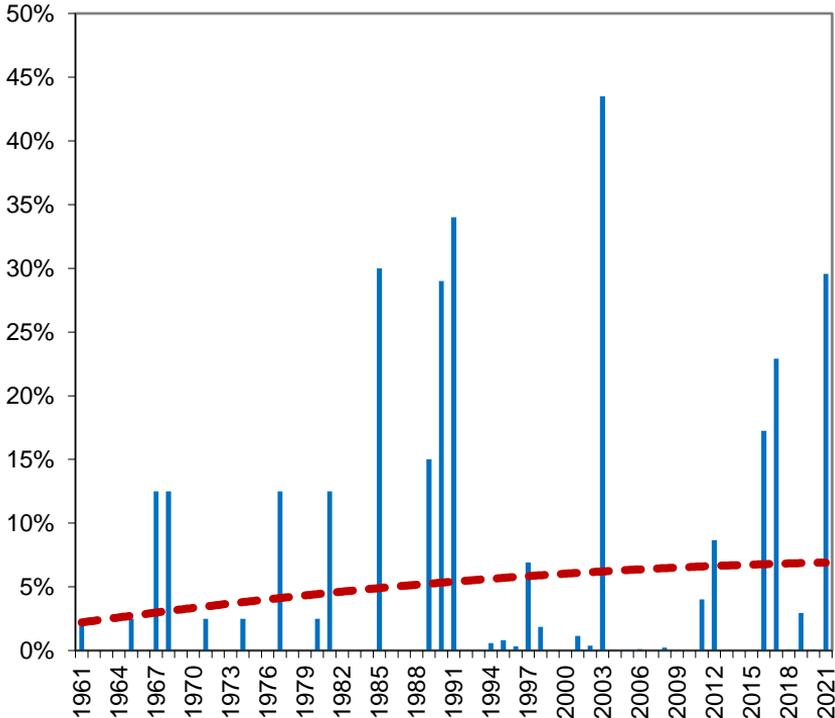
Climate hazards up



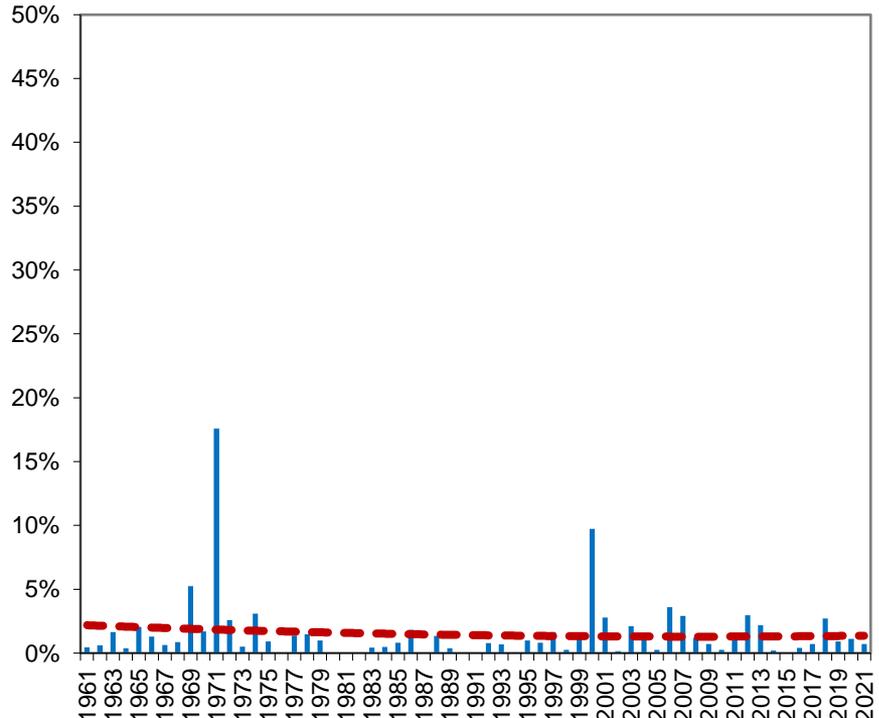
The risk of spring frost increases



Spring frost



Hail



1



The Champagne individual reserve

2



Spring frost protection

To combat spring frosts, the operator uses, if necessary, a method from the list of practices with a moderate environmental impact. Sprinkler systems with a low carbon footprint can be used, but their use must comply with regulatory and environmental constraints.

Point 42



3



Semi wide vine and plant material

Narrow vine

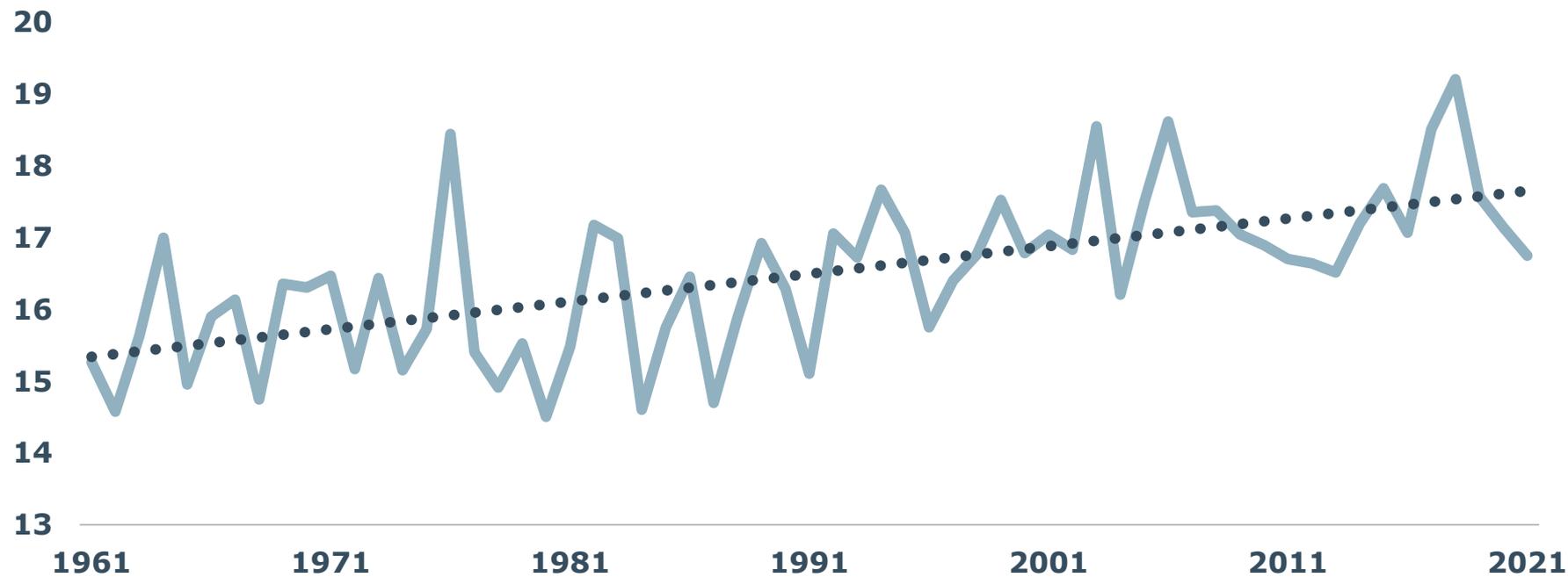
1 x 1,1 m

Semi-wide vines

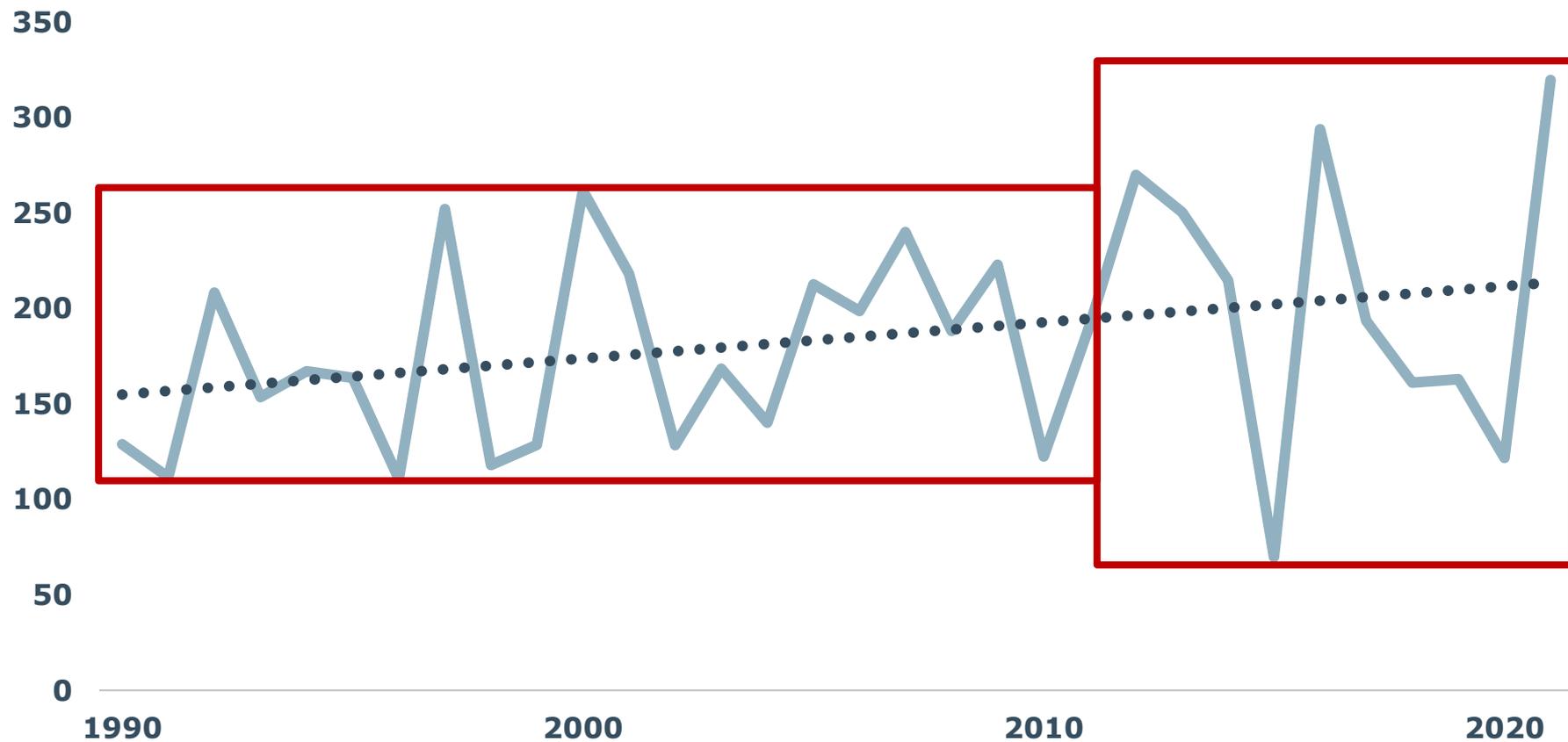
1 x 2 m

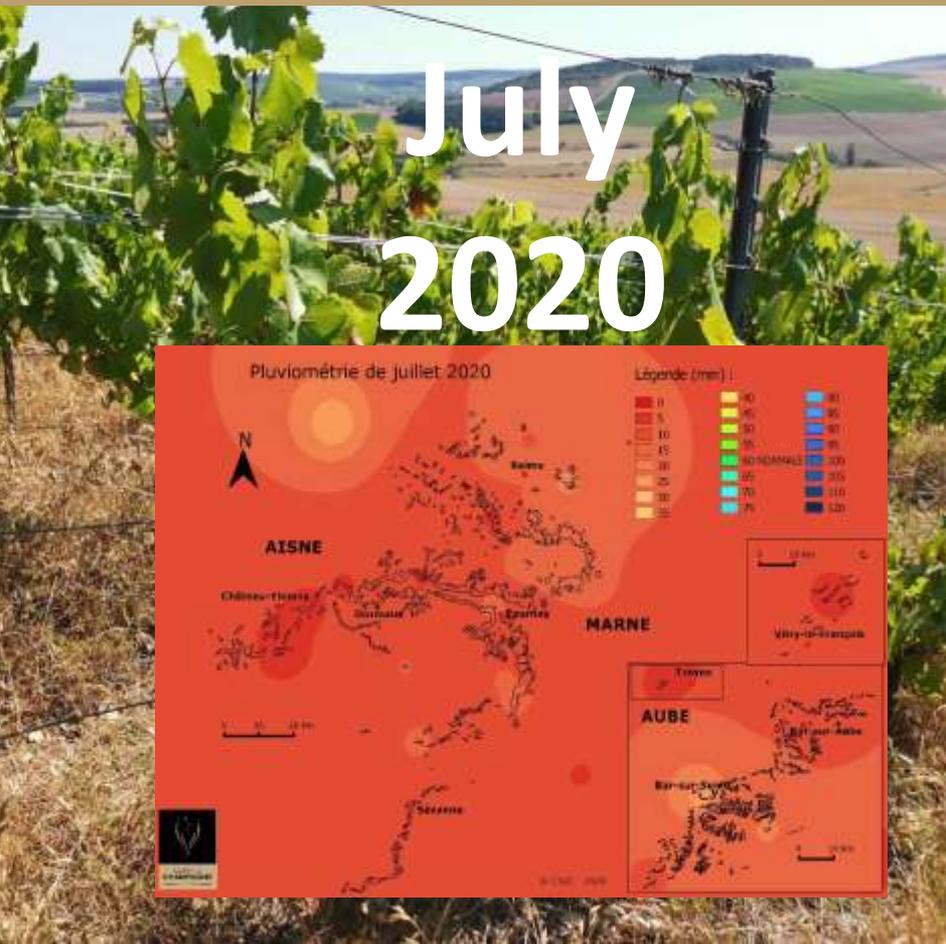
- 40 % frost spring on average

A steady increase in temperature (T°C)

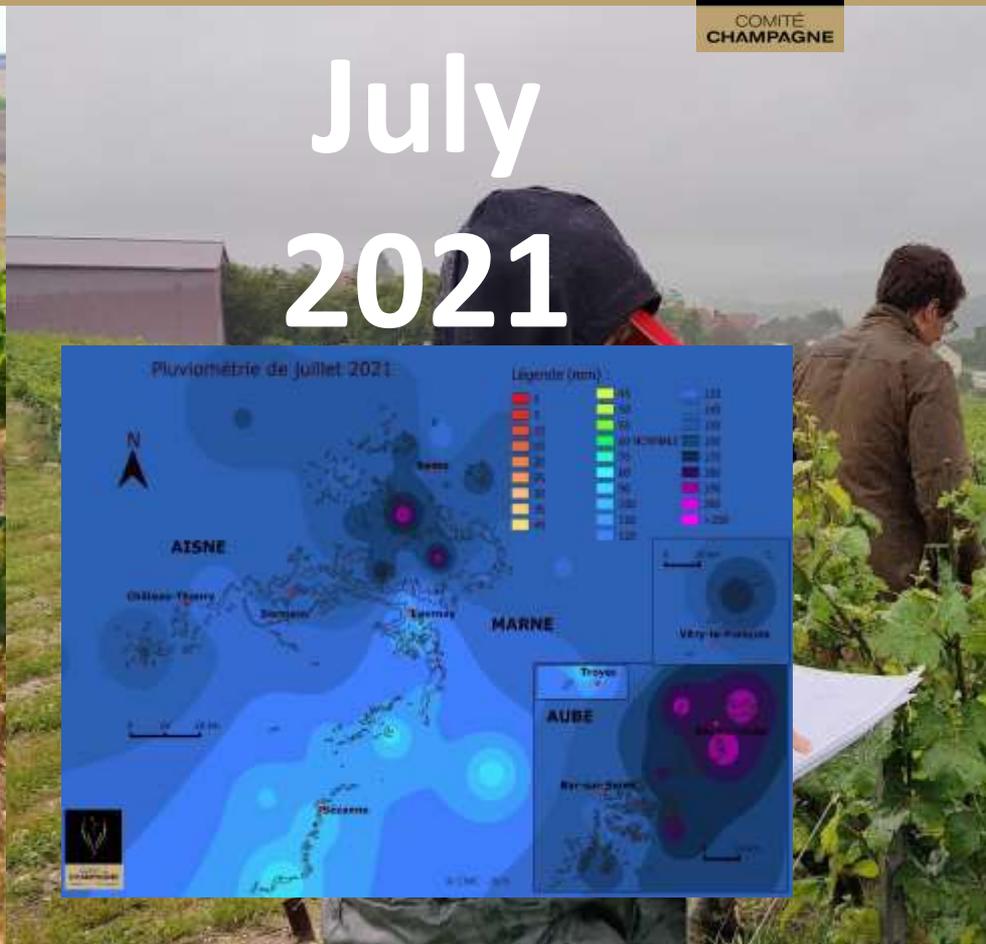
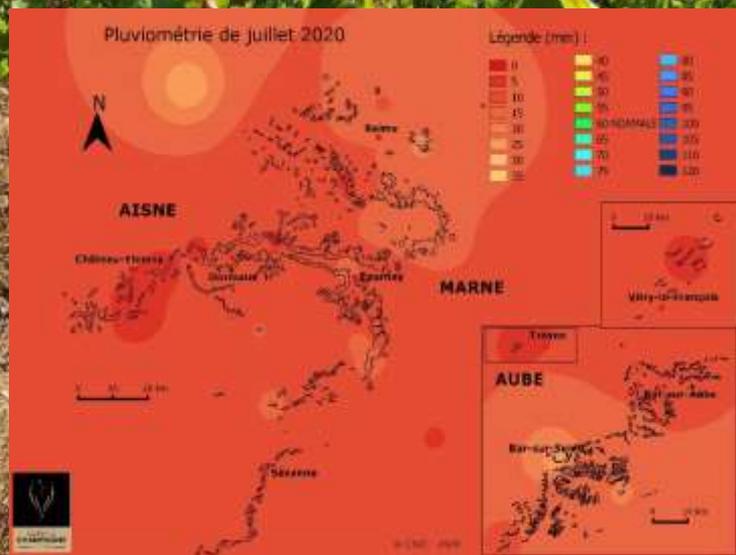


An increase in total rainfall (mm)

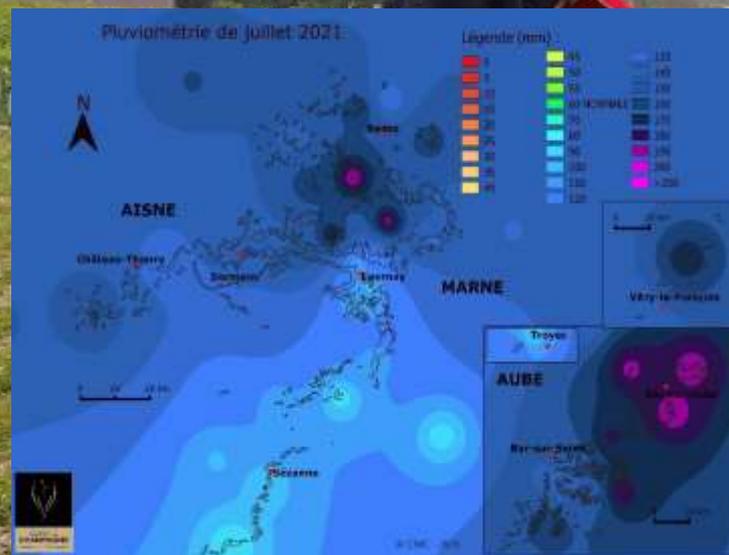




July 2020



July 2021



What about diseases and parasites?



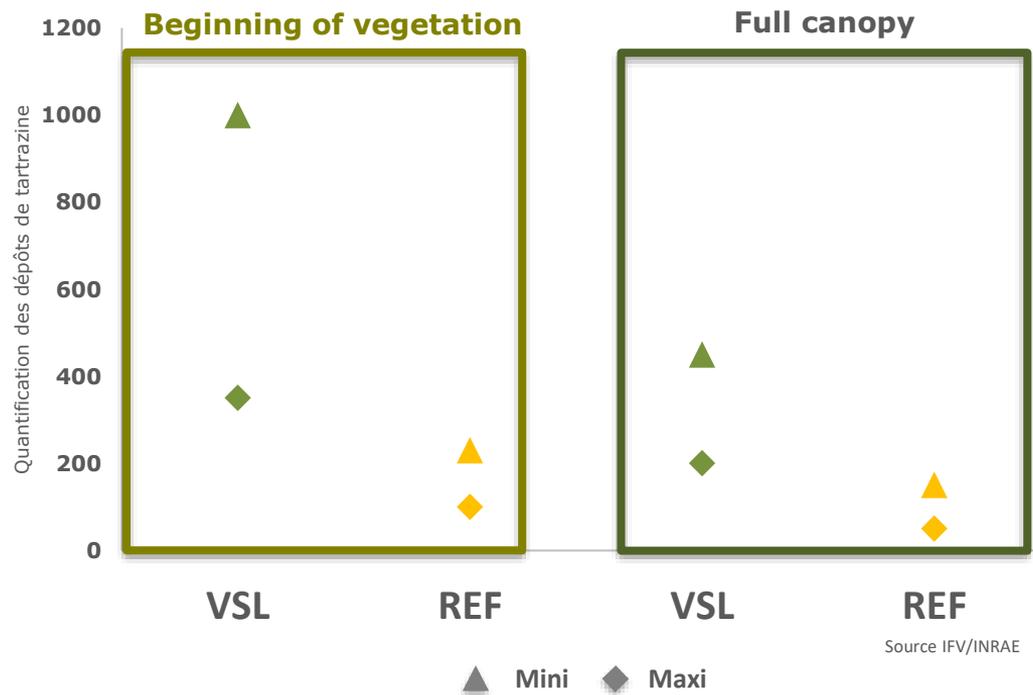
Evolution of diseases and parasites



The solutions: semi-wide vines



Tartrazin deposit on sensors in VSL and REF with Evasprayviti



Source IFV/INRAE

VOLTIS

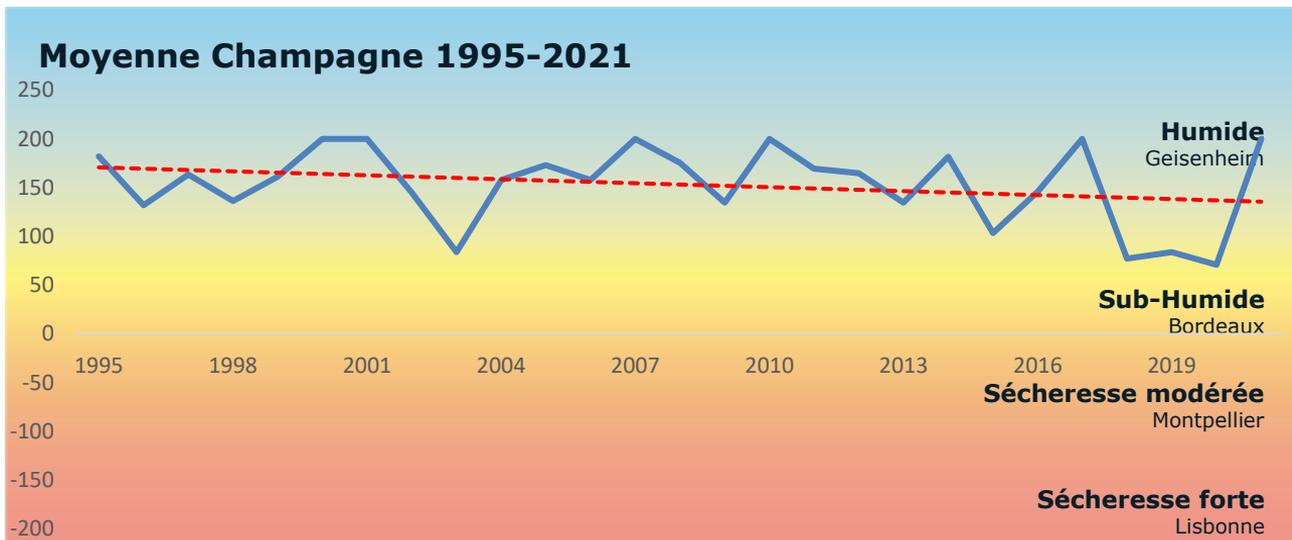
CHARDONNAY

Untreated plot
31/08/2021

What about soil fertility?

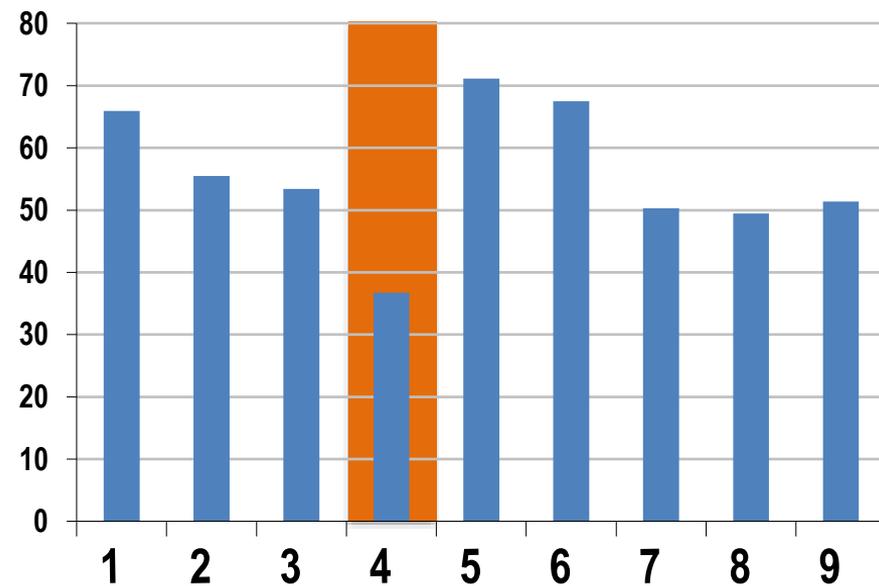


The drought index





Ten-year normal rainfall in mm



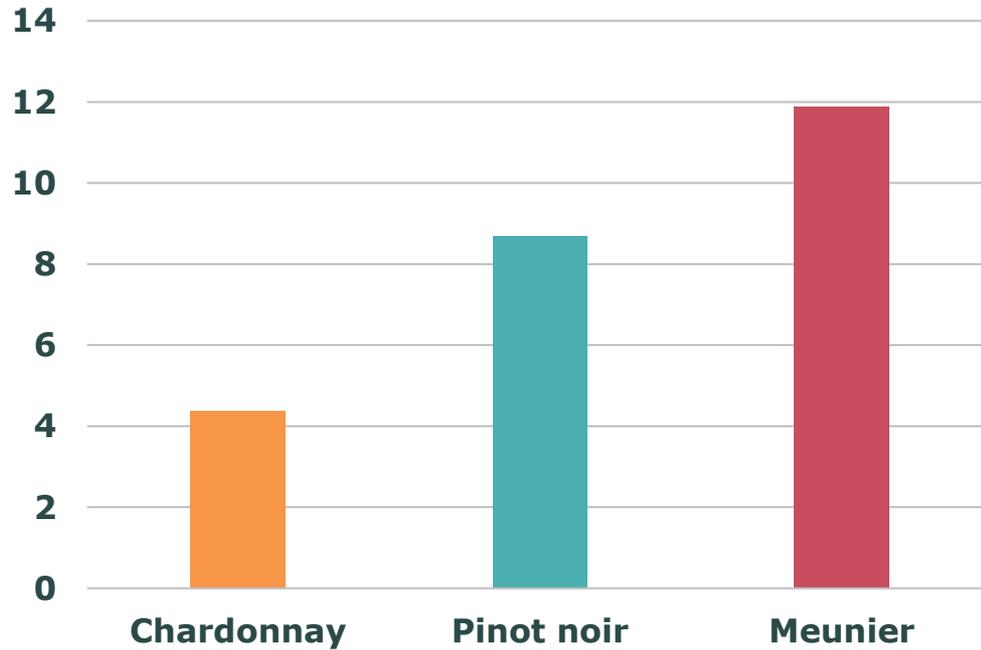
2003
2007
2010
2011
2015
2018
2019
2020



Grapes scalding



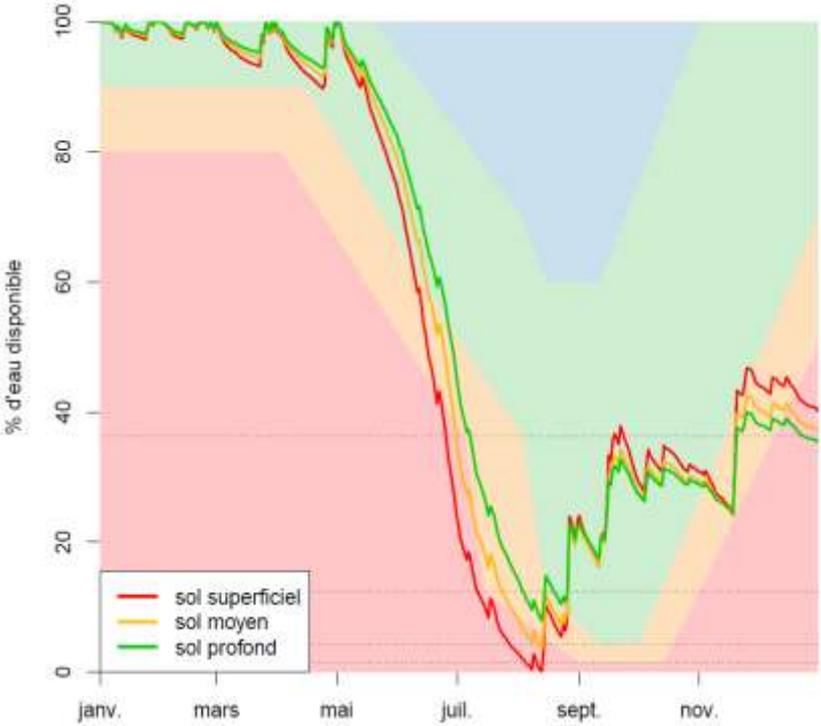
Grapes variety impact



Carte de pilotage de l'enherbement



La météo des sols
VERZENAY (AUTO) 2015



Date	sol superficiel (%)	sol moyen (%)	sol profond (%)
Janv.	95	90	85
Mars	95	90	85
Mai	90	85	80
Juil.	15	20	25
sept.	35	30	25
nov.	40	35	30

A final point on plant material



Plant density and semi wide vine

Composition of the grape berry

Phénology

Plant material

Yield

Disease Resistance

Adaptation to water stress



A final point on plant material



Climate Change

Temperature increase

Drought stress

Spring frost

Plant material

Rootstock

Grapes variety

Clones



**A more efficient metabolism.
A parasitic and diseases evolves.
Significant physiological stress but interesting vintages.
Common sense solutions: plant material.
Global warming is generally positive for Champagne.**

But tomorrow ?

