

IF YOU CAN'T stand the heat...

Soaring temperatures and climate change are threatening to alter the way of life in Champagne, with the very grapes used to make the classic fizz under threat. Producers tell *Giles Fallowfield* how they are coping with the phenomenon

THE CHAMPAGNE economy has faced some major challenges since the dawn of the new millennium. For most of the noughties, keeping up with increasing worldwide demand looked like being the most difficult to address. Revising the appellation to do this, by increasing the area under vine, was never going to be a simple task. But the financial crisis of 2008 and the steep initial drop in demand, followed by a levelling off at around the 300m bottle mark, has made this 'revision' – the Champenois don't like anyone calling it an expansion of the

vineyard – considerably less urgent. It may never happen now. Coronavirus will surely bring consumption down further in the short term, even though we have never needed a glass of cheering fizz more, but the greatest challenge that Champagne has to address is how to adapt to, and in the longer term deal with, climate change. This threatens its very existence, not its short-term consumption. Even if it does succeed, it's highly likely the wine that future generations call Champagne will be different to what we

Feature findings

- > Because of climate change, it's highly likely the wine that future generations call Champagne will be different to what we are currently drinking, possibly radically different, and produced partly or entirely from new grape varieties.
- > The CIVC released a climate change dossier, advising producers to cope with changing conditions.
- > During the 2019 harvest there were three heat spikes, with the temperature reaching 42.9°C in one village in the region.
- > Producers reported that they lost a significant percentage of their grapes from scorching.
- > Some producers have been experimenting with lower-density planting and changing foliage height to counteract the warming climate.

are currently drinking, possibly radically different, and produced partly or entirely from new grape varieties. The Comité Champagne (CIVC), the region's governing body, has been developing new varieties and experimenting with them since 2010. Evidence of the need for change has been mounting: there have been warmer and sunnier summers, with some



climate change

in some Pinot Noir plots as a result of the three summer heatwaves. Florent Nys, chef de cave at Billecart-Salmon, says the sun burned about 20% of the grapes in the two heatwaves of July and August, while Michel Drappier of Champagne Drappier reports that in Urville, in the Côte des Bar, “the excess summer heat combined with the drought, accounted for a 15% crop loss”.

WIDER SPACING

Speaking after the 2019 harvest about how producers need to adapt to heat extrêmes, Charles Philipponnat, CEO of the eponymous house, whose vineyards were also hit by scorching in the hot weather in the run-in to the 2016 harvest, says: “Measures like adopting a higher canopy have already been implemented and may be pushed further, along with wider spaces between rows.”

This latter measure, it seems, has become the preferred option for the vineyard the CIVC is promoting, and to which it gives most prominence in its climate-change review.

Work on this started in 2005, when INAO authorised the plantings of a dozen hectares of more widely spaced vines on an experimental basis in 17 plots in Champagne. This work had environmental aims, such as reducing the number of treatments needed, as well as examining planting density options. In these experimental plots the spacing between rows varied between 1.8m and 2.2m, and the space between the vine stocks, on the row, between 0.9m and 1.2m. Density varied between 4,000 and

extremes of temperature reached – notably during the last two growing seasons; harvests have been starting on average 18 days earlier over the past 30 years; potential alcohol increasing on average by 0.7% volume and total acidity dropping by 1.3g H₂S_o4/l. And although the CIVC also says that average rainfall is unchanged, at 700mm a year, that too has become less predictable. In the summer of 2019, rainfall was below average in June and August, and significantly down in July, when just 15.1mm fell on average,

During the 2019 harvest there were three heat spikes, with the temperature reaching 42.9°C in the Vitryat village of Glannes to the south-east of Châlon in the last week of July, the highest ever recorded in Champagne

compared with the normal monthly average of 57.9mm. There were there were 306.9 sunshine hours, well above the normal average for July of 236.2 hours. (see table, page 25).

DRAMATIC CHANGE

The average temperature has risen by 1.1°C, and while that may not sound that much, the effect of the warming climate on France’s most northerly vineyard, located just south of the 50th parallel, has been dramatic. In 2003, the harvest began on 18 August – before that you had to go back to 1822 to find the previous earliest, when grape picking began on 20 August. Since then we have had four further August harvests starts in 2007, 2011, 2015 and 2018 and a run of other warm vintages. And the 2020 harvest is the earliest ever.

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the Vitryat village of Glannes to the south-east of Châlon in the last week of July, the highest ever recorded in the Champagne region. There were on average 23.13 days when the temperature was above 30°C over the summer in 2019, which is barely less than the 24.69 such days in the summer of 2018, which produced the earliest ever harvest start on record on 17 August.

In response, in June 2019, the CIVC produced a 15-page document, *Climate Change: Adaption in the Champagne Region*, setting this out. It covers a lot of ground, from outlining some of the immediate effects climate change is having on the growing season, through reducing Champagne’s carbon footprint,

developing new grape varieties, adapting viticulture and winemaking, and, more widely, introducing sustainable viticulture. While the Comité recognises the positive effect that warmer summers are having on the general quality of the musts, it also notes the diurnal range in temperatures, seen as helpful in preserving freshness before the harvest, has diminished. This is partly as a result of more August harvests.

Here we are looking mainly at the short- to medium-term changes to viticulture,

some proposed, and others already being introduced, while touching on the longer-term work investigating the performance of ‘suitable’ new varieties (see boxout, page 22). The dossier lists four areas where changes can be made now under the headings ‘soil management’, ‘growing practices’, ‘grape ripening’ and, more controversially, ‘wider-spaced vines’.

Under growing practices, it talks about managing foliage height and density to counteract the warming climate. This is already happening in the vineyard.

Heatwave scorching (échaudage) of the grapes, resulting in some volume loss, has been an issue during several harvests since it came to the fore in the heatwave summer of 2003. Unsurprisingly, given there were three significant heat spikes in June, July and August 2019, this again affected many producers.

Michel Davesne, chef de cave at Deutz, estimates that between 10% and 20% of the crop was lost

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Programme to develop new grape varieties

The Comité Champagne (CIVC) started to actively focus on climate change in 2003 – after the warning shot of Champagne’s earliest and hottest harvest on record had been fired. In the CIVC climate dossier it notes that the warming climate has had a generally beneficial effect on the quality of the musts, which may well continue if global warming is limited to a 2°C rise. But if it rises further, other solutions, such as entirely new grape varieties, may be needed.

Working in conjunction with the Institut Français de la Vigne et du Vin and the Bureau Interprofessionnel des Vins de Bourgogne, in 2010 the CIVC began a project with the French National Institute for Agricultural Research (INRA), specifically under the INRA-ResDur sustainable resistance programme, with in situ evaluation of new varieties that could be included in the French catalogue.

Evaluation of the first series of varieties planted in 2011-12 resulted in four new varieties, two red and two white, being included in the catalogue: Voltis, Floreal, Artaban and Vidoc. Among their attributes, their principal claim to fame is that they are said to be resistant to both downy and powdery mildew so could help the Champenois reduce the frequency of fungicides, insecticides and herbicides (the latter are due to be banned in Champagne by 2025). Selection programmes are also taking place in Alsace, Bordeaux, Cognac, Provence and the Rhône.

A second series is being evaluated, and a third has just been planted and will be observed from 2020 onwards. A number of criteria are used to evaluate the varieties: phenology, agronomic behaviour, yield components, and wine quality, although they have not been selected to create a specific type of wine.

At the same time, in 2014 the CIVC launched a regional programme involving cross-breeding with Pinot Noir, Gouais, Chardonnay, Meunier, Arbane and Petit-Meslier.

As it spells out in the CIVC’s climate-change dossier, there will be a 15-year selection process for the new grape varieties, divided into four stages. While stage one to find those seedlings containing the desired resistance genes is complete, stage two, the intermediate selection that is expected to last six years, evaluating plants in situ in the CIVC’s experimental vineyards and in Burgundy, only started in 2018. During this stage, explains Thibault le Mailloux, the CIVC’s director of communication, 200 plants will be reduced to 15 or 20 potential candidates. He expects the whole process to take at least another 10 years.

Vines that are planted in wider rows are slightly less susceptible to spring frost; grassy strips in between rows are easier to maintain; mechanisation is simpler; and resistance to water shortages is improved

older vines are dug up when they become less productive. But, as the CIVC’s Thibault Le Mailloux explains: “The wider gap could be created by uprooting every other row in still productive vineyards, which would considerably accelerate the changeover.”

There are additional advantages that make the ‘wider-spaced vines’ solution more compelling. One of the main ones is that the wider gap will make it possible for grape growers to use the more basic and cheaper type of vineyard tractor to plough the grasses and herbs growing between the vines. As ploughing is the only obvious solution to controlling the cover crop between rows in the new no-herbicide era that is fast approaching – Champagne is committed to wholly banning herbicides by 2025 – this is particularly important. Currently the only options in the typical gap between rows, which may be no more than 1.5m wide, are horse-drawn ploughs or the tall, specialist ‘enjambeur’-style tractor that straddles the vines. These tractors cost around €200,000 each, which is about five times as much as models used more widely in France’s vineyards, so this development would make mechanical ploughing far more affordable for the smaller-scale grape growers who are in the majority in Champagne.

SAVE MONEY

Le Mailloux also notes that wider rows will also make any necessary spraying easier and more accurate, which will reduce the volume of spraying, saving money and helping to protect the environment, something that is very much in line with Champagne’s viticulture raisonnée goals.

And there is evidence from their trails that acidity in the grapes is preserved for longer in the wider rows, though Le

2020 sees harvesting records smashed in Champagne

This year’s harvest in Champagne smashed all past records for picking dates, with the earliest start date in the region’s history.

Although the first day of picking grapes in the sparkling wine region was authorised as Monday 17 August by the Comité Champagne (CIVC), the harvest actually began on 13 August in the Côte des Bars village of Buxeuil.

This is one of the southernmost villages in the Champagne appellation, close to Les Riceys – Champagne’s largest single cru – and the unusually early harvest start date in this part of the region means that a new record has been set, smashing the previous one by almost a week.

This is the sixth harvest since the millennium that has started in August, and beats the record for the earliest ever start by four whole days – in 2018 the secateurs were out in the Grand Cru of Ambonnay on 17 August.

The first producer to pick in 2020 was Noël Leblond-Lenoir, a grower with 13 hectares of vineyards, mainly planted with Chardonnay and Pinot Noir, though the prodcuer also has some Pinot Blanc.

Officially the dates when picking can start in each of Champagnes 319 crus is decided by the CIVC, but by the process known as derogation, producers can apply to the local INAO office to start picking earlier than the official start date for any village, if the grapes are already ripe.

The harvest in Champagne has begun in August in 2018, 2015, 2011, 2007 and 2003. Before that you have to go back nearly two centuries to find the next earliest start – in 1822 when grape picking began on August 20.

2020 will go down in history as one of the lowest-yielding harvests this century, similar in that regard to the 2003 heatwave vintage.

The CIVC – which strictly regulates the yields of the region – set an unusually low cap on the amount of grapes that can be turned into wine for making Champagne this year. However, it was already a small vintage.

Just ahead of the official harvest start date, the CIVC set a limit of 8,000kg/ha for the entire region, making this year 25% smaller than the 2019 vintage, which itself was down more than 10% on previous recent levels.

As for the quality of the vintage, it has been declared a very high-quality harvest, with hot, dry conditions this year producing unusually concentrated base wines for making Champagne.

And although this year’s ripe bunches have lower levels of acidity than on average in the region, Champagne Mumm’s new cellar master, Laurent Fresnet, told *the drinks business* that there was still a good balance between fruitiness and freshness.

Because the vines will be trained higher, the wood will be further off the ground, making the vines less susceptible to frost at the start of the growing season

Mailloux says this could be partly because of the greater use of cover crops between the rows. Because the vines will be trained higher, the wood will be further off the ground, making the vines less susceptible to frost at the start of the growing season.

Wider rows and the generally less dense planting contemplated will also bring yields per hectare down, which may still potentially be an issue for grape growers, who are paid for their grapes by the kilo. However, in an era where worldwide demand for Champagne is lower, the fact



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that the maximum permitted yields in recent harvests have already been adjusted downwards to a level that could reasonably still be achieved (10,200kg/ha rather than the 13,000kg/ha-plus that could comfortably be reached in more abundant years), makes this less of an issue.

Louis Roederer, one of only four players owning more than 200ha of Champagne vineyards, has had experience of both higher- and lower-density vine planting. Head winemaker Jean-Baptiste Lécaillon explains: “We have been among the first in Champagne to experiment with lower-density plantations; our first trials started in 1980. We moved in that direction taking into account our own experience in California’s Anderson Valley, where we planted in low density, and we wanted to know how such a plantation would work in Champagne. In early 2000 the first conclusion from this trial, supervised by CIVC, was negative, mainly because of too low a density [of planting].”

GOOD EXPERIENCE

But of the new low-density trials run in conjunction with the CIVC, in which Roederer has one of the largest blocks, Lécaillon says: “We had quite a good experience, and we agree with their conclusions. It’s an interesting solution, in certain specific conditions that need to be identified.”

However, for its own replanting programme in the 240ha Roederer Estate, which started in April 2020, the producer of the has adopted a higher, not lower, density of planting. “We’ve now decided to go from the classic 8,300 vines per hectare to 10,000-11,000 vines per hectare in all our replanted vineyards.” Essentially, this is to achieve “a lower yield per vine, while the higher canopy [also adopted] will help cast more shadow on the bunches”.

Lécaillon explains the apparent contradiction between supporting the CIVC trialling of lower-density vineyards and agreeing with the Comité’s conclusions but adopting higher density planting itself: “Louis Roederer is first in

Table A: Temperatures, rainfall and sunshine hours in July and August 2019

Source: Le Vigneron Champenois

Period	Temperature at 2 m (°C)			Rainfall		Hours of sunshine in 10-day period
	Max	Min	Ave	Water levels in mm	Days of rain	
1-10 July 2019	26.8	13.3	20.0	0.0	0	123.8
11-20 July 2019	26.5	13.9	20.2	2.0	2	81.3
21-31 July 2019	30.1	15.7	22.9	13.1	2	101.8
Average (A) July 2019	27.9	14.3	21.1	15.1	4	306.9
Normal (B)* July	26.2	14.2	20.2	57.9	11	236.2
Difference (A-B)	1.6	0.1	0.9	-42.8	-7	70.7
Percentage increase	-	-	-	26%	-	130%
1-10 August 2019	27.6	16.0	21.8	35.1	3	68.8
11-20 August 2019	22.8	12.8	17.8	18.2	7	49.1
21-31 August 2019	29.7	12.6	21.1	0.0	0	123.2
Average (A) August 2019	26.8	13.8	20.3	53.3	10	241.1
Normal (B)* August	25.7	13.2	19.4	58.7	13	225.7
Difference (A-B)	1.1	0.6	0.9	-5.4	-3	15.4
Percentage increase	-	-	-	91%	-	107%
* Average 2009-18						

effect a vigneron, relying on the strong resilience of our chalky soils. Our approach in more Burgundian, in a way. Most of our vineyards are grand cru, mid-slope, with lots of chalk and little topsoil, so not much vigour. We use massal selection of Pinot Noir and Chardonnay based on low vigour, low fertility and small bunches of small berries.”

The producer stopped using herbicides 20 years ago, mechanically tills the soil, does not use any fertilisers apart from biodynamic composts, and 122ha of the estate is certified organic. Lécaillon says: “We tend to favour old vines, with an average of 40-plus years in the Crystal estate vineyards. As a result, yield per vine are already 30% less than you could achieve with other clones and younger vines.” He stresses: “The more vines you have per hectare, the more consistent your yields are from one year to another; they become less dependent on varying weather conditions. There’s an old vigneron’s expression: ‘The fewer vines, the more sunshine and climate in the wine; the more vines, the more freshness and soil’, and it’s true.”

Clearly, the wider spacing will not be suitable for every grower in Champagne, nor for every location. But such spacing would also work well with the other

The area of vineyard being re-planted each year (2017-2019) Source: Comité Champagne

AOC Champagne	Productive area (hectares)	Planted area (hectares)	Area being replanted (hectares)
2017	33,868	34,359	491
2018	33,843	34,272	429
2019	33,829	34,282	453

Note: The difference between the figures for the ‘planted area’ in these three years is accounted for by producers who don’t immediately replant their vineyard in the spring after grubbing up the vines. The CIVC’s technical department actively encourages growers to wait at least one year between grubbing up and planting, for the land to recover. And since 2017, has compensated growers that do so by allowing them to take some wines out of their reserves, 8,000kgs/ha in the two years when this vineyard is not producing any usable grapes (thus they only lose one out of three years, when the parcel is unproductive).

soil management- and growing practices recommended in the CIVC dossier, such as introducing more cover crops and ploughing.

Looking further ahead, wider-spaced vines would also make mechanical harvesting a realistic possibility on the less steep vineyard slopes. The era of pickers coming to the Champagne region each harvest from other European countries may be over.

With the current Covid-19 lockdown measures it is certainly under threat and it seems that enough French pickers aren’t available. This could be a major problem in the approaching 2020 harvest.

In any case, the unpredictability of the harvest’s start has already become one of the big additional headaches that climate warming has brought to Champagne. It’s now far harder to select in advance the best dates to begin picking in each cru. The ripening process used to be more predictable, with the sugars and potential alcohol developing in a steady, linear fashion. With good planning, it was relatively easy to give suitable notice of perhaps a week to the pickers that flood into Champagne to pick the grapes each



Émilien Boutillat, Piper-Heidsieck's chef de cave

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autumn, from countries such as Poland. But the heatwaves experienced over the past decade, and particularly during the past two harvests, have made this much more difficult.

Much more accurate weather forecasting has become critical, not just for calculating picking dates, but also for assessing when to treat against diseases such as botrytis, odium and mildew during the growing season, especially as there is pressure to reduce such treatments as much as possible.

The textbook model of 100 days between flowering and harvest has been out of date for some time. On average it's now dropped to 92 days. But that's not really the issue, it's the unpredictability of the speed of ripening. Le Réseau Matu system, which sees testing taking place at over 450 sites spread over the appellation, shows how fast sugar, and therefore potential alcohol in the grapes, is developing from around mid-August. A normal rate of ripening would see sugars rise by about 1°C per week. When the first readings were taken in 2019, on 19 August, the average sugar levels were already high, with Chardonnay at 5.1% in volume, Pinot Noir 6.4% and Meunier at 5.8%.

SUGAR LEVELS RISING

The arrival of the third heatwave in Champagne in the second half of August (temperatures rose rapidly from around 18 August to reach a peak 10 days later) saw the potential alcohol increase dramatically in just one week. When the second sampling was taken across the appellation on 26 August, it showed sugar levels rising by 2.6% in volume in the case of Chardonnay (to 7.7%), 1.8% for Pinot Noir (to 8.2%); and 1.9% for Meunier (to 7.7%).

“The decision on when to start picking was tricky,” says Alice Paillard, CEO of the eponymous house, “since maturation suddenly increased very quickly in the last four days of August, gaining in some areas more than 2.5 degrees in six days, which is absolutely unheard of. A more normal rate [in Champagne] would be to see sugar advance one degree in a week, while 1.5 degrees is fast.”

To make matters more difficult, grapes showing relatively high potential alcohol

levels of 10 degrees or even slightly higher were still not showing phenolic ripeness. Rodolphe Péters who runs grower producer Pierre Péters in Le Mesnil-sur-Oger notes that “this year there was a disconnection between sugar levels and phenolic ripeness”, and he had to wait to achieve the latter, and keep tasting the grapes. The average potential alcohol level this year in 2019 [from holdings he has in Le Mesnil, Oger, Cramant and Avize] was a high 11.52 degrees.

“We decided the harvest dates not just on the chemical analysis but also as a result of tasting berries,” says Émilien Boutillat, Piper Heidsieck's chef de cave. “In 2019, the perfect ripeness (phenolic and aromatic) was reached with quite a high level of sugar above 10 degrees potential alcohol for Pinot Noir and Meunier and even more for Chardonnay; 10.5 degrees and sometimes 11 degrees. We had to be quite patient to reach the perfect balance between phenolic and aromatic ripeness; sugar and acidity. The

Deciding the exact best time to pick has never been more important to the Champenois

end of August was amazing, in some areas the potential alcohol increased very quickly, rising by 2 degrees or more in just seven days. But this increase in sugar was not linked with the phenolic ripeness, so we had to be careful.”

Lanson's head winemaker, Hervé Dantan, says: “We delayed harvest for a few days in Côte des Blancs, Vitryat and Montagne de Reims to wait for a true phenolic ripeness that was better around 11.0 degrees potential alcohol with a malic acid level under 6g/l.”

Clément Pierlot, head winemaker at Pommery, notes: “This year (2019), there has been a lag between the ‘traditional’ ripeness and ‘phenolic’ ripeness, which is pretty rare up until now in Champagne.



Hervé Dantan, Lanson's head winemaker

We tasted a lot of berries [in the vineyard] this year to catch the moment when vegetal aromas change to fruity aromas. It was a vintage when it was vital for winegrowers to be in the vineyard constantly tasting the grapes.”

So deciding the exact best time to pick has never been more important to the Champenois. The CIVC's climate-change dossier also lists commonsense steps to prevent the grapes from becoming hot. These include picking at the coolest times of day (something mechanical harvesting would facilitate further), not leaving grape bins in the full sun, using light coloured bins – after six hours' exposure to the sun there's a 5°C temperature difference between a white and a red one

– and pressing as quickly as possible.

Of course, there are winemaking options to preserve freshness too, with blocking the malolactic fermentation on part or all of the base wines the most obvious. But there are advances in and changes to viticulture, such as the wider gap between vine rows and adjusting canopy height and density, plus pinpoint weather forecasting are the short-term solution to the warming climate, providing temperatures don't rise by more than 2°C. Beyond that, and Chardonnay, Pinot Noir and Meunier's role in Champagne may have to diminish. **db**