

**International Cool Climate Wine Symposium (ICCWS)  
& WineGB Yield Survey 2020**

**C O N T E N T S**

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## **International Cool Climate Wine Symposium (ICCWS) & WineGB Yield Survey 2020**

### **ICCWS- WineGB Yield Survey 2020 – Introduction**

The 2020 ICCWS-WineGB Yield Survey is the third such survey to be undertaken and follows on from the 2018 and 2019 surveys. The aim of these surveys is to show why ‘grape yields in England and Wales can be significantly lower than comparable wine-producing regions and are also subject to significant temporal and spatial variation’. The cost of the surveys has been funded by the ICCWS surplus, with additional help from WineGB. As this is probably the last survey of this type that will be undertaken, it was decided that it would be sensible to amalgamate the three years to give a more overall picture of grapegrowing in Britain.

The three years in question have each been quite different in their own different ways:

- 2018 was an exceptional year and one in which the highest ever yield in terms of overall bottles produced, 13.11 million bottles and the highest yield per hectare, 45.97 hl-ha, were recorded from 2,138-ha cropping vines.<sup>1</sup> This is almost twice the current 10-year average national yield level of 25.24 hl-ha. Many growers reported above-average bunch weights which contributed to the high yields.
- 2019 was unusual in that whilst the flowering weather wasn’t particularly good, June, July and August saw some exceptionally warm weather, which included the highest temperature ever recorded in Britain of 38.7 °C on July 25<sup>th</sup> in the Cambridge Botanic Garden. However, harvest 2019 was one of the wettest growers could remember and undoubtedly some crops were lost to *Botrytis*. Even so, at 32.24 hl-ha, yields were above 10-year average with a total of 10.48 million bottles being harvested from an estimated 2,438-ha.
- 2020 saw frost in both April and May and as our survey shows, this was cited as the most common cause of crop loss. The other major factor was the relatively low bunch weights which many growers commented on. Whilst this reduced yields, it probably contributed to the higher-than-average sugar levels with some growers achieving natural alcohol levels of 14 per cent and more. The very hot summer pushed crops on and picking both started and finished early. National yields were 23.78 hl-ha from 2,378-ha, just below the 10-year average and the total number of bottles produced was

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<sup>1</sup> Please see Appendix I to understand how the national yield figures are produced.

8.68 million, 34 per cent down on the record breaking 2018, despite the cropping area being 28 per cent larger.

### **ICCWS- WineGB Yield Surveys 2018-2020**<sup>2</sup>

Over the three years of the surveys, a total of 267 vineyards covering 1,464-ha (3,681-acres) have contributed their data. This is approximately 20 per cent of the cropping area for the years concerned. Owing to the conditions of confidentiality under which the surveys were conducted, there is no way of knowing whether the same vineyards contributed every year or whether they were different each year. However, one can safely assume that there was a core of contributors who supplied data each year, thus making the results a reliable snapshot of the vineyard industry in Britain. We do know that the contributing vineyards came from all the regions of Britain that have vineyards in roughly the proportions that vineyards are planted. Whilst we had hoped the response would be higher, we had a lower response rate in 2020, no doubt occasioned by a certain amount of Covid-19 related screen-time fatigue, plus the general surfeit of on-line surveys and questionnaires from which we have all suffered.

<b>Vineyards in Great Britain by Region - 2020 *</b>				
<b>Region</b>	<b>Hectares</b>	<b>% of area</b>	<b>No. of Vyds</b>	<b>Average Size</b>
South East inc London	2,147.29	61.5%	222	9.67
Wessex	400.20	11.5%	101	3.96
East Anglia	353.78	10.1%	108	3.28
South West	292.63	8.4%	176	1.66
Midlands & North	142.10	4.1%	85	1.67
Thames & Chilterns	97.37	2.8%	41	2.37
Wales	50.87	1.5%	31	1.64
Scotland	1.37	0.0%	2	0.69
Channel Isles	5.50	0.2%	3	1.83
	<b>3,491.11</b>	<b>100.0%</b>	<b>769</b>	<b>4.54</b>
<b>*Vineyards of 0.10-ha and over. Regions as defined by WineGB Regional Associations</b>				
<b>Source: UK Vineyards Guide 2020</b>				

<sup>2</sup> Some tables have been produced using data from private yield surveys from 2016 and 2017.

Respondents to the survey provided their data separated into ‘parcels’ i.e. an identifiable block of vineyard planted with one variety-clone-rootstock combination and growers contributed a maximum of five parcels each. Only data supplied by vineyards of 0.10-ha or more<sup>3</sup> and at least in their fourth year after planting i.e. could be considered under normal circumstances to be fully cropping, was used. The varieties for which data was supplied covered the spectrum of varieties being grown in Britain with enough data from fourteen varieties, accounting for over 90 per cent of the British vineyard area, for them to be separately analysed. In addition, for the four major varieties, Chardonnay, Pinot noir, Meunier and Bacchus, which together cover just over 70 per cent of the vineyard area, we were able to produce additional yield data showing how the four major varieties performed in the top 25 per cent, middle 50 per cent and the bottom 25 per cent yielding vineyards.

**Table 2 Vine variety distribution in Great Britain 2020**

<b>Great Britain - Vine Varieties 2020</b>		
<b>Variety</b>	<b>2020 (Estimate)</b>	<b>Percentage</b>
Chardonnay	975.0	28%
Pinot noir	925.0	26%
Bacchus	295.0	8%
Meunier	275.0	8%
Seyval blanc	145.0	4%
Reichensteiner	75.0	2%
Frühburgunder, Blauer	70.0	2%
Solaris	70.0	2%
Rondo (Gm 6494/5)	65.0	2%
Ortega	55.0	2%
Madeleine x Angevine 7672	50.0	1%
Regent	35.0	1%
Pinot blanc	35.0	1%
Pinot gris (Ruländer)	35.0	1%
Müller-Thurgau	30.0	1%
Miscellaneous	365.0	10%
<b>Totals</b>	<b>3,500.0</b>	<b>100%</b>
<b>Source: UK Vineyards Guide</b>		

<sup>3</sup> This is the size which Wine Standards considers ‘commercial’ and which in theory must register with the Vineyard Register within 6 months of planting.

## Yields

**Table 3 2020 yields slightly above ten-year national average**

<b>2020 Harvest</b>					
<b>Vineyards 0.10 ha or larger and 4 years and older</b>	<b>No. of vineyards</b>	<b>Hectares</b>	<b>Average size - ha</b>	<b>Average yield t-ha</b>	<b>Average Hl-ha *</b>
Top yielding 25% of vineyards	20	81.6	4.08	7.63	49.60
Middle yielding 50% of vineyards	41	188.1	4.59	3.55	23.08
Bottom yielding 25% of vineyards	20	43.8	2.19	0.92	5.98
<b>All vineyards 2020</b>	<b>81</b>	<b>314</b>	<b>3.87</b>	<b>4.24</b>	<b>27.30</b>
Note: *65% press extraction per tonne					

The yield in 2020 of all vineyards of 0.10-ha or more and of 4 years or older who submitted data for the survey was 4.24 t-ha (1.72 t-acre). At 65 per cent press-out<sup>4</sup>, this equates to a yield of 27.30 hl-ha, slightly above the ten year (2011-20) average yield of 25.24 hl-ha. Taking a pressing percentage of 65 per cent (6.5 hl-tonne) and multiplying it by the estimated area in production of 2,378-ha (5,876-acres) produces a yield of 8.65 million 75 cl bottles<sup>5</sup>. As can be seen from Table 3, the top performing vineyards yielded well over this at 7.63 t-ha (3.09 t-acre) which equates to 49.60 hl-ha. This was the lowest level of yield of the last five years, 26 per cent down on 2019 and a massive 38 per cent down on the record-breaking 2018 harvest.

**Table 4 Top performing vineyards yield 74% more than the average yield**

<b>All Parcel Data 2016-2020</b>						
<b>Vineyards 0.10 ha or larger and 4 years and older</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>Average 2016-2020</b>
Top yielding 25% of vineyards	8.84	9.57	10.52	9.63	7.63	9.24
Middle yielding 50% of vineyards	4.41	4.12	6.16	5.32	3.55	4.71
Bottom yielding 25% of vineyards	1.36	1.31	1.63	1.77	0.92	1.40
<b>Av. All varieties, all vineyards</b>	<b>4.54</b>	<b>4.68</b>	<b>7.12</b>	<b>5.93</b>	<b>4.24</b>	<b>5.30</b>

<sup>4</sup> 65 per cent press out (650 litres per tonne) is an educated guess and takes into account both still and sparkling wine producers. Still wine producers might achieve nearer 75 per cent, depending on varieties and pressing practices, whereas some sparkling wine producers only produce between 500 and 650 litres per tonne (50-65 per cent) although many will press out the remainder of the juice for use in still wines or other products.

<sup>5</sup> The actual yield for 2020, as recorded by Wine Standards, was a total of 66,107 hl or 8.81 million 75cl bottles.

As has been seen in previous years, the ability of the top performers to produce yields well above the national average has been fairly consistent and over the five years for which we have data and as can be seen in Table 4, it is running at 74 per cent above the ‘all vineyards’ average. As has already been explained, we have no way of knowing whether these are the same vineyards year by year, or whether they are a different set of growers each year. Varieties will also play a part in this data. For the middle 50 per cent, 4.71 t-ha (1.91 t-acre) must be considered marginal and if the grapes were being sold as grapes (as opposed to as wine) would barely be enough to cover the annual cultivation and harvesting costs, let alone produce enough income for a return on capital and a profit. The bottom 25 per cent are producing yields which would indicate they are struggling commercially as viable vineyards. With grapes valued at around £1,850-tonne<sup>6</sup>, an income of under £3,000-ha (£1,200-acre) cannot be sustainable.

**Table 5 Yield performance of the major varieties 2018-20**

2018-20 Vineyards 0.10 ha or larger and 4 years and older	Bacchus			
	Median Parcel Size -Ha	Median Yield tonnes-ha	Mean Yield per tonnes-ha	Median Sugar °ÖE
Top yielding 25% of vineyards	0.68	11.55	11.95	74
Middle yielding 50% of vineyards	0.49	5.54	5.74	75
Bottom yielding 25% of vineyards	0.50	1.00	1.29	70
2018-20 Vineyards 0.10 ha or larger and 4 years and older	Chardonnay			
	Median Parcel Size -Ha	Median Yield tonnes-ha	Mean Yield per tonnes-ha	Median Sugar °ÖE
Top yielding 25% of vineyards	1.10	11.37	13.16	71
Middle yielding 50% of vineyards	1.09	6.56	6.55	75
Bottom yielding 25% of vineyards	0.85	2.40	2.17	73
2018-20 Vineyards 0.10 ha or larger and 4 years and older	Meunier			
	Median Parcel Size -Ha	Median Yield tonnes-ha	Mean Yield per tonnes-ha	Median Sugar °ÖE
Top yielding 25% of vineyards	0.70	11.92	12.49	72
Middle yielding 50% of vineyards	0.58	6.23	6.34	74
Bottom yielding 25% of vineyards	0.90	2.65	2.69	71

<sup>6</sup> This is an educated guess at the value of 1 tonne of grapes, taking an average across all varieties.

**Table 5 - continued**

2018-20 Vineyards 0.10 ha or larger and 4 years and older	Pinot Noir			
	Median Parcel Size -Ha	Median Yield tonnes-ha	Mean Yield per tonnes-ha	Median Sugar °ÖE
Top yielding 25% of vineyards	0.69	10.61	12.33	76
Middle yielding 50% of vineyards	0.67	5.78	5.91	74
Bottom yielding 25% of vineyards	0.95	2.62	2.41	74

**Table 6 Top producers have sustainable vineyards with major varieties**

2018-20 Median yields in tonnes-ha	Bacchus, Chardonnay, Meunier, Pinot noir				
	Bacchus	Chardonnay	Meunier	Pinot noir	Average
Top yielding 25% of vineyards	11.55	11.37	11.92	10.61	11.36
Middle yielding 50% of vineyards	5.54	6.56	6.23	5.78	6.03
Bottom yielding 25% of vineyards	1.00	2.40	2.65	2.62	2.17

Enough data from the four major varieties being grown in Britain, Bacchus, Chardonnay, Meunier, and Pinot noir, over the 3 years of the surveys has been collected to give us some reliable and representative data, something that has never been done before with British-grown grapes (see Table 5).

As can be seen from Table 6, where the results for the four varieties have been amalgamated, the average yields for the top 25 per cent of performers at 11.36 t-ha (4.60 t-acre) is comfortably in the ‘sustainable’ zone. These are vineyards that both cover their costs and produce a return for their owners. But this is only 25 per cent of producers and the other 75 per cent are lagging behind. With the middle 50 per cent averaging 6.03 t-ha (2.44 t-acre), the industry badly needs to learn some lessons from the best producers. Is it the site, the altitude, the orientation, the exposure to wind? Is it the varieties, the clones, maybe even the rootstocks, or is it the vine density, management, or disease control that makes some producers better than others? If growing vines in Britain is to become truly (financially) sustainable, then these questions need answering.

However, one slightly sobering thought is that if all the vineyards currently planted in 2020 (3,750-ha) cropped at the level of the average of the last three years (2018-20), then annual production would be almost 18 million bottles. If they cropped at the 2018 level, the yield would be almost 23 million bottles. With sales running at 7.5 million a year, this is certainly food for thought.

## Regional variability<sup>7</sup>

**Table 7 East-west yield trend clearly shows over five years**

<b>All Parcel Data 2016-2020</b>						
<b>Yields in tonnes-ha</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>Average 2016-2020</b>
East Anglia	6.89	4.35	6.92	6.09	N/A	6.06
South East	4.31	4.61	9.90	6.43	7.08	6.47
Thames and Chilterns	2.59	5.62	N/A	6.83	N/A	5.01
Wessex	2.08	3.44	9.93	5.66	6.61	5.54
South West	3.95	5.82	5.52	5.35	4.01	4.93
<b>All regions</b>	<b>3.96</b>	<b>4.77</b>	<b>8.07</b>	<b>6.07</b>	<b>5.90</b>	<b>5.60</b>

In 2020 we were only able to collect reliable data from three regions, the South East, Wessex and the South West. These three regions account for 81 per cent of the planted area, so give a good guide to Britain as a whole. The data shows the same trend as we have seen before with the eastern half of Britain considerably ahead in yields when compared to the western half. Looking at the data collected over the last 5 years, the east-west trend is very clear. The drier, less-windy eastern and south-eastern parts of Britain deliver better yields than the wetter and windier western half. That is not to say that individual vineyards in the south-west cannot perform well, only those sites need to be chosen with shelter, altitude and exposure in mind.

**Table 8 Yields across the regions in 2020 vary considerably**

<b>2020 Median yield by variety by region</b>	<b>South East</b>	<b>Wessex</b>	<b>South West</b>	<b>Other regions</b>
Bacchus	7.46	4.60	5.35	3.16
Chardonnay	6.87	6.71	2.77	8.44
Meunier	6.00	7.22	3.92	6.20
Pinot Noir	6.30	6.29	2.36	6.00
Mean of major varieties	6.66	6.20	3.60	5.95
Other varieties	5.50	4.72	3.29	5.31
<b>All Varieties Median</b>	<b>6.43</b>	<b>5.91</b>	<b>3.54</b>	<b>5.82</b>

<sup>7</sup> Regions are as defined by WineGB regional vineyard associations.

Yields of the major varieties varied across the country, as they have in previous years, with the South East and Wessex well above the rest of the country.

**Table 9 Sugar levels vary across regions**

<b>2020 Sugar level by region</b>	<b>South East</b>	<b>Wessex</b>	<b>South West</b>	<b>Other</b>
Mean Sugar in °Öe	78.8	73.0	72.6	72.3
Median Sugar in °Öe	78.0	74.0	72.0	72.0
Mode Sugar in °Öe	78.0	75.0	75.0	66.0
Number of parcels	94	28	37	41

The variability of yields across the regions, is also matched by sugar levels. Whether the difference between 78°OE and 72°OE (roughly 0.7% abv) is noticeable in terms of quality is debateable.

### Yields, sugars and acids by variety

**Table 10 Yields vary across the major varieties 2016-20**

<b>Major varieties: 2016-20 in tonnes per hectare</b>						
<b>Variety</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>Median 2016-20</b>
Bacchus	3.07	4.21	5.50	7.14	2.50	<b>4.48</b>
Chardonnay	5.58	4.42	8.67	6.61	6.64	<b>6.38</b>
Madeleine x Angevine 7672	6.05	5.64	6.70	6.44	4.78	<b>5.92</b>
Meunier	5.88	5.24	9.53	6.23	5.61	<b>6.50</b>
Pinot Noir	3.00	4.31	7.93	6.18	4.45	<b>5.17</b>
Reichensteiner	8.36	4.37	16.60	7.50	1.88	<b>7.74</b>
Seyval Blanc	4.58	6.87	9.38	3.36	3.44	<b>5.52</b>
<b>Mean of all varieties</b>	<b>5.22</b>	<b>5.01</b>	<b>9.19</b>	<b>6.21</b>	<b>4.19</b>	<b>5.96</b>

Table 10 shows data for the six most widely grown varieties grown in Britain, plus Madeleine x Angevine 7672, which together account for 77 per cent of all plantings. Purely in terms of yield, Reichensteiner is the most prolific variety and at a median yield of 7.74 t-ha (3.13 t-acre) it is well ahead of all other varieties. Whilst few single varietal wines are made from Reichensteiner, some have been and have been well received. For blending with other varieties, especially if higher-volume, non-traditional sparkling wines are being considered, it might be a more viable option than other, lower-yielding varieties. Chardonnay, Pinot noir and Meunier

are all fairly consistent with an average median yield of 6.02 t-ha (2.44 t-acre), with the lower performance of Pinot noir probably due to the fact that a proportion of this variety is used for still red and rosé wines, whereas most of the Chardonnay and Meunier is used for sparkling wines where higher yields (in a British context) do not have such an impact on final wine quality. The yield for Seyval blanc is (somewhat surprisingly) one of the lower yielding of the major varieties, but it has to be remembered that this variety is now less-often grown in the warmer eastern and south-eastern counties where yields are on average higher, and more likely to be grown in the cooler counties.

**Table 11 Yields are lower across minor varieties 2017-20**

<b>Minor varieties: 2017-20 in tonnes per hectare</b>					
<b>Variety</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>Median</b>
Dornfelder			3.47	6.06	<b>4.77</b>
Ortega			6.53	3.90	<b>5.22</b>
Pinot Gris			2.21	4.47	<b>3.34</b>
Pinot Noir Précoce		6.62	4.32	1.59	<b>4.18</b>
Regent		11.09	4.12	3.25	<b>6.15</b>
Rondo	7.42	7.30	2.66	2.97	<b>5.09</b>
Solaris			2.66	0.70	<b>1.68</b>
Other varieties		4.10	3.35	2.85	<b>3.43</b>
<b>Mean of all varieties</b>	<b>7.42</b>	<b>7.28</b>	<b>3.66</b>	<b>3.22</b>	<b>4.23</b>

Table 11 shows the yield data available for the other most widely grown varieties, which together account for around 10 per cent of the planted area. There are few surprises, although one thing to note is that the three red-only varieties, Dornfelder, Regent and Rondo, have significantly lower yields than the major white varieties. Whether this is due to other factors, such as crop thinning, more rigorous selection at picking or more incidence of *Botrytis* is debateable. Another factor is (again) the regional distribution of some of these varieties. Rondo and Solaris for instance, are less grown in the higher-yielding eastern and south-eastern counties and this may well have impacted on the results.

## Sugars and acids by variety 2018-2020

Table 12

<b>Sugars by variety 2018-20</b> <b>°ÖE</b>	<b>Count of</b> <b>parcels</b>	<b>Mean</b> <b>sugar</b>	<b>Median</b> <b>sugar</b>
Bacchus	58	73.26	73.00
Chardonnay	133	72.98	72.00
Dornfelder	11	68.00	68.00
Madeleine x Angevine 7672	25	71.80	74.00
Meunier	68	71.78	72.00
Ortega	13	79.85	78.00
Pinot Gris	16	76.75	76.50
Pinot Noir	134	74.26	74.00
Pinot Noir Précoce	27	77.41	76.00
Regent	15	70.20	74.00
Reichensteiner	15	75.60	75.00
Rondo	35	72.20	70.00
Seyval Blanc	41	65.22	65.00
Solaris	14	75.86	79.00
*Other varieties	62	73.06	72.00
<b>Overall Mean &amp; Median</b>		<b>73.22</b>	<b>73.23</b>

Table 13

<b>Acids by variety 2018-20</b> <b>g/l as tartaric</b>	<b>Count of</b> <b>parcels</b>	<b>Mean</b> <b>acidity</b>	<b>Median</b> <b>acidity</b>
Bacchus	46	9.04	9.00
Chardonnay	104	12.21	12.00
Dornfelder	8	8.96	8.55
Madeleine x Angevine 7672	15	9.43	9.50
Meunier	53	11.78	12.00
Ortega	12	7.69	7.60
Pinot Gris	11	10.82	10.20
Pinot Noir	101	11.67	11.80
Pinot Noir Précoce	18	8.33	8.10
Regent	9	7.92	7.90
Reichensteiner	10	8.54	8.90
Rondo	15	9.92	9.90
Seyval Blanc	31	11.04	11.00
Solaris	7	7.99	8.50
*Other varieties	39	10.01	10.20
<b>Overall Mean &amp; Median</b>		<b>9.69</b>	<b>9.68</b>

The sugar and acid levels for the three years 2018-20 are fairly consistent with almost all the major varieties averaging 72°OE to 74°OE (around 9% abv) with total acids of the sparkling varieties around 12 g/l as tartaric. The outliers to these figures are Seyval blanc (which is to be expected) with sugar levels of 65°OE, Dornfelder (surprisingly) with sugar levels of 68°OE, and Rondo with 70-72°OE. The lower sugar levels for these two red varieties could be to do with early picking as *Botrytis* moves in. The geographical distribution of varieties is also undoubtedly a factor.

### **Yields and physical factors such as altitude, vine density and row width**

#### **Altitude**

**Table 14 Sites at 60 m to 100 m above sea level deliver the best yields**

<b>Altitude</b>	<b>Average yield 2018</b>	<b>Average yield 2019</b>	<b>Average yield 2020</b>	<b>Average 2018-20</b>	<b>Median yield 2020</b>	<b>Median yield 2019</b>	<b>Median yield 2018</b>	<b>Median 2018-20</b>
Lower than 60m	7.00	6.57	3.69	<b>5.75</b>	3.33	5.76	5.73	<b>4.94</b>
60m-100m	<b>9.69</b>	6.92	5.42	<b>7.34</b>	4.79	6.23	8.33	<b>6.45</b>
Higher than 100m	<b>8.99</b>	4.75	4.67	<b>6.14</b>	3.66	4.00	8.40	<b>5.35</b>

The results for the three years surveyed have been very consistent. Vineyards planted at less than 60 m have lower yields than those planted at either above 100 m, or between 60 m and 100 m. The reasons for this are a combination of sites being more frost prone and with possibly more losses due to disease. Sites above 100 m are clearly more likely to be cooler because of wind and having worse flowering conditions than lower sites. This is not to say that some sites outside the 60-100 m sweet spot cannot be productive and as always it is the exact location of the individual site that matter. Sites between 60 m and 100 m have a crop increase of between 1.10 and 1.51 tonnes-ha over sites outside these parameters, a 25 per cent bonus.

## Vine density

**Table 15 Higher density plantings produce higher yields**

Vines density	Average yield 2018	Average yield 2019	Average yield 2020	Average 2018-20	Median yield 2018	Median yield 2019	Median yield 2020	Median 2018-20
Less than 2,000 vines-ha	4.69	2.59	1.92	<b>3.07</b>	3.00	2.51	1.75	<b>2.42</b>
2,000-3,000 vines-ha	7.39	5.40	3.79	<b>5.53</b>	6.20	5.02	2.89	<b>4.70</b>
3,000-4,000 vines-ha	10.03	6.85	4.68	<b>7.19</b>	9.19	6.38	4.48	<b>6.69</b>
More than 4,000 vines-ha	10.97	6.27	6.11	<b>7.78</b>	10.00	5.94	5.51	<b>7.15</b>

The effect of vine density on yields has been slightly inconsistent in years 2018 and 2019, but the addition of the 2020 data has firmed up the effects. There is a straight-line increase in yields as the vine density increases, with the ‘more than 4,000 vines-ha’ having an advantage of almost 0.50 tonnes-ha over the next density category. Of course, more vines per hectare means more expense in both establishing and running the vineyard, but the additional yield benefit will, on average, be there every year for the 30 or so cropping years of the vineyard. Many vineyards today are being planted at 5,000 vines-ha (2.00 m x 1.00 m) and the difference in yields is proving to be even more marked than lower density plantings.

**Table 16 2.00 m row width is the optimum for the largest yields**

Row width	Average yield 2018	Average yield 2019	Average yield 2020	Average 2018-20	Median yield 2018	Median yield 2019	Median yield 2020	Median yield 2018-20
Below 2.00 m	5.87	5.72	4.51	<b>5.37</b>	5.40	5.00	3.65	<b>4.68</b>
2.00 m - 2.10 m	10.31	6.48	5.39	<b>7.39</b>	10.00	5.59	5.50	<b>7.03</b>
2.20 m - 2.30 m	9.56	6.15	4.86	<b>6.86</b>	8.40	6.02	5.08	<b>6.50</b>
2.40 m - 2.50 m	8.20	6.82	4.00	<b>6.34</b>	7.89	5.70	2.45	<b>5.35</b>
Over 2.60 m	6.51	4.23	5.74	<b>5.49</b>	5.75	3.39	4.20	<b>4.45</b>

Row width is closely allied to vine density, and one follows the other. The data collected over the three years and shown in Table 16, shows convincingly that in vineyards with row width under 2.00 m, yields fall (probably due to shading), but that 2.00 m to 2.10 m (I suspect that most of the vineyards surveyed and falling into this category are probably planted at 2.00 m) produce the highest yields, with just over a 0.50 tonne-ha increase over the next category. At

2.50 m row width, the difference in yields is a very significant 1.68 tonnes-ha. One interesting fact is that the closer the rows, the greater the yield per vine is. Making some educated assumptions, and taking the yields above, vines planted at 2.00 m to 2.10 m have an average yield of 1.44 kg per vine, whereas vines planted at 2.40 m to 2.50 m have a yield of 1.31 kg per vine. A small difference, but with the greater number of vines in the narrower rows, this accounts for the difference in yield of 1.68 tonnes-ha mentioned above. It is my firm belief that closer rows help improve the microclimate in the vineyard and a vine with less access to water and nutrients (as rainfall and nutrients per hectare are the same whatever the row width and vine density) will root more deeply and perform better. Another factor about high-density vineyards is that the death or poor performance of a single vine has less impact upon the yield than in a lower-density vineyard. As vineyards get older and less-productive and as losses due to graft failure and trunk diseases rise, this impact can be quite considerable. Ideally, vineyards need gapping up with new vines whenever one dies, but in practice we know that this is not always done.

### **Sugar and total acidity levels for 2018-20**

**Table 17 Sugar level and altitude 2018-20**

<b>Median level of Sugar (°Oe) by variety by altitude</b>	<b>Lower than 60 m</b>	<b>60 m-100 m</b>	<b>Higher than 100 m</b>
Bacchus	75.00	72.00	72.00
Chardonnay	77.00	72.00	69.50
Meunier	73.50	72.50	70.00
Pinot Noir	76.50	74.00	72.00
Pinot Noir Précoce	73.00	85.50	78.00
Rondo	75.00	70.00	70.00
Seyval Blanc	68.00	63.00	65.00
Other varieties	75.00	76.00	72.00
<b>Mean</b>	<b>74.13</b>	<b>73.13</b>	<b>71.06</b>

The trends shown in 2018 and 2019 where sugar levels fall with increasing altitude were reinforced by the addition of the 2020 data as the table above shows, with the exception of Pinot noir Précoce (Blauer Frühburgunder) which showed the reverse. This is undoubtedly due to the much smaller number of samples of this variety skewing the results. If these results are removed, then the difference between ‘lower than 60 m’ and ‘higher than 100 m’ is around 4.15°OE, a difference of 0.50% abv.

**Table 18      Acidity level and altitude 2018-20**

<b>Median level of acidity in g/l tartaric by variety by altitude</b>	<b>Lower than 60 m</b>	<b>60 m-100 m</b>	<b>Higher than 100 m</b>
Bacchus	8.90	9.20	8.05
Chardonnay	11.80	12.00	12.90
Meunier	11.40	12.20	12.20
Pinot Noir	11.30	11.90	12.90
Pinot Noir Précoce	8.00	7.80	9.60
Rondo	9.60	12.00	9.50
Seyval Blanc	10.00	11.25	11.20
Other varieties	9.50	9.20	8.50
<b>Mean</b>	<b>10.06</b>	<b>10.69</b>	<b>10.61</b>

The differences in total acidity levels between different altitudes is less clear-cut and straightforward, and is generally more mixed. This is undoubtedly caused by the question of whether some varieties are predominantly for still wine or predominantly for sparkling wine. There are also some anomalies caused by small sample numbers.

**Table 19      Sugar level and planting density 2018-20**

<b>Median level of Sugar in °Öe by variety by density</b>	<b>Less than 4,000 vines per ha</b>	<b>More than 4,000 vines per ha</b>
Bacchus	69.50	75.00
Chardonnay	71.00	74.00
Meunier	69.00	74.50
Pinot Noir	73.00	76.00
Pinot Noir Précoce	75.50	77.00
Rondo	74.00	70.00
Seyval Blanc	65.00	65.00
Other varieties	72.00	77.00
<b>Mean</b>	<b>71.13</b>	<b>73.56</b>

The trend seen in the previous two years is again shown in the 2020 results. The table above which amalgamates all three years shows, with the exception of Rondo and Seyval blanc, that as planting density increases, sugar levels rise. If the results of these two relatively minor varieties, which are less widely planted in the major vineyard counties, are removed, then the difference is around 4°OE. Whether this really makes a difference in wine quality is debateable, but one thing is certain: riper grapes ought to make better wine than less-ripe ones.

**Table 20 Acidity level and planting density 2108-20**

<b>Median acidity by variety by density g/l tartaric</b>	<b>Less than 4,000 vines per ha</b>	<b>More than 4,000 vines per ha</b>
Bacchus	9.10	9.00
Chardonnay	12.00	12.00
Meunier	12.20	11.90
Pinot Noir	11.25	12.00
Pinot Noir Précoce	8.00	8.35
Rondo	10.70	8.40
Seyval Blanc	11.00	11.10
Other varieties	9.50	9.00
<b>Mean</b>	<b>10.47</b>	<b>10.22</b>

As with sugar levels, the trend for acid levels is as seen in 2018 and 2019: the higher the planting density, the lower the acids. In some varieties the differences are very slight, and again, wine style plays a part.

### **Crop loss**

In all three years, growers were asked to rank the factors that caused any significant loss of crop. This is the percentage of growers that responded, not the percentage of the crop they lost.

2018

- 45 per cent said ‘Botrytis’
- 44 per cent said ‘Powdery Mildew’
- 40 per cent said ‘Birds’
- 34 per cent said ‘Animals (deer, badgers, rabbits)’
- 19 per cent said ‘Downy Mildew’

2019

- 31 per cent said ‘Botrytis’
- 16 per cent said ‘chicks and hens’ [poor flowering]
- 15 per cent said ‘Frost’
- 15 per cent said ‘Unripe fruit’
- 11 per cent said ‘Birds’

2020

- 52 per cent said ‘Frost’
- 14 per cent said ‘Birds’
- 12 per cent said ‘Botrytis’

- 11 per cent said ‘Powdery Mildew’
- 10 per cent said ‘Extreme weather’

Taking the three years together it is obvious that some of the reasons are very weather dependent. *Botrytis* was a problem in 2018 and 2019, but less of a problem in an early, warmer and drier ripening period, such as we saw in 2020.

### **Summary**

The data collected and analysed over the last five years have given us a valuable insight into the business of growing grapes in Great Britain and suggest why ‘grape yields in England and Wales can be significantly lower than comparable wine-producing regions’ – the original purpose of these surveys. Although the data was not as comprehensive as we would have liked – for which allowances must be made in some areas – it nevertheless showed several significant trends which anyone planting, establishing and managing a vineyard in Britain, should take note of. Sustainability in all its forms is something we all should embrace and support, but it must not be forgotten that sustainability has three legs, economic, environmental and social and without a viable, profitable business, the other two cannot be paid for. Regular yields of a sufficient size to cover the capital employed, the annual management costs, plus something over for a profit, must be the aim.

### **Yields**

Anyone who has been involved with viticulture in Britain even for a few years will know that two things stand out: the low yields relative to other major vinegrowing regions; and the variability of our yields, again, when compared to other mainstream regions. In essence both of these are brought about by the same environmental factor: the British climate which in many parts of our islands (but by no means all) is cooler, wetter and windier than in those regions against whose wines we must compete in the market.

Of course, measuring the profitability of a vineyard, whether it grows grapes for sale or grows them for making into wine which it subsequently sells, is a difficult task. The cost of planting and establishment are incurred in the first two or three years and written off over whatever time period the owner decides over the lifetime of the vines. Likewise, wineries, both buildings and equipment, are built to last for decades and working out an annual charge is a very flexible affair. One other important factor in calculating profitability is the cost of the annual management of the vines, something which in Britain can fluctuate due to several

reasons: economies of scale, vine density, row width, vine variety and availability of equipment and labour, plus of course the weather during the growing season. All of these can make a difference to annual costs.

The final factor in calculating the viability of any grapegrowing or winemaking enterprise is that of returns from sales. Again, this depends on several factors. Are the grapes being sold under contract or sold on the open market; what variety are they and of what quality? For wines, even more factors come into play: where is the wine being made – under contract or in your own winery; are the wines still or sparkling; red white or rosé; what's their style and vintage; what is the quality and reputation of the wines; and are sales direct to consumer or business to business? The options are almost endless and each option shifts the net returns one way or the other. However, the one thing we do know with certainty is that given that almost all of the costs of establishing and running a vineyard are fixed, the higher the yield of the vineyard, the lower is the cost per kilo of grapes and therefore per bottle of wine.

### **Lessons to be learnt from the surveys**

#### **Regions**

With good regional distribution of the data, the east-west trend of reducing yields has shown itself quite clearly. Average yields of all vineyards and all varieties shows that East Anglia and the South East have a 27 per cent yield advantage over the South West. One could argue that higher tourist numbers and more visitor interest in some parts of that region make up for lower yields, but the facts show that as a place to grow grapes, the western half of Britain is at a disadvantage.

#### **Altitude**

The results for the three years surveyed for altitude have been very consistent. Vineyards planted on sites between 60 m and 100 m above sea level have a yield advantage of between 1.10 and 1.51 tonnes-ha over sites outside these parameters, a 25 per cent bonus. Sites over 100 m had lower yields than those below 60 m.

#### **Vine density and row widths**

The data shows quite clearly that a higher density of vines per hectare, i.e. 4,000 vines per hectare and above, and rows of 2.00 m to 2.10 m produce significantly higher yields than sites outside these parameters.

### **Sugar and acidity levels**

Both sugar and acidity levels are negatively influenced by higher altitudes and lower vine densities, something which common sense would suggest leads to lower quality wines.

### **Yields of different varieties**

An analysis of the yields by variety was hampered by the lack of detailed regional data. With the South East region being dominated by the major varieties, it is clear that many of the less widely-planted varieties are to be found in the regions with smaller areas of vines where growing conditions are less favourable. The top yielding variety from all regions was Reichensteiner by a substantial margin over all others of 0.75 tonnes per hectare. The next two best yielding varieties were Meunier and Chardonnay. All variety data should be looked at with wine style and quality in mind. For some wines, still red wines and still Chardonnay for instance, growers may well have reduced yields in order to raise quality.

The minor varieties being grown in Britain had lower yields by quite a large margin: 5.96 tonnes per hectare for the majors and 4.23 tonnes per hectare for the minors. Some of this yield reduction can be accounted for by the fact that some of these minor varieties are mainly to be found in the less-favourable regions. The collection of regional yield data by variety is something that would really help growers in the minor regions.

### **Top performing vineyards**

Another consistent factor shown by the three detailed surveys was the disparity in performance of the top quartile of respondents, compared to the middle fifty percent and the bottom quartile. Taking all vineyards and all varieties, the top 25 per cent of producers (ranked solely by yield) cropped at almost double the level of the next 50 per cent. Taking the four major varieties, Bacchus, Chardonnay, Meunier and Pinot noir, the yields from the top 25 per cent of producers was almost two and a half times as high as the other 75 per cent. These figures show that it is possible to produce economically sustainable yields in vineyards in Britain, although exactly how is for another day.

**Stephen Skelton MW**

Date: 26 October 2021

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**NOTE:** This report has been put together using data collected and analysed independently, and completely anonymously, by Wine Intelligence Ltd. The surveys were undertaken during November and December of the year in question and the anonymous data managed by Luke Spalding from Spalding Consultancy Ltd. Luke is also vineyard manager at Everflyht Vineyard in Ditchling, East Sussex. Both Luke and Peter Hayes AM, Australian viticulturalist and past WineSkills Mentor, have contributed to this report which has been written by Stephen Skelton MW, WineGB Viticulture Working Group Chairman.

## Appendix 1 – National vineyard and yield data 2011-2020

Annual production data from the Wine Standards Branch of the Food Standards Agency 2011-20								
Year	Total Planted Ha	Total Commercial Vineyards Ha	Hobby & abandoned vineyards	Ha. In production	Ha. Not in prod.	% of total not in prod	Total Yield in Hl.	Yield Hl-Ha
2011	1,384			1,208	176	12.72%	22,659	18.76
2012	1,438			1,297	141	9.81%	7,750	5.98
2013	1,884	1,738	146	1,375	363	19.27%	33,385	24.28
2014	1,840	1,691	149	1,506	185	10.05%	47,434	31.50
2015	1,956	1,839	117	1,655	184	9.41%	37,977	22.95
2016	2,077	1,957	120	1,612	345	16.61%	31,116	19.30
2017	2,245	2,125	120	1,677	448	19.96%	39,574	23.60
2018	2,889	2,769	120	2,138	631	21.84%	98,289	45.97
2019	3,300	3,180	120	2,438	742	22.48%	78,607	32.24
2020	3,336	3,380	120	2,378	1002	30.04%	66,107	27.80

**Note: 20018-20 'Ha in production' are industry estimates**

Year	Total No. of Vineyards	Av. Size of Commercial Vineyards	No. of Wineries	% White	% Red	No 75 cl bottles in millions	*Yield T-ha	Yield T-acre
2011	419	3.30	124	79.77%	20.23%	3.02	2.89	1.17
2012	432	2.78	128	71.86%	28.14%	1.03	0.92	0.37
2013	448	3.88	131	72.70%	27.30%	4.45	3.74	1.51
2014	473	3.58	131	80.87%	19.13%	6.32	4.85	1.96
2015	502	3.66	133	83.13%	16.87%	5.06	3.53	1.43
2016	525	3.73	135	85.05%	14.95%	4.15	2.97	1.20
2017	523	4.06	151	85.69%	14.31%	5.28	3.63	1.47
2018	674	4.11	164	85.45%	14.55%	13.11	7.07	2.86
2019			171	86.35%	13.65%	10.48	4.96	2.01
2020			190	85.65%	14.35%	8.68	3.66	1.48

**Note: Yield weights calculated at 650 litres per tonne**

Average yield 2011-20 25.24 hl-ha  
 Average number of 75 cl bottles produced 2011-20 6.16 million  
 Average number of 75 cl bottles produced 2018-20 10.76 million

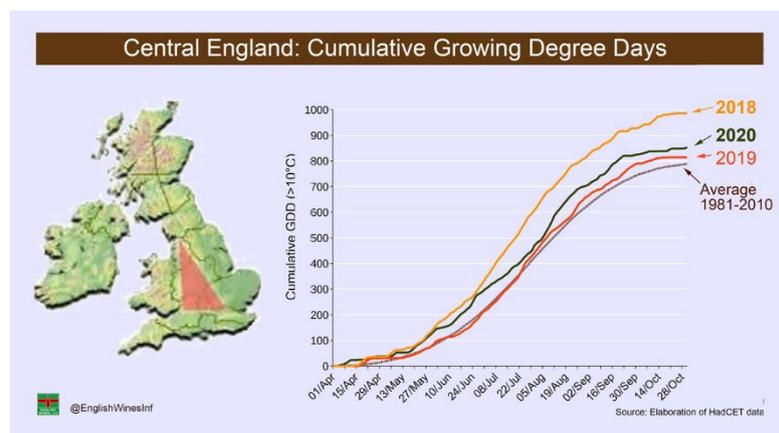
### Note on how national yields are produced

The national hectolitre per hectare yields are produced by Wine Standards from mandatory annual winery production records. These state how many litres of wine are produced from how many hectares, irrespective of the age of the vines or weight of the grapes. Therefore, vineyards that produce low yields in their first two or three years are still recorded. Likewise, there is no allowance made for wineries producing sparkling wine who may only press the cuvée juice and maybe discard any additional juice. It would of course to have Wine Standards record the yields by weight, but that is beyond their remit. Therefore, the national yields are lowered by the inclusion of young, low-cropping vineyards, plus wineries with conservative pressing practices. The yields for the surveys were taken from vines of four years or older.

## Appendix II – Vineyard Harvest Report for Great Britain – 2020

### Summary

A warmer and drier than average spring led to an early bud-burst. Frost damage in mid-May was significant in some vineyards. Flowering took place in good conditions and a warmer than average August brought ripening on quickly. The harvest was one of the earliest of modern times with reduced yields, but exceptionally high natural sugar levels, and some growers picked Chardonnay and Pinot noir with over 14% potential alcohol. Both still and sparkling wines



should be of excellent quality and a total harvest of over 10 m bottles is anticipated. The GDD (Growing Degree Days) for the year were 853, above the LTA of just under 800, but way below the heights of almost 1,000 in 2018.<sup>8</sup>

### Weather conditions for the year

After one of the wettest autumns and winters on record, the early part of 2020 turned out to be quite mild and dry and there was little in the way of ice and snow. A couple of Atlantic storms in early to mid-February, Ciara and Daniel, brought flooding to the north and west of the county, but apart from quite windy conditions, February ended wet but mild and the month was 0.8°C warmer than the 1981-2010 LTA<sup>9</sup>. The warm weather continued into March and as the country went into lockdown, the vines thought otherwise and decided to come out for a very early bud-burst. The first recorded incident of bud-burst on the WineGB 2020 Vineyard Survey<sup>10</sup> was Chardonnay at Wodetone Vineyard near Bridport Dorset on 22 March. This was extremely early, if not the earliest ever recorded. Bud-burst reached its peak between 6 and 18 April. The good weather continued throughout April and May, with 24°C being recorded on 12 May and 27°C on 23 May. Parts of Essex saw no rain for over thirty days. The average

<sup>8</sup> See Appendix III for GDDs from seven regional weather stations.

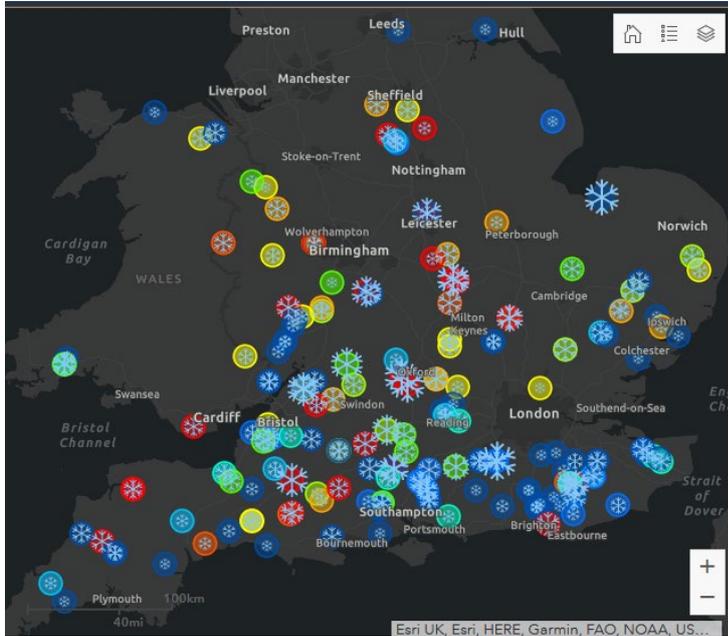
<sup>9</sup> Long Term Average

<sup>10</sup> During 2020, WineGB hosted five 'vineyard surveys' covering bud-burst, frost, flowering, véraison and harvesting. Together, growers entered data on 1,075 separate events. They can be seen here:

<https://mapmanltd.maps.arcgis.com/apps/MapSeries/index.html?appid=17782655c48a469e8fd41a66d275a3e0>

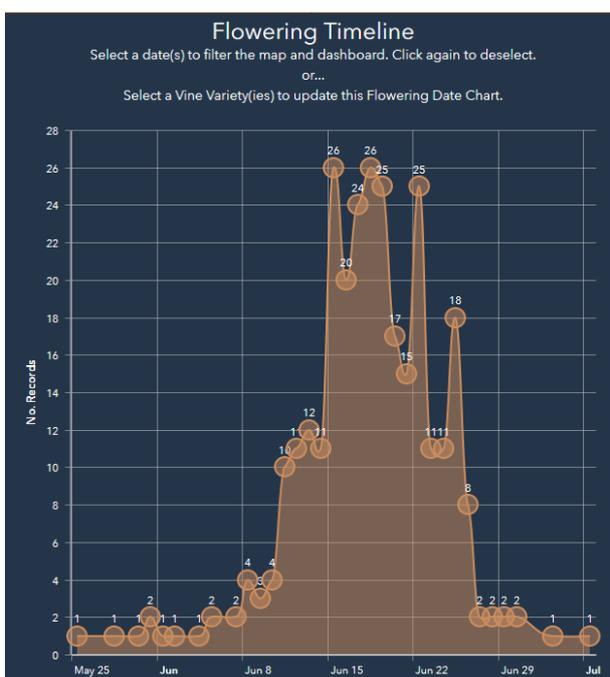
temperature in April in the south of England was 10.9°C, which was 2.1°C above the LTA and with 257 hours of sunshine, it was the sunniest April since 1929.

### Spring frosts



Inevitably the early Spring brought with it the danger of frosts and there were two separate frost periods which hit vineyards in 2020. Between the 1 and 15 April, vineyards in Kent and Surrey were hit with frosts that went down to around -2°C, although one vineyard recorded -4°C. The second, and more serious set of frost events, was between 11 and 15 May when producers across the whole of

Britain recorded 184 separate events with temperatures going down as low as -5.5°C, but most vineyards recording temperatures of -3.0°C or higher. Frost damage is always hard to assess with any accuracy at the time and most reports of (say) ‘fifty per cent damaged’ refer to the percentage of shoots visibly damaged or destroyed. Of the 184 reports for the mid-May events, around thirty-seven per cent said that they had suffered damage of fifty per cent or greater.



Twenty-four growers said it had been a loss of 100%. At Breaky Bottom Vineyard, a vineyard in East Sussex only a few kilometres from the sea and usually completely untroubled by frost (and one I have known and visited often for over 45 years), the frost damage was the worst I have ever seen ever, anywhere.

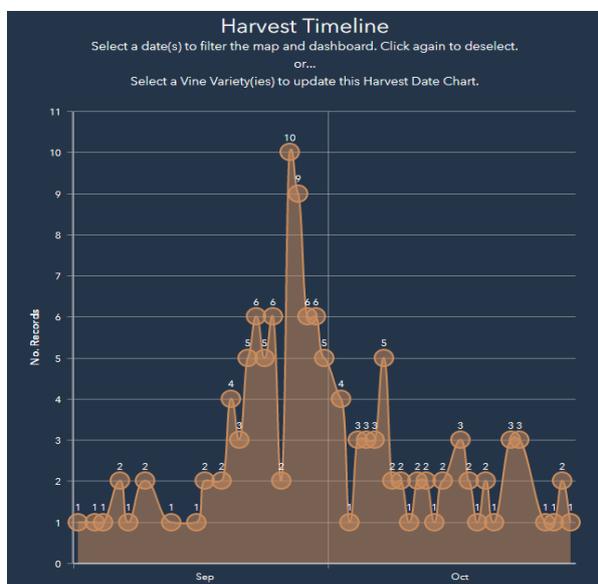
### Flowering took place in good weather

May continued dry and warm with sunshine hours in the month totalling 626 against an LTA of 440. It was one of the driest Mays on

record. There then followed some much-needed rain at the beginning of June, with cooler temperatures, but towards the middle of the month things warmed up again, reaching a peak temperature of 32.6°C between 23 and 25 June with one very unusual ‘tropical night’<sup>11</sup> on 25 June. With the warm spring and early bud-burst, it was inevitable that flowering would start early, and the first recorded flowering was on 25 May, although this may have been an anomaly. The bulk of the flowering across all varieties started on 11 June and continued until 26 June. The peak was between 15 and 22 June with 178 out of 303 flowering events (fifty-nine percent) taking place during this eight-day period.

The summer continued quite changeable with wet and windy periods (during Wimbledon fortnight which of course didn’t happen) but also very hot spells. Between the 30 July and 12 August, the whole of the UK experienced very warm conditions. The temperature at Heathrow reached 37.8°C on 31 July and between 8 and 12 August there was a run of six days with the temperature of 30°C and over (including three over 32°C) and five ‘tropical nights’ in a row, and unheard of occurrence. Night-time temperatures are of course just as important a component in ripening, as warmer nights permit photosynthesis to start earlier in the day and continue longer into the evening, thus increasing sugar production. However, August Bank Holiday reverted to the norm with a daytime temperature of only 18°C! As was to be expected, véraison started early with Bolney recording colour-change on Rondo on 13 July, with most vineyards following on and finished by mid-August.

### Harvest starts and finishes early



With the dryer than average spring and summer, plus the high temperatures in August, most vineyards were fast-tracking towards harvest. As usual, the first out with their buckets was Biddenden Vineyard who started harvesting Ortega on 1 September (not their earliest – that was 28 August 2018) and others soon followed. The harvest took place in largely dry conditions, a marked change from the rain-soaked 2019 affair, and many growers found their crops smaller and their

<sup>11</sup> A ‘tropical night’ is when the night-time temperature is 20°C or more.

grapes riper than they had expected. Henry Laithwaite at Harrow & Hope finished harvesting the last of his Chardonnay on 30 September which must be something of a record. Most vineyards finished picking by mid-October, around 2-3 weeks ahead of normal.

Almost all growers reported higher than average sugar levels, but yields lower than average. Bunch weights were lower than average, a result of the dry summer conditions in most regions and the earliness of the harvest. From very preliminary data, it would seem that yields were down compared to 2018 and 2019, due to the frost and the low bunch weights, but still above the 10-year average of 25.35 hl-ha. My estimate for the 2020 cropping area is 2,738-ha

	2016	2017	2018	2019	2020	Average
Sugar levels °OE	78.40	74.00	75.20	70.60	78.40	75.32
Potential alcohol %	9.80	9.30	9.35	8.80	9.80	9.41
Total acidity as tartaric g/l	11.81	10.36	11.00	11.30	10.00	10.89
Yield t-ha	4.54	5.03	8.44	4.85	4.30	5.43
Yield t-acre	1.84	2.04	3.42	1.96	1.74	2.20

(up from 2,438-ha in 2019) and on the basis of the yields so far recorded, this equates to a total yield of 10.55 million x 75 cl bottles<sup>12</sup>

Year	Total planted hectares	Total cropping hectares	Yield in hl-ha	No 75 cl bottles in m
2011	1,384	1,208	18.76	3.02
2012	1,438	1,297	5.98	1.03
2013	1,884	1,375	24.28	4.45
2014	1,840	1,506	31.50	6.32
2015	1,956	1,655	22.95	5.06
2016	2,077	1,612	19.30	4.15
2017	2,245	1,677	23.60	5.28
2018	2,889	2,138	45.97	13.11
2019	3,300	2,438	32.24	10.48
2020	3,500	2,738	28.90	10.55

**Stephen Skelton MW**

**10 November 2020**

<sup>12</sup> In fact, the official Wine Standards yield was 8.68 million x 75 cl bottles.

### Appendix III

<b>Growing Degree Days 2018-21</b>						
<b>County</b>	<b>Altitude (m)</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>Average</b>
Essex	85	1089	948	987	906	<b>983</b>
East Kent	43	1125	968	1051	940	<b>1021</b>
West Kent	39	1107	949	1037	957	<b>1013</b>
East Sussex	65	1107	950	1059	951	<b>1017</b>
West Sussex	20	1109	887	998	917	<b>978</b>
Hampshire	80	1103	885	959	911	<b>965</b>
Somerset	33	1040	912	969	962	<b>971</b>
<b>Average</b>		<b>1097</b>	<b>928</b>	<b>1009</b>	<b>935</b>	
<b>Source: Data and table supplied by Agrii from weather stations</b>						