International Cool Climate Wine Symposium (ICCWS)
& WineGB Yield Survey 2019

ICCWS- WineGB Yield Survey 2019 – Summary

The 2019 ICCWS-WineGB Yield Survey is the second such survey to be undertaken and follows on from the 2018 survey. 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 both surveys has been funded by the ICCWS surplus, with additional help from WineGB.

This survey should be read with the following taken into account:

- Conditions for vineyard owners and wine producers in 2018 were exceptional, and a largely frost-free spring, followed by excellent flowering conditions, a warm summer and an early harvest, saw the biggest vintage ever in vineyards in Britain, with the equivalent of 13.11 million 75 cl bottles being produced. The results therefore from 2018 were far from average in almost every respect, with very high bunch weights, record sugar levels and yields never before seen.
- 2019 was also, in its own way, an unusual year. An early start was followed by frost in many vineyards and a wetter than normal May. Whilst the weather during flowering wasn't ideal, June, July and August saw some exceptionally warm weather, which included the highest temperature ever recorded in Britain of 38.7 ˚C on July 25th in the Cambridge Botanic Garden. This above average summer, was followed by extremely wet weather in September and October which made picking the relatively large crop very challenging. 2019 was however, an interesting year to compare with 2018.[1]

ICCWS- WineGB Yield Survey 2019

The ICCWS-WineGB Yield Survey, undertaken during November and December 2019, was managed by Luke Spalding from Spalding Consultancy Ltd. Luke is also vineyard manager at Everflyht Vineyard in Ditchling, East Sussex. This report has been put together using data collected and analysed independently, and completely anonymously, by Wine Intelligence Ltd. 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. Please also see separate report by Peter Hayes.

[1] See Appendix I for a complete 2019 Harvest Report.

A total of 118 separate vineyards contributed data to the survey, very slightly up from 2018's 114, but the area of vines covered increased significantly from 464-ha (1,147-acres) to 1,108-ha (2,738-acres). Respondents replied where possible with data separated into 'parcels' i.e. an identifiable piece of vineyard planted with one variety-clone-rootstock combination and growers contributed a maximum of five parcels each. Some of the data had to be discounted where it risked identifying individual vineyards and/or parcels or where tonnage of grapes produced was not given. In order to make the data more reliable, only data supplied by vineyards of 0.10-ha or more[2] and at least in their fourth year after planting i.e. could be considered under normal circumstances to be fully cropping. This reduced the number of vineyards down to 96 and the area from which data could be safely taken down to 749-ha (1,851-acres). This represents 31 per cent of the estimated 2019 cropping area of 2,438-ha (6,024-acres)[3]. Whilst less than we had hoped, it is still a marked improvement on 2018 and makes the reliability of the data better.

Vineyards were well spread across the country, with growers in Kent, West Sussex, East Sussex, Hampshire, Devon, Dorset, Surrey, Wiltshire and Northamptonshire (in that order) supplying the largest area of returns, but with more than twenty additional counties in both England and Wales supplying data. East Anglia, one of Britain's fastest expanding wine regions, only contributed data from five vineyards, two in Essex, and one each in Norfolk, Suffolk and Cambridgeshire. Because of this very low number of respondents, it has not been possible to use their data in all situations to show regional differences because of the possibility of identification. We hope that in 2020, there will be more contributors from this region.

Varieties grown covered the spectrum of varieties being grown in Britain with enough data from fourteen varieties (three more than last year) for them to be separately analysed, with additional data from thirteen other varieties also being recorded. This covered all of the major and significant minor varieties which together account for 95 per cent of vineyards in Britain.

Yields[4]

The median yield in 2019 of all vineyards in the survey of 0.10-ha or more and of 4 years or older was 5.93 t-ha (2.40 t-acre). This was down from 2018's record-breaking 7.12 t-ha (2.88

[2] This is the size which Wine Standards considers 'commercial' and which in theory must register with the Vineyard Register within 6 months of planting.
[3] The 2019 cropping area is estimated as Wine Standards, who collect and compile the official figure, at the time of writing have not yet managed to produce more accurate figures.
[4] In most instances, the median value has been used over the mean (simple average) in order to lessen the influence of outliers in the data.

t-acre) and much closer to the four-year average of 2016-19 of 5.57 t-ha (2.25 t-acre). Taking a pressing percentage of 62.5 per cent[5] (6.25 hl-tonne), which equates to 37.06 hl-ha, and multiplying it by the estimated area in production of 2,438-ha (6,024-acres) – 300-ha more than 2018 as vineyards planted in the last few years come into production – produces a yield of 12.05 million 75 cl bottles. As in previous years, there is a considerable difference in yields between the best performing vineyards and the rest. As can be seen from Table 1, the top 25 per cent of vineyards by yield managed to produce 9.63 t-ha (3.90 t-acre) which is 80 per cent higher than the middle 50 per cent and 381 per cent higher than the bottom 25 per cent.

Table 1 – Yield varies considerably between highest and lowest yielding vineyards

Vineyards 0.10 ha or larger and 4 years and older	No. of vineyards	Hectares	Average size ha	Total yield tonnes	Average yield t-ha	Average yield t-acre
Top yielding 25% of vineyards	24	177.4	7.4	1,708.7	9.63	3.90
Middle yielding 50% of vineyards	48	475.4	9.9	2,542.2	5.35	2.16
Bottom yielding 25% of vineyards	24	96.6	4.0	193.0	2.00	0.81
All vineyards 2019	96	749.4	7.8	4,444.0	5.93	2.40

As can be seen from Table 2, the ability of the top performers to produce yields well above the national average has been fairly consistent over the four years for which we have data and it is running at 73 per cent over the 'all vineyards' average. Of course, because the data is collected and analysed completely anonymously, 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 may also play a part in this data. For the middle 50 per cent, 5.35 t-ha (2.16 t-acre) must be considered marginal and if the grapes were being sold as grapes (as opposed to

Table 2 – Yield differences between vineyards are consistent over time

Yields Tonnes-ha	2016	2017	2018	2019	2016-19 t-ha	2016-19 t-acre
Top 25% of vineyards - all varieties	8.84	9.57	10.52	9.63	9.64	3.90
Middle 50% of vineyards - all varieties	4.41	4.12	6.16	5.35	5.01	2.03
Bottom 25% of vineyards - all varieties	1.36	1.31	1.63	2.00	1.58	0.64
All varieties - all vineyards	4.54	4.68	7.12	5.93	5.57	2.25

[5] 62.5 per cent 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.

as wine) would barely be enough to cover the annual cultivation costs, let alone 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[6], an income of under £3,000-ha (£1,200-acre) cannot be sustainable.

Yields by region[7]

In 2019, we were able to collect yield data from all the major vineyard regions: East Anglia, the South East, Wessex, Thames & Chilterns and the South West. These five regions account for 95 per cent of all vineyards in Britain. As can be seen from Table 3, for 2019 the Thames & Chilterns region had the highest yields with 6.83 t-ha (2.76 t-acre) with the South East coming a close second with 0.40 t-ha less at 6.43 t-ha (2.60 t-acre). The other regions followed behind with diminishing yields. As ever, it must be remembered that the East Anglia and Thames & Chilterns' data for 2019 came from very small numbers, so it is statistically less reliable than for the larger regions. When you consider the results over the past four years, the trend is quite clear with only the South East and East Anglia breaking the 6.00 t-ha barrier with the former at 6.31 t-ha (2.55 t-acre), and the latter close behind at 6.06 t-ha (2.45 t-acre).

Table 3 – Yields vary across the regions

Yields Tonnes-ha	2016	2017	2018	2019	2016-19 t-ha	2016-19 t-acre
East Anglia	6.89	4.35	6.92	6.09	6.06	2.45
South East	4.31	4.61	9.90	6.43	6.31	2.55
Thames and Chilterns	2.59	5.62	N/A	6.83	5.01	2.03
Wessex	2.08	3.44	9.93	5.66	5.28	2.14
South West	3.95	5.82	5.52	5.35	5.16	2.09

Yields by variety[8]

For 2019, yield data taken from all regions and all growers was available for fourteen individual varieties, plus the ever present 'other varieties'[9]. No data in 2019 was available for Pinot blanc (which was available in 2017 and 2018) which is a pity as it is becoming more widely planted. However, it was good to see data available in 2019 for Ortega, Pinot gris and Solaris, all varieties which are now being grown more widely. Table 4 shows that the star performer (as in

[6] This is an educated guess at the value of 1 tonne of grapes, taking an average across all varieties.
[7] Regions are as defined by regional vineyard associations.
[8] Median was chosen over average in many cases in an attempt to reduce the influence of outliers in the data.
[9] See Annex III for a list of 'other varieties'.

2018) was Reichensteiner with 7.50 t-ha (3.04 t-acre), closely followed by Bacchus with 7.14 t-ha (2.89 t-acre). These were followed quite closely by the Champagne trio (Chardonnay, Meunier and Pinot noir – in that order) plus Ortega and Madeleine x Angevine 7672, which were all fairly consistent at between 6.61 t-ha and 6.18 t-ha. Five of these seven varieties are in the top six varieties by planting area[10], showing that yield is a major factor in the decision-making process of choosing varieties. Seyval blanc, the other variety in the top six, had an off year in 2018 (as so often happens with this variety after heavy years – in 2017 and 2018 it cropped at a median yield of 10.31 t-acre or 4.17 t-acre) and in 2019 only produced 3.36 t-ha (1.36 t-acre). None of the other varieties listed managed more than 4.32 t-ha (1.75 t-acre) which cannot be considered an economically sustainable yield.

Table 4 – Reichensteiner and Seyval blanc highest yielding varieties across four years

Yields Tonnes-ha	2016	2017	2018	2019	Average 2016-19	Av. 2016-19 T-acre
Bacchus	3.07	4.21	5.48	7.14	4.98	2.01
Chardonnay	5.58	4.42	8.67	6.61	6.32	2.56
Dornfelder	No data	No data	No data	3.47	3.47	1.40
Madeleine x Angevine 7672	6.05	5.64	6.70	6.44	6.21	2.51
Meunier	5.88	5.24	9.53	6.23	6.72	2.72
Ortega	No data	No data	No data	6.53	6.53	2.64
Pinot gris	No data	No data	No data	2.21	2.21	0.89
Pinot blanc	No data	4.86	7.85	No data	6.36	2.57
Pinot noir	3.00	4.31	7.93	6.18	5.36	2.17
Pinot Noir Précoce	1.81	3.50	6.62	4.32	4.06	1.64
Regent	No data	5.70	11.09	4.12	6.97	2.82
Reichensteiner	8.36	4.37	16.60	7.50	9.21	3.73
Rondo	No data	9.24	7.30	2.66	6.40	2.59
Seyval blanc	6.40	11.24	9.38	3.36	7.60	3.07
Solaris	No data	No data	No data	2.66	2.66	1.08
Other varieties*	4.26	3.68	4.10	3.35	3.85	1.56
Average of all varieties	4.93	5.53	8.44	4.85	5.56	2.25

Looking at the varieties over the last four years, as might be expected, Reichensteiner and Seyval blanc top the list, with the other major varieties following a few steps behind. Regent made a surprise entry at number three, but this is only from three year's data and 2018's data is less than totally reliable. Apart from Bacchus, all the top seven varieties by planting

[10] Wine Standards figures from 2018. These are based upon 2017 data, since when the planted area has risen from 2,328-ha to near to 3,300-ha. The varietal percentages have undoubtedly changed since then.

(accounting for around 85 per cent of plantings) have averaged over 6.32 t-ha (2.56 t-acre) across the four years. However, 2018 and 2019 were amongst the largest yielding years in the last two decades, so unless this is the 'new normal' one needs to consider these yields with this in mind.

Taking the three Champagne varieties as a group (Table 5), which today probably account for around sixty-five per cent of all plantings (although not yet of production), they are all fairly consistent at an average of 6.13 t-ha (2.48 t-acre). Given the price level of most sparkling wines and the increasing number of good red, white, and rosé still wines made from these varieties, these yield levels are probably tolerable and maybe even profitable. Of course, it maybe that some of the low yields have been brought about by growers thinning some varieties down in order to achieve better ripeness levels for still wines: Pinot noir or Pinot gris perhaps? We will be asking this question in the 2020 survey.

Table 5 – Pinot noir is lowest yielding Champagne variety

Yields 2016-19	2016	2017	2018	2019	Av. 2016-19 T-ha	Av. 2016-19 T-acre
Chardonnay	5.58	4.42	8.67	6.61	6.32	2.56
Meunier	5.88	5.24	9.53	6.23	6.72	2.72
Pinot noir	3.00	4.31	7.93	6.18	5.36	2.17
Average of varieties listed	4.82	4.66	8.71	6.34	6.13	2.48

Yields by variety by region

In 2019, we were able to collect sufficient varietal yield data from all the major vineyard regions: East Anglia, the South East, Wessex, Thames & Chilterns and the South West, plus 'other regions' i.e. Wales and Mercia. The five named regions account for 95 per cent of all vineyards in Britain. The four named varieties are the most widely planted ones, Chardonnay, Pinot noir, Meunier[11] and Bacchus, which together account for over 70 per cent of the planted area. As can be seen from Tables 6 and 7, the Thames & Chilterns had a year with the highest Chardonnay and Meunier yields out of all five named regions. However, this was mainly down to some growers whose yields were over 10 t-ha (4 t-acre) which lifted this region's overall performance of all varieties to top spot with 6.83 t-ha (2.76 t-acre). However, this just shows

[11] Except for Meunier in East Anglia where data was not available.

that data from the smaller regions is less reliable owing to the smaller number of parcels from which data was taken.

Table 6 - Wessex leads the way with Champagne varieties in 2019

2019: Median yield by variety by region	South East	Wessex	South West
Chardonnay	6.61	6.87	3.13
Pinot Noir	6.18	7.19	2.21
Meunier	6.00	6.81	3.14
Mean of above varieties t-ha	6.26	6.96	2.83
Mean of above varieties t-a	2.53	2.82	1.14

Table 7 - Bacchus and 'other varieies' do better in the South East

2019: Median yield by variety by region	South East	Wessex	South West
Bacchus	7.60	5.53	7.69
Other varieties	5.94	3.30	2.39
Mean of above varieties t-ha	6.77	4.41	5.04
Mean of above varieties t-a	2.74	1.79	2.04

Altitude and yield

The commonly held view is that the higher above sea level vines are grown in Britain, the cooler and more exposed it is and therefore the lower the yields will be. In 2018, the first year this data was collected, we saw that in fact, the altitude sweet spot for vineyards with regard to yields was 60 m -100 m and this again appeared to be the case in 2019, although the differences were more marginal. Taking the two years together, we can see from Table 8 that there are quite significant yield differences between the three altitude levels, with the '60 m -100 m' level having significantly higher yields than the other two categories. It will be interesting to see if this trend continues in future years. The reason for lower altitude vineyards having lower yields is possibly because of a combination of frost damage and disease pressures, both being worse in more sheltered sites.

Table 8 – Highest yields in 2018 and 2019 were between 60 m and 100 m above sea level

Altitude	No. of parcels in 2019	Average yield 2018	Average yield 2019	Median yield 2018	Median yield 2019	Mean of Av. yields 2018-19	Mean of Med. yields 2018-19
Lower than 60m	92	7.00	6.57	5.73	5.76	6.79	5.75
60m-100m	109	9.69	6.92	8.33	6.23	8.31	7.28
Higher than 100m	59	8.99	4.75	8.40	4.00	6.87	6.20
Total no. of parcels	260						

Yield and vine density

As in 2018, the 2019 yield returns based upon vine density showed the effect of vine numbers per hectare upon yield, although the differences between the two highest density categories were reversed by 0.44 t-ha which seems somewhat perverse given the 2018 results. Taking the figures over two years however, the impact of vine density upon yield is quite clear, especially between the 2,000-3,000 and the 3,000-4,000 categories where the difference is 2.18 t-ha (0.88 t-acre). Between the 3,000-4,000 and the 'over 4,000' categories, the two-year difference is minimal. More data is required to verify these trends. It would be interesting to break down the density categories even more to see if there is an optimum density for British vineyards.

Table 9 – 2018 and 2019 data show higher density planting produces higher yields

Vines density recoded (parcel level)	No. of parcels in 2019	Average yield 2018	Average yield 2019	Median yield 2018	Median yield 2019	Mean of Av. yields 2018-19	Mean of Med. yields 2018-19
Less than 2,000 vines per ha	13	4.69	2.59	3.00	2.51	3.64	2.76
2,000-3,000 vines per ha	58	7.39	5.40	6.20	5.02	6.40	5.61
3,000-4,000 vines per ha	106	10.03	6.85	9.19	6.38	8.44	7.79
More than 4,000 vines per ha	82	10.97	6.27	10.00	5.94	8.62	7.97
Total number of parcels	259						

Yield and row width

Row width of course, given the same intervine planting distance, is a key factor in vine density, so it is not surprising that the data shows (Table 10), with one slight anomaly, that as row width increases, yield falls. The anomaly is the 'Below 2.00 m' figure which shows, as it did in 2018, that despite narrower rows, the yields reduce. Given the fact that there is the same consistency in both years, there must be an underlying reason for these results which needs investigation. Apart from this, the rest of the data shows very conclusively the impact of row width upon yield. The 'sweet spot', is again the 2.00-2.10 m row width with an almost regular progression

of lowering yields as rows get wider. For every 0.30 m of row width increase, yields lower by around 0.50 t-ha.

Table 10 - For every 0.30 m of row width increase, yields lower by around 0.50 t-ha

Row width recoded	No. of parcels in 2019	Average yield 2019	Average yield 2018	Median yield 2019	Median yield 2018	Mean of Av. yields 2018-19	Mean of Med. yields 2018-19
Below 2.00 m	39	5.72	5.87	5.00	5.40	5.80	5.20
2.00 m - 2.10 m	72	6.48	10.31	5.59	10.00	8.39	7.79
2.20 m - 2.30 m	98	6.15	9.56	6.02	8.40	7.85	7.21
2.40 m - 2.50 m	47	6.82	8.20	5.70	7.89	7.51	6.80
Over 2.60 m	20	4.23	6.51	3.39	5.75	5.37	4.57
Total number of parcels	276						

Sugar levels – by variety[12]

In marked contrast to 2018, sugar levels across most varieties were well down in 2019. As can be seen on Table 11, the all-varieties average was 70.6˚ÖE (9.30% potential alcohol), compared to 75.2˚ÖE (10.00% potential alcohol) in 2018. Biggest fallers were Regent with 14.5˚ÖE less, Chardonnay with 11˚ÖE less, and Pinot noir with 9.0˚ÖE less. Almost all other varieties were between 5.5˚ÖE and 8˚ÖE less. However, there were two varieties, both early reds, which bucked the trend and had higher sugars in 2019: Pinot noir Précoce and Rondo, both with 6.0˚ÖE more. This is probably because, as early ripening varieties, they were able to get into their sugar-producing phase before the poor September and October weather set in. It is also good to note that in 2019 we were able to collect sugar (and acid) results from fourteen varieties, four more than in 2018. What these reduced sugar levels (and increased acidity levels – see below) mean for winemakers and wine quality is open to debate. Less ripe grapes ought, according to conventional wine-wisdom, result in lower quality wines. For still wines this rule probably holds good as fruit flavours will naturally be better in riper grapes, and higher alcohols generally result in a better mouthfeel in the wines. Still wines from high(er) natural alcohol years such as 2003, 2009, 2014, and 2018 have generally been better than from lower natural alcohol years. But for sparkling wines, it is acidity that is important for both flavour retention and longevity. Thus, the sparkling wines from higher acid years such as 2010, 2013 and 2015 (and in time, probably 2019) especially from Chardonnay-based *blanc de blanc* wines, seem to

[12] For the conversion of ˚ÖE to % ABV, I have taken the WS official enrichment charts as a guide. Other guides to sugar to alcohol conversions will possibly have slightly different figures.

show better than from the riper, lower acid years. As always, it is worth noting the number of parcels from which the data was derived and obviously, the data from the small parcel numbers is likely to be less reliable than from the major varieties with many more parcels[13].

Table 11 – Sugar levels in 2019 on average 5°ÖE less than in 2018

Parcel variety recoded	Count of parcels in 2019	Median sugar level 2018	Median sugar level 2019
Bacchus	27	76.0	68.0
Chardonnay	59	78.0	67.0
Dornfelder	5		63.0
Madeleine x Angevine 7672	9	75.5	70.0
Meunier	35	75.0	68.0
Ortega	6		76.0
Pinot gris	8		74.0
Pinot noir	62	78.0	69.0
Pinot noir Précoce	10	73.5	79.5
Regent	6	78.0	63.5
Reichensteiner	7	75.0	76.0
Rondo	14	69.0	75.0
Seyval Blanc	17	70.0	62.0
Solaris	5		78.0
Other	23	79.0	70.0
Mean of all Varieties		75.2	70.6
Total number of parcels	293		

Sugar levels by county

Table 12: Sugar levels across different counties in south and south-east of England

	Kent	Surrey	East Sussex	West Sussex	Hampshire	Dorset
Bacchus	67.2	N/A	65.0	69.7	72.5	N/A
Chardonnay	68.4	63.0	68.0	66.8	69.1	67.0
Meunier	69.8	67.5	69.0	65.1	67.2	65.0
Pinot Noir	69.7	68.7	70.1	69.7	72.4	65.5
Average sugar levels	68.8	66.4	68.0	67.8	70.3	65.8

[13] We need at least 30 samples for each parameter for the data to be statistically reliable.

Differences in sugar levels for the four most widely grown varieties and across the counties with the most vineyards are shown in Table 12. Sugar levels are of course affected by a number of factors, wine style and yield levels probably being the most significant. The variation across both varieties and counties was actually quite small and probably not significant.

Acidity levels – by variety[14]

Table 13 – Levels of acidity were very similar in 2018 and 2019

Parcel variety recoded	Count of parcels in 2019	Average acidity level 2018 g/l tartaric	Average acidity level 2019 g/l tartaric
Bacchus	23	9.30	9.09
Chardonnay	44	11.73	13.09
Dornfelder	4		9.98
Madeleine x Angevine 7672	5	9.46	9.24
Meunier	30	11.79	12.30
Ortega	5		7.48
Other	17	9.25	10.01
Pinot gris	5		11.30
Pinot noir	47	11.83	12.20
Pinot noir Précoce	7	8.60	8.30
Regent	4		8.80
Reichensteiner	4	8.80	8.80
Rondo	7	9.12	10.04
Seyval Blanc	14	11.00	11.62
Solaris	2		8.30
Mean of all Varieties		10.09	10.04
Total number of parcels	218		

Average acidity levels for 2019 for all varieties (Table 13) were broadly similar to 2018's with only a 0.05 g/l average difference between the two years. For individual named varieties, Rondo showed a difference (0.93 g/l higher) which for a red is significant and Chardonnay was

[14] All acidity levels are expressed in grammes per litre of total acidity as tartaric. For followers of the French inspired g/l as sulphuric acid method, multiply by 0.65.

1.37 g/l higher, reflecting the vintage and the fact that it's a late-ripening variety. Apart from Rondo, which was probably picked earlier than ideally winemakers wanted in order to get it in before *botrytis* did too much damage, the adage that winemakers prefer to pick when the acid levels are right for the type and style holds good, rather than waiting for the sugar levels to rise.

Sugar and acid levels – by altitude

As in 2018, the effect of altitude on sugar levels (Table 14) is mixed, although for all but one variety (Pinot noir Précoce), there is a reduction in sugar level as you climb in altitude (which is what you would expect). Taking all varieties, the difference is 3.9˚ÖE, a difference of around 0.60 per cent alcohol by volume (abv). For individual varieties, some of the differences were more marked. Surprisingly, the three Champagne varieties, considered harder to ripen than Bacchus, show very little difference between lower and higher altitudes. Bacchus itself also showed only 1˚ÖE difference between '60 m and lower' and 'higher than 100 m'. The two biggest differences were for Rondo and Seyval blanc which were 11˚ÖE and 12˚ÖE lower respectively (a difference of around 1.40 per cent abv). Will this result in lower quality wines?

Table 14 – Sugar levels by altitude

Median level of Sugar (°Oe) by variety by altitude	Lower than 60m	60m-100m	Higher than 100m
Bacchus	69.0	67.5	68.0
Chardonnay	68.5	67.5	65.0
Meunier	68.0	69.0	67.0
Pinot noir	68.5	69.5	66.0
Pinot noir Précoce	75.0	85.0	82.0
Rondo	81.0	72.5	70.0
Seyval Blanc	68.0	62.0	56.0
Other varieties	72.0	72.0	65.0
Mean of all varieties	71.3	70.6	67.4

As for acid levels (Table 15), the differences were very marginal and over all varieties, the difference was 0.41 g/l total acidity as tartaric. Perversely, Bacchus and Chardonnay had lower acid levels at higher altitudes (although by very small amounts), but all the others had the expected results: lower acid levels at lower altitudes. Meunier and Pinot noir had the greatest

differences in acid levels: 1.00 g/l and 1.20 g/l respectively. What impact these lower sugars and higher acids have upon wine quality is arguable, except to say that most winemakers would prefer to work with riper grapes than less ripe grapes.

Table 15 – Acid levels by altitude

Median level of acidity by variety by altitude g/l Tartaric	Lower than 60m	60m-100m	Higher than 100m
Bacchus	9.90	9.10	9.10
Chardonnay	12.90	12.85	12.85
Meunier	11.70	12.70	12.70
Pinot noir	11.60	12.80	12.80
Pinot noir Précoce	7.80	8.15	8.15
Rondo	10.30	10.70	10.70
Seyval Blanc	10.20	11.50	11.50
Other varieties	10.00	9.90	9.90
Mean of all varieties	10.55	10.96	10.96

Sugar and acid levels – by density of planting

The differences in sugar levels (Table 16) between vineyards with 4,000 vines-ha and more and those with less than 4,000 vines-ha were mixed Only two varieties – Dornfelder and Rondo – showed significantly higher sugar levels at higher planting densities by 3.00˚ÖE and 8.00˚ÖE respectively, and three varieties – Pinot nor, Pinot noir Précoce, and Seyval blanc – showed slightly lower levels of sugar at higher densities. Looked at across all varieties, the difference in sugar levels was a very marginal 0.80˚ÖE.

For acidity levels (Table 17), the differences in acidity by density of planting were also fairly marginal, some named varieties showing positive results at higher densities – Bacchus, Chardonnay, Meunier, Seyval blanc and Rondo – and two named varieties – Pinot noir and Pinot noir Précoce – showed the opposite, higher acid levels at denser planting rates. Over all varieties the differences were positive in favour of denser plantings, although only by 0.60 g/l. However, the data for Rondo was based upon very low parcel numbers and therefore cannot be considered as reliable as for other varieties. If the Rondo figures are excluded, then there is statistically no difference for sugar and acid levels for density of planting. In 2018, the

differences between sugar and acid levels by density of planting were also low and not statistically significant, leading to the conclusion that winemakers tend to leave their grapes to achieve the desired level of sugar and/or acidity, then start to harvest.

Table 16 – Sugar levels by planting density

Median level of Sugar (°Oe) by variety by planting density	Less than 4,000 vines per ha	More than 4,000 vines per ha
Bacchus	68.0	68.0
Chardonnay	67.0	68.0
Dornfelder	62.0	65.0
Meunier	68.5	69.0
Pinot noir	70.0	68.0
Pinot noir Précoce	80.5	79.5
Rondo	74.5	82.5
Seyval blanc	62.0	60.0
Other varieties	73.0	73.0
Mean	69.5	70.3

Table 17 – Acidity levels by planting density

Median level of acidity by variety by planting density g/l tartaric	Less than 4,000 vines per ha	More than 4,000 vines per ha
Bacchus	9.20	9.00
Chardonnay	12.90	12.85
Meunier	12.70	12.40
Pinot noir	12.05	12.30
Pinot noir Précoce	7.80	9.20
Rondo	10.70	5.80
Seyval blanc	12.45	11.00
Other varieties	9.70	10.20
Mean	10.94	10.34
Note: Rondo data based on very low parcel numbers so is less reliable than other varieties.		

Bunch weights

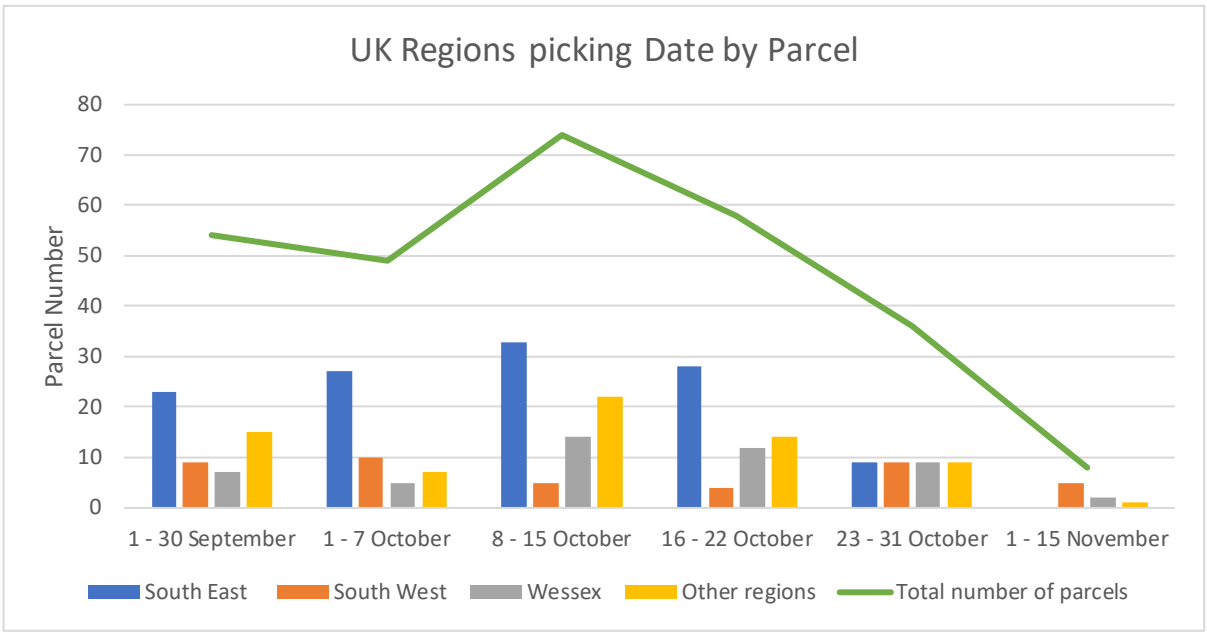
When it comes to yield estimating, bunch weights are a crucial part of the equation. The last two years, 2018 and 2019, have seen what many experienced growers thought were much larger than average bunch weights and contributed to the very large under-estimation of the yield, especially in 2018. We intend to gather bunch weights in future years so that growers can see how vintages differ.

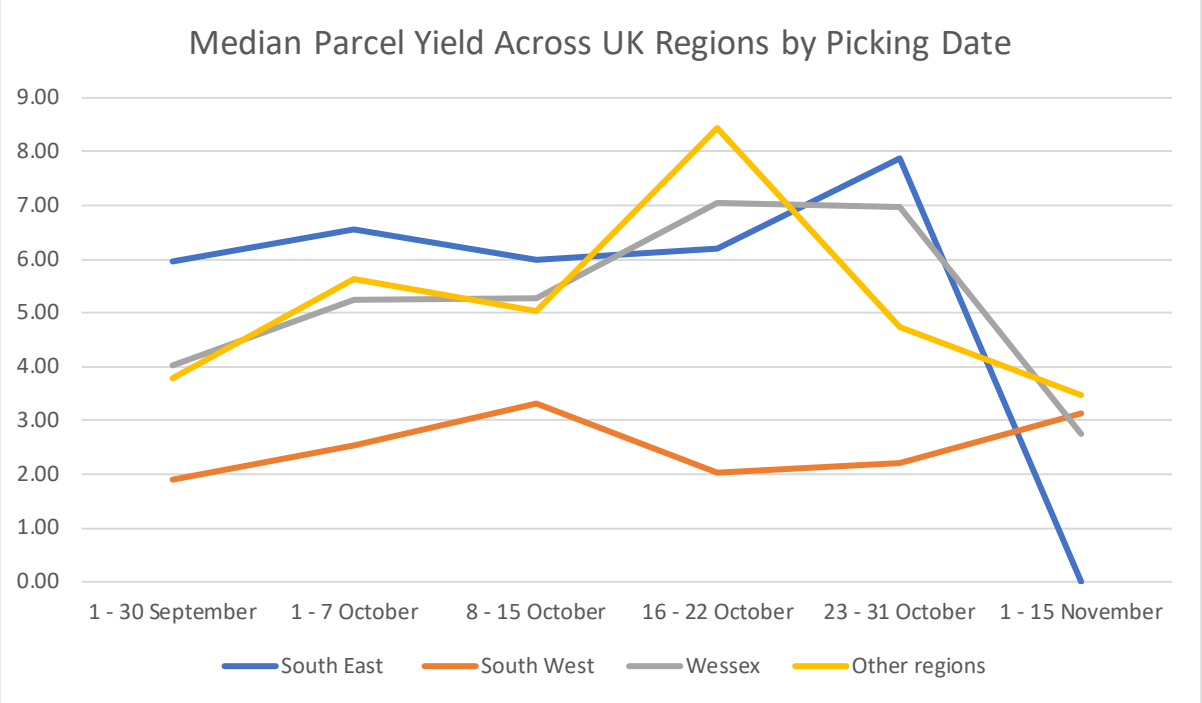
Table 18 2019: Bunch weights

Variety	Parcel Nos.	Median Weight
Bacchus	12	161g to 170g
Chardonnay	35	161g to 170g
Meunier	27	131g to 140g
Pinot Noir	35	141g to 150g
All Varieties	153	141g to 150g

Picking dates

As can be seen from the tables and graphs below, picking dates (as shown by frequency of parcel picking) are shown with different peaks for the different regions. With future surveys, the data collected with regards to picking dates may lead to a correlation being found between different varieties and when they are picked within different counties. This could help with pre-planning labour and logistics, and managing the grape processing schedule within wineries.





Rootstocks

Table 19 - Rootstocks

Rootstock	2018	2019
SO4	40.0%	50.0%
Don't know	12.0%	12.6%
Fercal	9.0%	10.6%
3309C	1.0%	8.4%
41B	6.0%	7.8%
5BB	1.0%	3.1%
Own roots	5.0%	2.8%
Binova	1.0%	2.0%
125AA	2.0%	1.1%
5C	1.0%	0.6%
161-49	1.0%	0.3%
Gravesac	1.0%	0.3%
Others	20.0%	0.6%
Total	100.0%	100.0%

Growers were asked what rootstocks they were using, with the results shown in the table below. SO4 is still the major rootstock with 50 per cent, with 'don't know' still a firm second choice.

Crop loss

In 2018, Growers were asked were asked to rank the factors that caused some loss of crop. This is the percentage of growers that responded, not the percentage of the crop they lost:

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

In 2019, growers were asked the same question.

- 31 per cent of growers said 'Botrytis'
- 16 per cent said 'chicks and hens'
- 15 per cent said 'Frost'
- 15 per cent said 'Unripe fruit'
- 11 per cent said 'birds'

Note: Since writing this report, WS have released 2019 figures which shows the official yield to be 78,606-hl, a total of 10.48 million x 75 cl bottles. They have not released the figure for hectares in production.

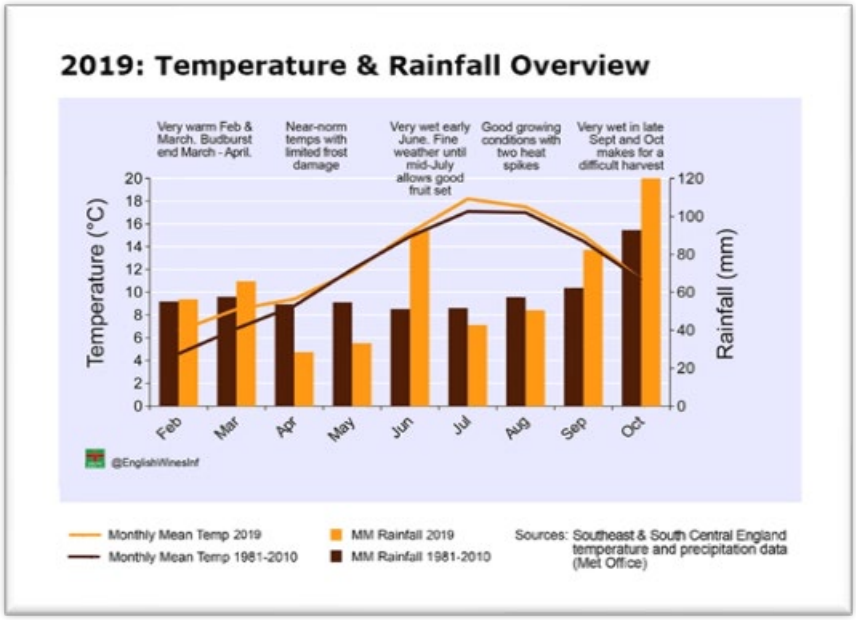
Stephen Skelton MW
14 May 2020
www.englishwine.com

Appendix I – 2019 Harvest Report

Harvest Report for Great Britain – 2019 [15]

Weather conditions for the year

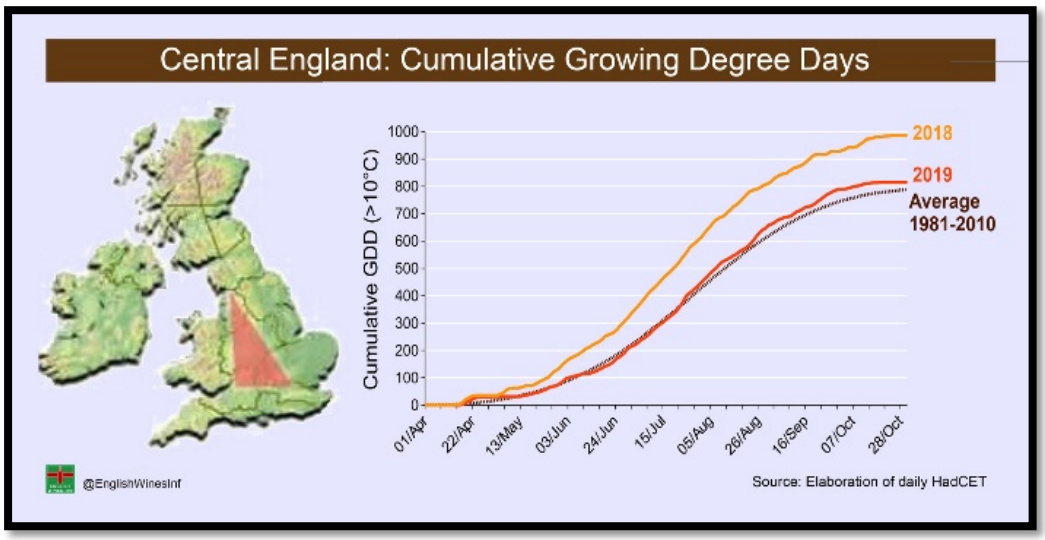
2019 started without much in the way of ice and snow and February was warmer than usual (warmest February since 1910) with a few days of 20˚C, a record temperature, towards the end of the month. March continued to be warm (1.7˚C above the LTA[16] for South-East and South-Central England) and between the middle and end of March, many growers reported budburst on Chardonnay and other varieties. Inevitably, spring frost followed and there were several reports of damage in the first half of April. Towards the end of April, the south east recorded days of 25˚C and good weather continued throughout most of May. Rainfall over the whole of England in May was 75 per cent less than the LTA but significantly less than that in the east and south. The first three weeks of June however, were a different matter with wind and heavy rain in much of the south of the country which set things back, although flowering of some early varieties did start around 20 June. There were several reports of Chardonnay and Pinot noir flowering between 22 June and the end of the month, helped by the hottest June day ever recorded, 34˚C, on 29 June at Heathrow and Northolt[17]. Flowering continued during a mainly dry and roof-less Wimbledon (roof-less at least for rain – it was used because the players were too hot!) and by the end of the two-week tournament (14 July) flowering was pretty much over and grapes were starting to swell. It was generally agreed that the season was about 'on time', neither early nor late. In comparison to 2018 however,



[15] This report has been produced with help on the weather data from Tony Eva, www.englishwine.info
[16] Long Term Average (LTA) period is 1981-2010.
[17] Heathrow and Northolt, both being airport weather stations, tend to record slightly higher temperatures than open ground nearby as they are surrounded by heat-retaining concrete.

flowering was about 10 days later. The weather during flowering alternated between sunshine and showers and many growers reported Early Bunch Stem Necrosis (EBSN) and/or coulure with a marked preponderance for caps to hang on during and after flowering and refused to be dislodged. This seemed quite marked on Bacchus and Pinot noir and was undoubtedly a contributory factor in the incidence of Botrytis later in the season.

The end of July was blessed with some scorching weather with the UK's all-time highest temperature of 38.7 ˚C being recorded on July 25th in the Cambridge Botanic Garden, knocking Faversham in Kent's 38.5˚C record into 2nd place. The end of July continued warm, but as soon as the schools broke up and the holiday season started, the weather reverted to true 'English Summer' style with massive floods in Derbyshire with dams threatening to burst, villages evacuated and generally cool, wet and windy weather for the first three weeks of August. Véraison on early varieties (Rondo and Frühburgunder[18]) was reported on 12-13 August, with others following, although because the weather was wet and cool, many sites didn't go through colour-change until the end of the month.

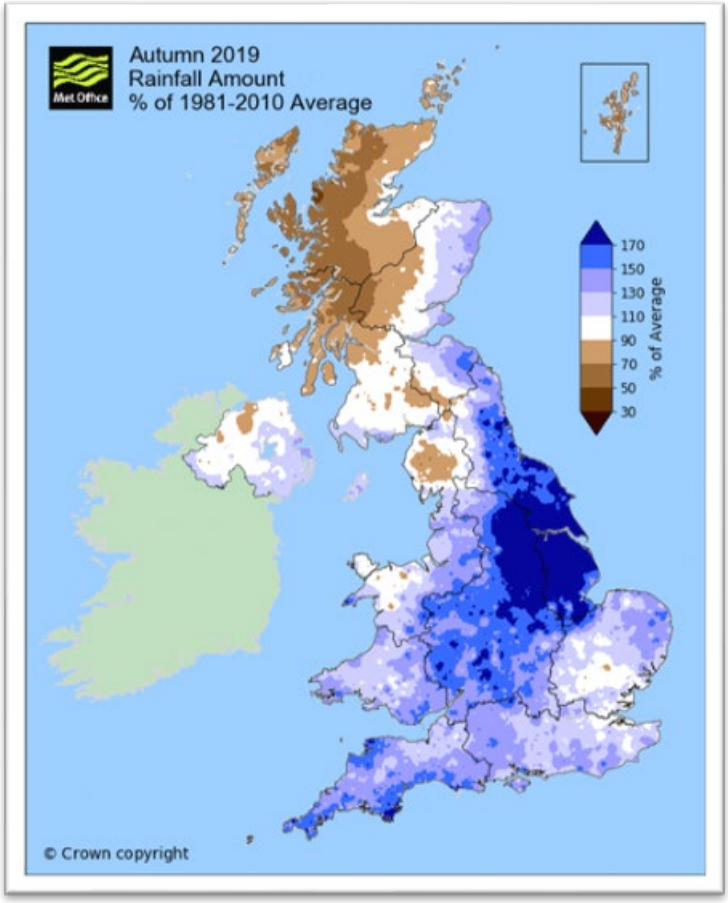


April – October GDD in 2019 were almost 200 less than in 2018

As the August Bank Holiday weekend approached, weather forecasters suddenly decided that we were in for a spell of Mediterranean weather and instead of this prediction resulting in rain and high winds, for once they were right. On Thursday 22 August the weather suddenly improved, leaping to the low 30s. Friday and Saturday were very warm, with 33.2˚C recorded at Heathrow on Sunday. Bank Holiday Monday surpassed all records with Heathrow recording a temperature of 33.4˚C (91.6F), beating the previous high of 28.2C for that day

[18] Pinot noir Précoce

(set at Holbeach, Lincolnshire, in 2017) by a massive 5 degrees. Some vineyards even complained that their vines were suffering from heat stress! Looking at the summer at this point, it had been quite remarkable with three consecutive days over 30˚C in June, July and August – a first – and all-time record highs also in June, July and August. The mean temperature for these three summer months in the UK was 15.1˚C which is 0.8 ˚C above the 1981-2010 average. At this stage most growers had good looking crops of grapes on their vines, with large bunches and prospects of above-average yields. However, it was at this time that things took a turn for the worse.



The second half of September and October 2019 will be remembered for rain. Not just ordinary rain, but heavy and frequent rain which made both timing of picking difficult and the worst picking conditions since – well since most people could remember, although I remember 1981 as being pretty awful. For England as a whole, in September 2019, rain was 154 per cent of LTA, although sunshine was 121 per cent of LTA. For October, the figures were rainfall 136 per cent and sunshine only 84 per cent. For grape growers, things could not really have been worse. Vines, which in many areas had enjoyed a warm, dry summer and were carrying a large crop and were in good condition, sucked up the water further swelling yields, but slowing down sugar accumulation. Should one wait for the sugars to rise? Wait for good weather? Start picking what looked like a big (and therefore time-consuming) crop? Those who were able to pick their early varieties (Bacchus, Ortega, Reichensteiner and Rondo) in the middle of September got the best of the picking conditions and by and large picked good, disease-free crops. Sugar levels were reasonable (but by no means record-breaking) with middling acid levels which had been diluted along with the sugars. Later-ripening

varieties such as the majors, Chardonnay, Pinot noir and Meunier, were in many cases starting to suffer from Botrytis and, with the weather showing no signs of improving, picking of these varieties started, in the wet, in the last week of September. Picking itself in the wet isn't great, but it's possible. What was difficult in many vineyards was the practicalities of loading and hauling a large crop of grapes over grass alleyways and headlands which quickly became rutted and, in some places, turned into semi-liquid mud-baths. As usual, conditions in some regions were worse than others with some parts of Essex and Kent having rainfall around the LTA, but the more westerly regions receiving up to 170 per cent of LTA. What was different was the frequency of the rain with barely a day in October in some parts of southern England that didn't have rain at some stage.

Taken as a whole, 2019 was a disappointing year. The exceptionally warm summer promised much and at the end of August there was every prospect of a very good, ripe harvest. Sadly, the autumn let us down and, in many vineyards, crop was lost to rot and failed to ripen. Both sugars and acids were diluted which is never great for wine quality.

Stephen Skelton MW
30 April 2020
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Appendix II

Vine varieties in Great Britain
Issued by Wine Standards 2018 based upon 2017 data

UK Vine Varieties 2018	Hectares	Percentage
Chardonnay	637.5	27.38%
Pinot noir	617.6	26.53%
Bacchus	196.7	8.45%
Meunier	182.6	7.84%
Seyval Blanc	101.3	4.35%
Reichensteiner	67.9	2.92%
Rondo	53.6	2.30%
Solaris	47.3	2.03%
Müller-Thurgau	43.2	1.85%
Pinot noir Précoce	39.2	1.68%
Madeleine x Angevine 7672	38.6	1.66%
Ortega	38.6	1.66%
Pinot blanc	29.0	1.25%
Pinot gris	28.8	1.24%
Regent	28.6	1.23%
Phoenix	24.6	1.06%
Schönburger	21.6	0.93%
Siegerrebe	19.4	0.83%
Dornfelder	18.7	0.80%
Other varieties	90.4	3.88%
Total	2328.1	100.00%
Source: Wine Standards Branch of the FSA		

Appendix III – "Other varieties" 2019

Varieties included in "Other varieties"	
Acolon	Optima
Auxerrois	Orion
Cabernet Cortis	Phoenix
Gamay	Pinot Blanc
Huxelrebe	Schönburger
Kernling	Siegerrebe
Müller-Thurgau	

Appendix IV – Vineyards by region

Vineyards in Great Britain by Region*			
Region	**Hectares**	**%**	**No of Vyds**
South East inc London	1,898.43	59.59%	242
Wessex	451.05	14.16%	99
South West	282.75	8.88%	182
East Anglia	279.10	8.76%	97
Mercian	127.64	4.01%	88
Thames & Chilterns	95.41	2.99%	39
Wales	50.98	1.60%	35
Scotland	0.38	0.01%	2
	3,185.74	**100.0%**	**784**
***Vineyards of 0.10-ha and over. Regions as defined by WineGB Regional Associations. Source: UK Vineyards Guide 2020**			