

French Hybrid Red Wine Grapes Under Cover in Northeast Scotland

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"We want the finest wines available to humanity, we want them here, and we want them now!"

Withnail, in Withnail and I (1986)

Well, perhaps not necessarily the finest wines here in Northeast Scotland, reasonable would suffice. Although it has been suggested that global warming should lead to the advancement of grape growing northwards, the weather here at 57°N has been less favourable since the instability in the jet-stream began in the summer of 2007. As a consequence of this, I have been exploring the possibilities for covered growing in addition to testing Baltic grape varieties outdoors. Grapes have been grown in greenhouses in Scotland going back to Victorian times¹⁻³. Although the focus was usually on table grapes, wine was made from Muscat of Alexandria grown in heated greenhouses in the Govenfords Vinery near Galashiels, between 1959 and 1989³. Covered growing can be criticised as resorting to using an artificial environment, but it has been pointed out that growing outdoors often involves chaptalization to artificial sugar levels⁴.

Rising fuel costs eventually made the heated vineries uneconomical^{2,3}, and nowadays most covered grape growing is in unheated greenhouses or polytunnels. To date there has been no large-scale growing of wine grapes under cover in Scotland, but in the south of the UK polytunnel vineyards have been used for growing a range of late-ripening vinifera varieties (Fig 1). Merlot and Cabernet Sauvignon have been grown at Beenleigh Manor Vineyard in Devon, Gewurztraminer on the Isle of Wight, and Chardonnay, Pinot Noir and Sauvignon Blanc at Worthenbury Vineyard near Wrexham⁵. My own tests with late vinifera varieties, however, have shown most to be mildew-prone and to have poor wood ripening under the dull, damp conditions that have blighted the summers of recent years. I therefore decided to investigate the potential of hybrid varieties, and a category which became of interest was the French hybrid reds.

Choice of Variety

In choosing which to grow, I decided to look at varieties not usually grown in the UK on the principle that if it grows outdoors further south, there was not much point growing it under cover with greater expenditure in the north. In Scotland, Black Hamburg has been a popular choice for unheated greenhouses and in recent years has been grown in polytunnels, as in the Polycroft on the Isle of Lewis⁶. In the UK National Vine collection notes by Edwards⁷, Black Hamburg is described as needing a good summer for ripening outside in the UK. From this it was reasoned that varieties described by Edwards⁷ as "just ripening" or "just too late outside", would have potential for growing in unheated greenhouses and polytunnels in the north. Included in this group are the Seibel varieties Plantet (S.5455), Chancellor (S.7053), and DeChaunac (S.9549). Also included was Landal which was bred by Pierre Landot, as it was derived from Seibel grapes including Plantet which is its seed parent. Chancellor (S.7053) and DeChaunac (S.9549) are also related, as they share a common seed parent (S.5163).

As hybrid varieties, the popularity of these vines declined in France during the latter half of the 20th Century, and they began to be phased out on the basis of a range of criteria, including inferior wine quality to vinifera varieties, and being over-vigorous and over-producing^{8,9}. The varieties nonetheless gained popularity in eastern North America on account of their cold-hardiness¹⁰. The name Chancellor was given by the Finger Lakes Wine Growers Association of New York State. DeChaunac was named in honour of Canadian oenologist Adhemar deChaunac, and in the mid 1970's was the most planted variety in New York State¹⁰. While cold-hardiness is a plus, the main reasons for investigating these varieties was their vigour, yields, and reported disease resistance in the south of the UK.

The 2014 Growing Season

The test vines were grown on their own roots from hardwood cuttings obtained from the UK National Vine Collection at Sunnybank. Success rates with cuttings decreased in the sequence: Chancellor > Plantet > DeChaunac > Landal. The test vines were 3 years old, and were under glass. A no spray regime was used in order to evaluate disease resistance. Marshall Foch and Gamay Noir were used as reference varieties, and the results compared with accounts of the growing season for these varieties at Sunnybank⁷, in France⁹, and in the USA¹⁰.

The winter of 2013-14 was mild and the 2014 growing season started early. Budburst occurred in mid-late March led by Chancellor, followed by DeChaunac, Foch, Landal and Gamay Noir approximately a week later, and Plantet approximately 10 days after Chancellor (Fig 2). Budburst preceded the last significant frosts (15th and 20th April), and although temperatures dipped as low as -2.5°C under cover, none of the varieties showed any illeffect. Flowering started in the last week of May, first with Chancellor, followed by DeChaunac, Foch and Gamay, then Plantet and Landal in early to mid June. Berry-set was good on all varieties.

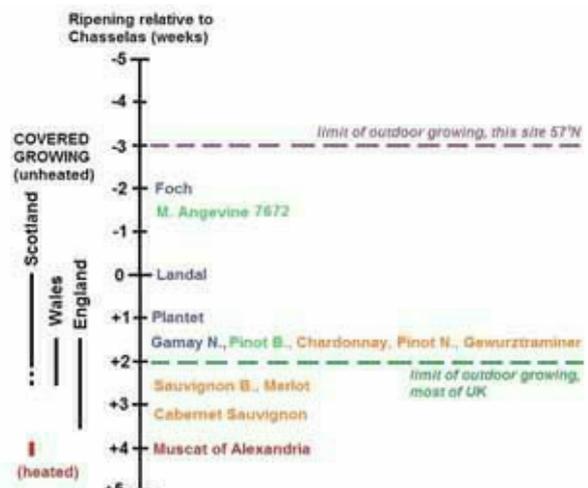


Figure 1 Grape ripening relative to Chasselas⁹, showing the ranges for open and covered growing in the Britain. Varieties in this study are shown in blue, in green are varieties grown outdoors in the UK, and in brown are varieties which have been grown under cover in England and Wales⁵. Varieties which have been grown in heated greenhouses in Scotland are in red. Chancellor and DeChaunac were not listed relative to Chasselas⁹, but from the ripening results obtained in this study would be placed between Landal and Plantet.

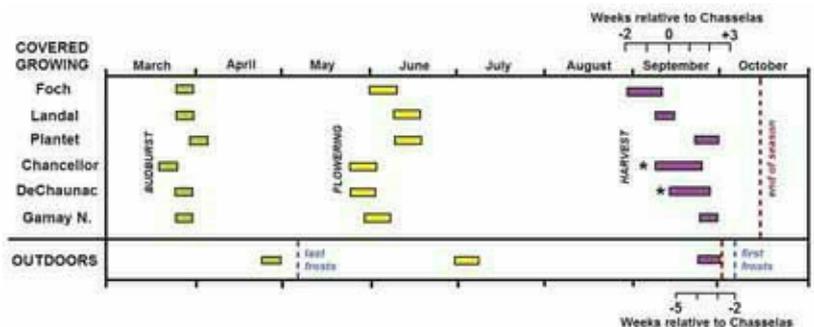


Figure 2 The covered- and open-growing season for grapes on this site. The results for covered growing are for the 2014 season. Dates corresponding to the 100- and 105-day ripening times observed for Chancellor and DeChaunac in Iowa¹⁰ are marked with *. The data for outdoor growing is a compilation of results for the varieties Zilga and Jbdupe over the last three years.

Summer came to an abrupt halt on 11.8.14, with the arrival of remnants of Hurricane Bertha ushering in cool damp conditions on a northerly airstream. Heat accumulation for August, measured as Growth Degree Days (GDD), was reduced by up to 70% under open conditions, but only 30% under cover (Fig 3). September was marked by a recovery toward normal temperatures, although conditions remained largely dull. Overall, the total heat accumulation for covered growing from April to mid October was 1440 GDD, almost double the value of 770 GDD for uncovered growing on an adjacent south slope (Fig 3). For comparison, most vineyards in the UK have 750 to 1000 GDD⁵. The GDD values attained under cover were thus more comparable to totals for southern France (e.g. Bordeaux 1350 GDD). The concept of Growth Degree Days has, however, its limitations⁵, particularly in that it does not take into consideration for how long during the day high temperatures were achieved.

Results

The earliest ripening of the varieties was Foch, reaching 210 Brix at the beginning of September (Fig 4). Landal was approximately two weeks behind Foch, and had the largest berries with an average berry weight of almost 1.7g (Table 1). However, the clusters of Landal were compact (Fig 5), and botrytis was a problem in August on account of the thin berry skins being prone to cracking. Approximately two-thirds of the Landal clusters were lost as a result.

Ripening of Chancellor and DeChaunac followed close behind Landal. This was somewhat unexpected as both fall into the category of “just too late outside” according to Edwards⁷, and hence would have been expected to have been around + 2.5 weeks on the scale relative to Chasselas. The time from bloom to harvest for these varieties was nonetheless close to the intervals of 100 days (Chancellor) and 105 days (DeChaunac) observed in Iowa¹⁰ (Fig 4), which may suggest the early maturation was the result of early budburst in these varieties under cover.

Chancellor was found to produce wellfilled clusters up to 78g in weight, and had an average berry weight of 1.1g (Figs 5, 6; Table 1). Sugar contents reached 20 °Brix by mid September (Fig 4). Chancellor has been noted to be highly susceptible to powdery and downy mildew^{8,10}; and downy mildew was observed on the berry stems during the cool August conditions. DeChaunac produced smaller, looser clusters than Chancellor, though berry size was slightly larger (Figs 5, 6; Table 1). Sugar contents were lower in DeChaunac than for Chancellor, reaching only 18.5 °Brix. However, no mildew problems were encountered, suggesting DeChaunac is the more suitable variety for no-spray growing regimes.

Next to last in ripening was Plantet, with berries reaching 22 °Brix in late September (Fig 4). The timing of ripening relative to Foch and Landal is consistent with its position at + 1 weeks relative to Chasselas⁹, and

with its categorisation of “just ripens outdoors” in the south of the UK⁷. Plantet is generally shown as having compact clusters⁹, but the clusters observed in this study were quite loose (Fig 6). The variety was observed to be slightly susceptible to powdery mildew on the berries.

The slowest ripening and poorest performer was the only vinifera variety in the test group, Gamay Noir, which showed a marked slowing of ripening during the cool conditions in August. While little variation was observed in Brix readings between bunches in the hybrid varieties, only about half of the bunches on the Gamay approached the 20 °Brix achieved with this variety in 2013. The variety was also beset by powdery mildew on leaves and fruit from August through September, and also by botrytis in some bunches.

	Berry Weight (g)	Bunch Weight (g)	Botrytis	Powdery Mildew	Downy Mildew
Foch	0.87	24	SS	No	No
Landal	1.68	76	MS	Yes	No
Chancellor	1.09	46-78	SS	No	Yes
DeChaunac	1.19	35-45	SS	No	MS
Plantet	0.84	30	No	Yes	No
Gamay Noir	0.82	—	Yes	Yes	No

SS Slightly susceptible HS Highly susceptible
MS Moderately susceptible yes/no whether observed in this trial

Table 1 Berry/Bunch Weights and Disease Resistance

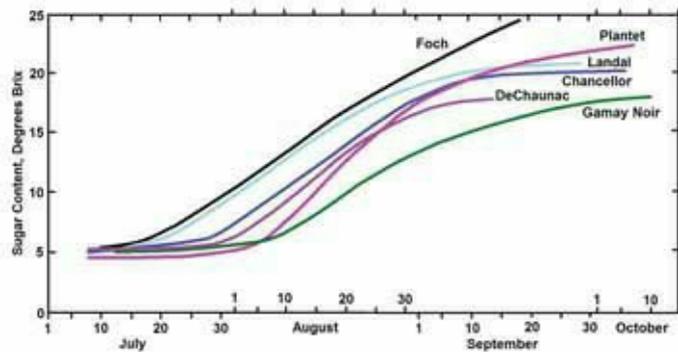


Figure 4 Sugar levels for covered growing in the 2014 season on this site.

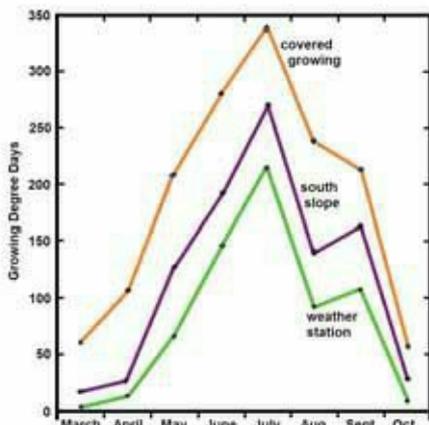


Figure 3 Heat accumulation as Growing Degree Days (base 10°C) by month during the 2014 season on this site. Totals for August are normally similar to July, but were reduced this year as a result of the arrival of storm remnants from Hurricane Bertha.



Figure 5 Grapes grown under cover in 2014. Left: Chancellor (note: downy mildew on berry stems); Centre: DeChaunac; Right: Landal (one of the smaller bunches which escaped botrytis).



Conclusions

The growing season of 2014 showed a marked departure from 'normal' conditions in August, and thus continues the pattern of unstable weather noted since the summer of 2007. Nonetheless, the test results suggest that it is possible to grow hybrid varieties which are considered 'too-late ripening' outside in the south of the UK, under cover at least as far north as Aberdeenshire. Considering various parameters such as reputed quality of wine, pollination, yields, disease resistance under a no spray regime, and ease of propagation, the most promising variety of the group tested was DeChaunac. The limit for reliable unheated covered growing in Scotland would appear to be varieties which ripen two to three weeks after Chasselas, which raises the possibility of growing even later types such as Villard Noir and Chambourcin (+ 2 and + 2.5 weeks after Chasselas, respectively⁹); these varieties are currently being grown for testing in 2015-16.



References

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Figure 6 Berry size and compactness of bunch.
From left to right: Chancellor, DeChaunac, Hantet. Pound coin for scale.