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Vinesense Growing Season Report

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Report number: *2020-1*

Date Produced: *31/05/2020*

Vineyard covered: *Chateau Slate*
Number of sensors: *4*
Sensor unique references*:* *Slat-01, Slat-02, Slat-03, Slat-04*

Report description:

This report is 1 of 4 annual growing season reports generated via *VineSense*. The report provides an analysis of, and recommendations regarding, the growing season conditions within the target vineyard as reported by deployed *VineSense* sensors and observations recorded by the vineyard management team.

Climate is one of the most important factors in determining vineyard productivity and grape quality. Climate is a key determinant of vineyard location and varietal suitability, as well as influencing grape quality. The climate of a region dictates the style of wine produced, while inter-annual variability and day-to-day or week-to-week weather influences vintage quality and yields. Both weather and climate change (temporally or spatially) therefore have a direct effect on wine style and quality.

Topographic, soil and ground cover variation within a vineyard will cause significant temperature variability. A good understanding of variation in microclimate enables the application of targeted viticulture practices, which help to optimise the quality of the fruit delivered to the wine maker.

Section 1 - Year to date summary

Section 1.1 General review of climate conditions year to date

In general, the dormancy period from December to March 2020 has been warmer than that observed in previous years. All sensors recorded higher monthly average temperatures in all months through the growing season. GDD accumulation began on 4th April, which is earlier that previous seasons, resulting in an early budburst and leaving the buds susceptible to early frosts.

Rainfall for the vineyard was in line with regional averages for 2020 and the wettest since 2006. The GDD tracker in Section 2 shows that since March the GDD accumulated has been less than in the previous 3 seasons and will lead to a slowing of phenological stages.

Observations from Section 3 show that sensors 1 and 2 are warmer than 3 and 4, the observed difference is the same order of magnitude as the GDD difference between Champagne and Bordeaux. This is likely to lead to a marked variation in the rates of plant development (not allowing for varietal differences and all else being equal).

The vineyard was subject to several frost events during the early growth stages, between March and May. The Pinot Noir clone 777 block was subject to the most frequent and severe events, as expected due to its situation at the lowest point of the vineyard (shown in cold air flow map in Section 3). However, the active frost protection measures taken prevented any noticeable frost damage.

Section 1.2 Observations regarding budburst

a. Data in Section 3 indicates that Block 2 was the warmest followed by Block 1 then 3 then 4. First budburst was observed in Block 2 which is in line with observations from previous years.
b. Regional historic records show that this was the earliest budburst this decade with the exception of 2018.

Section 1.3 Recommendations

Frost protection measures that were taken in this season were observed to be successful, but the number and severity of frost events justify additional measures in future seasons, particularly in the Pinot 777 Block, recommendations include:

- Late pruning wherever possible.
- Sacrificial canes – which should not be tied down or removed, until after the danger of frost damage has passed.

Measures should be taken to delay budburst in Block 2 next season including:

- Delaying pruning until late February.

The heavy rainfall during the dormant season followed by above average rains in March and April may lead to increased vigour if the water table is not able to subside in the coming

months. The nutrient maps and vigour maps from section 3 show that this additional vigour is likely to be most evident in the northwest and western areas of the vineyard. It is recommended to:

- Pay attention to crown and shoot thinning in these areas.
- Commence earlier leaf stripping on the east side of the canopy, in late May.
- Removal of any laterals from the canopy as soon as they emerge, particularly in Blocks 2 and 4 and south eastern corner of Block 3.

Section 2 – Observations

2.1 Phenology and Bioclimatic indices

In viticulture temperature suitability is often presented through bioclimatic indices (BCIs), metrics which provide simplistic illustrations and assessments of viticulture or varietal suitability. BCIs place numerical or descriptive envelopes around summed or averaged daily or monthly growing-season temperatures to express suitability ranges. Various indices exist, two of which are used in this report: Growing Season Average Temperature (GST) and Growing Degree Days (GDD).

GDDs are calculated as a summation of the daily mean (Tmax + Tmin / 2) temperature above a base of 10°C, for April – October (Northern Hemisphere). The 10°C base temperature is a subjective minimum threshold considered necessary for grapevines to initiate their growing cycle.

$$\sum_{d=1}^{n} \max\left[\frac{Tmax + Tmin}{2} - 10{,}0\right]$$

GST is calculated as the average daily mean temperatures summed for the growing season (Northern Hemisphere: April–October). GST is easier to calculate than GDD but is functionally identical.

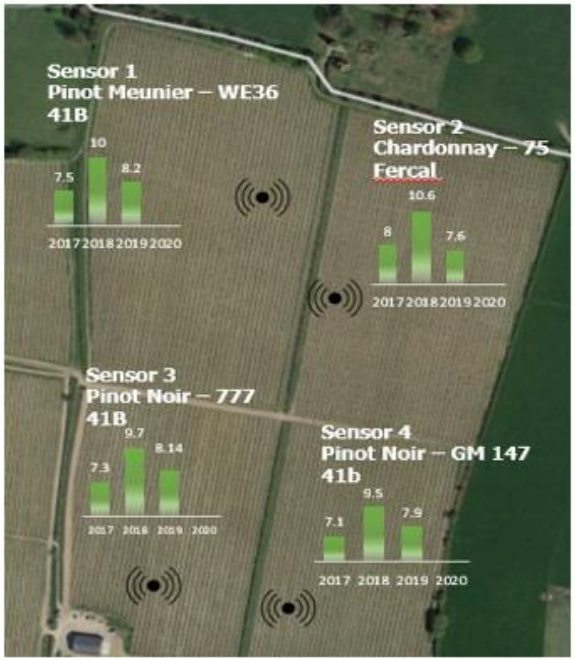
$$\frac{\sum_{d=1}^{n}[Tmax + Tmin]/2}{n}$$

Phenology, from the Greek (phainesthai = to appear, logos = knowledge, teaching) is the study of the sequence of biological development. Its aim is to ascertain correlations between dates of events in an organism's growth cycle and climate indices, thus highlighting the reaction of a plant to its environment and elucidating its behaviour in a new environment.

By calculating the GDD and/or GST for a given site and location, and comparing the outcome to previous years, to other sites or standard values we can make predictions about the growth cycle of the vines at this site and calculate the likely timing of key stages of growth such as harvest date. This knowledge can also be used to plan the logistics of vineyard management including timing of canopy management, labour and equipment requirements.

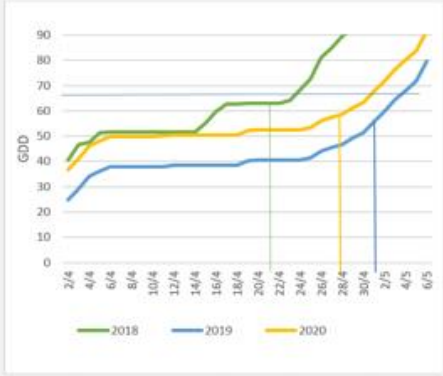
Section 2.2: Season to date and comparison to previous seasons

Sensor locations and historic yields

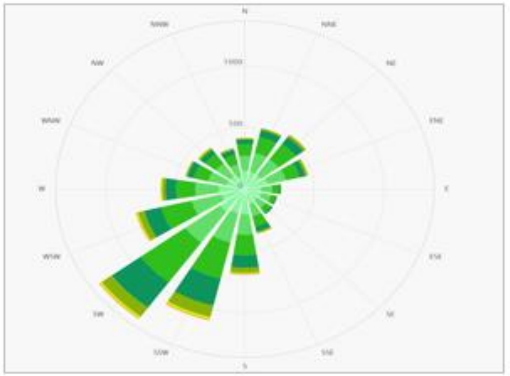


Historic budburst dates and GDD accumulation

Year	BB Date	GDD
2018	25/4	69
2019	2/5	70
2020		



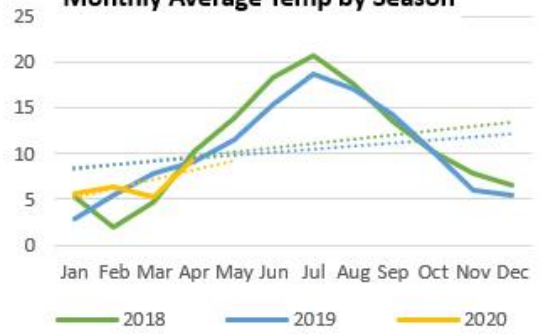
Wind rose. Jan – May 2020



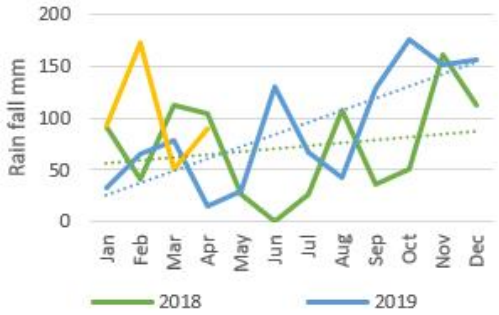
Number of <0°C Days by Season

Month	2018	2019	2020
Jan	3.0	5.0	2.0
Feb	1.0	2.0	1.0
Mar	1.0	6.0	3.0
Apr	2.0	3.0	2.0
May	2.0	3.0	

Monthly Average Temp by Season



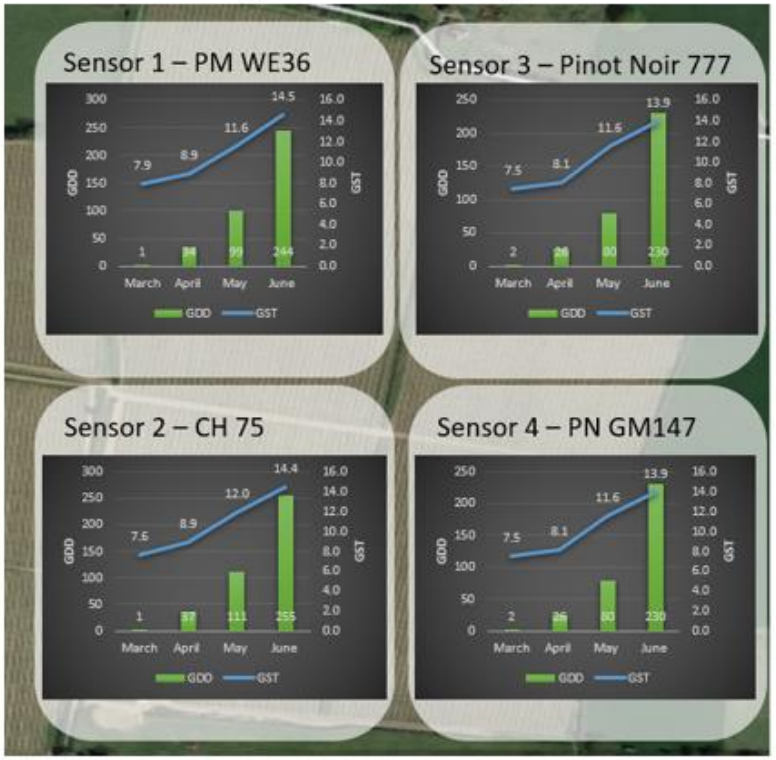
Seasonal Rainfall Comparison



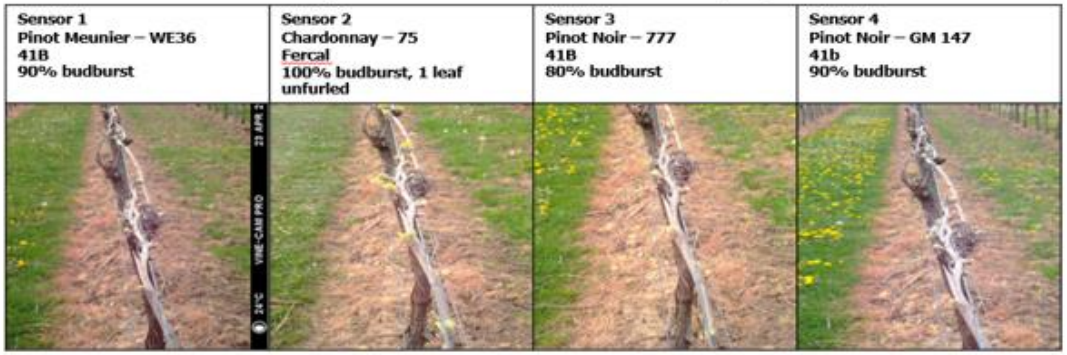
GDD accumulation 2018–2020

Section 2.3: Sensor Comparison Data

Monthly GDD and GST by sensor



Vineyard observations as of 24/4/20



Vineyard Maps