vegetalsignals

Listen to your crops

Presentation

#precisionviticulture #realtimemonitoring #deeptech

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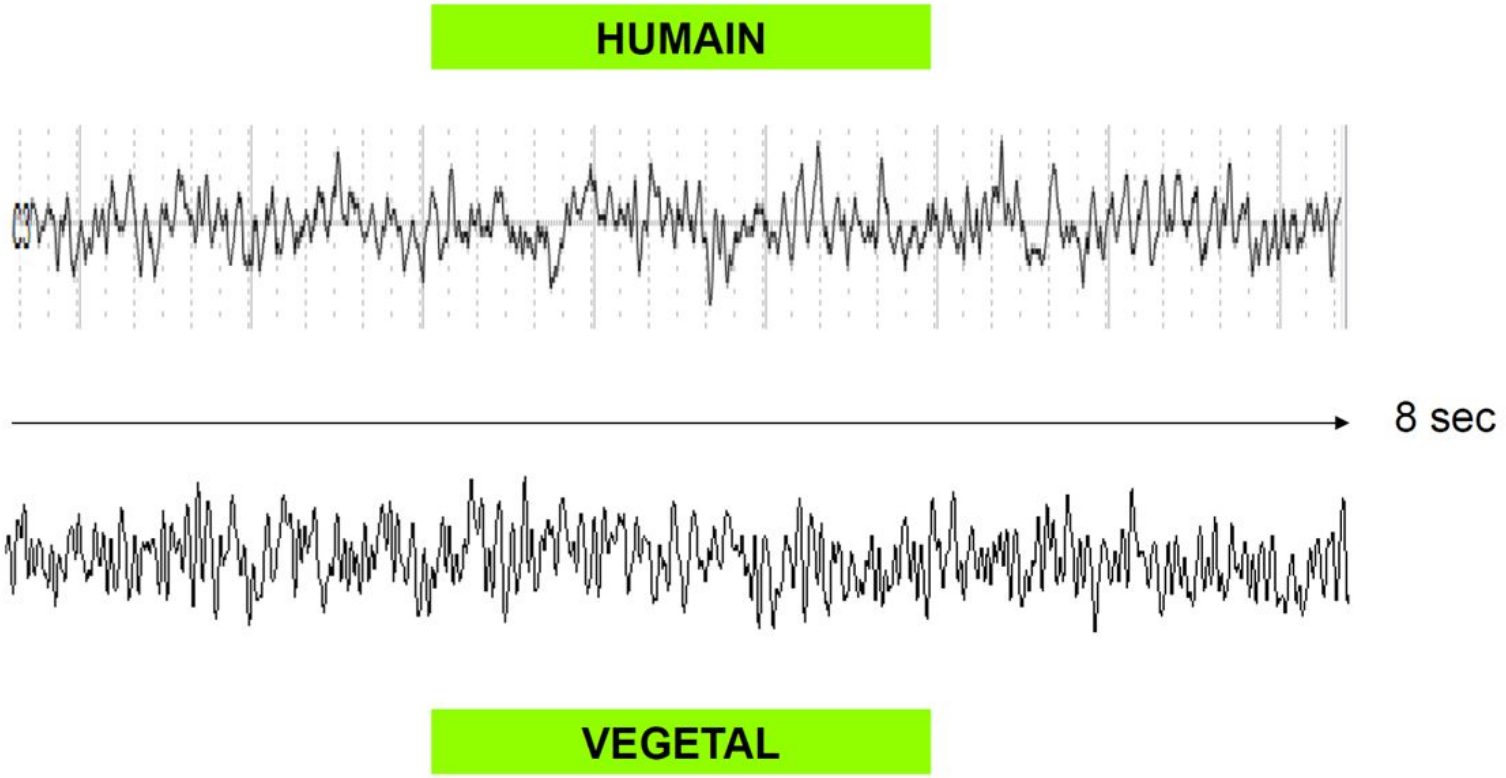
Our commitments

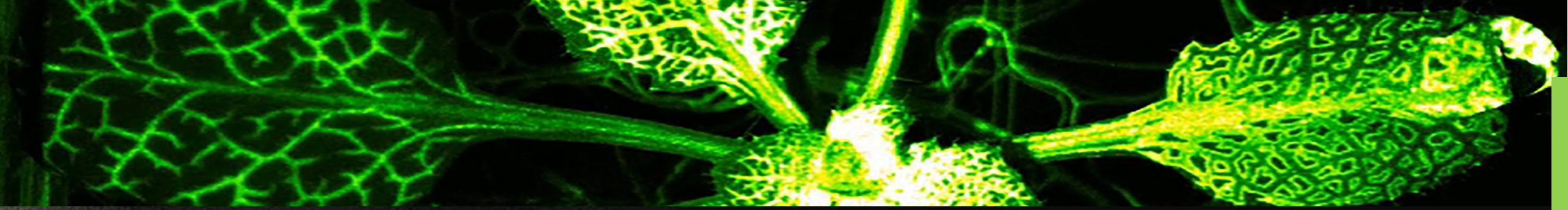
**We are committed to connecting humans and plants,
and to participate in the resilience of agriculture,
by providing useful information to winegrowers on the state of their vines.**

At the origins of Vegetal Signals, Neuroscience

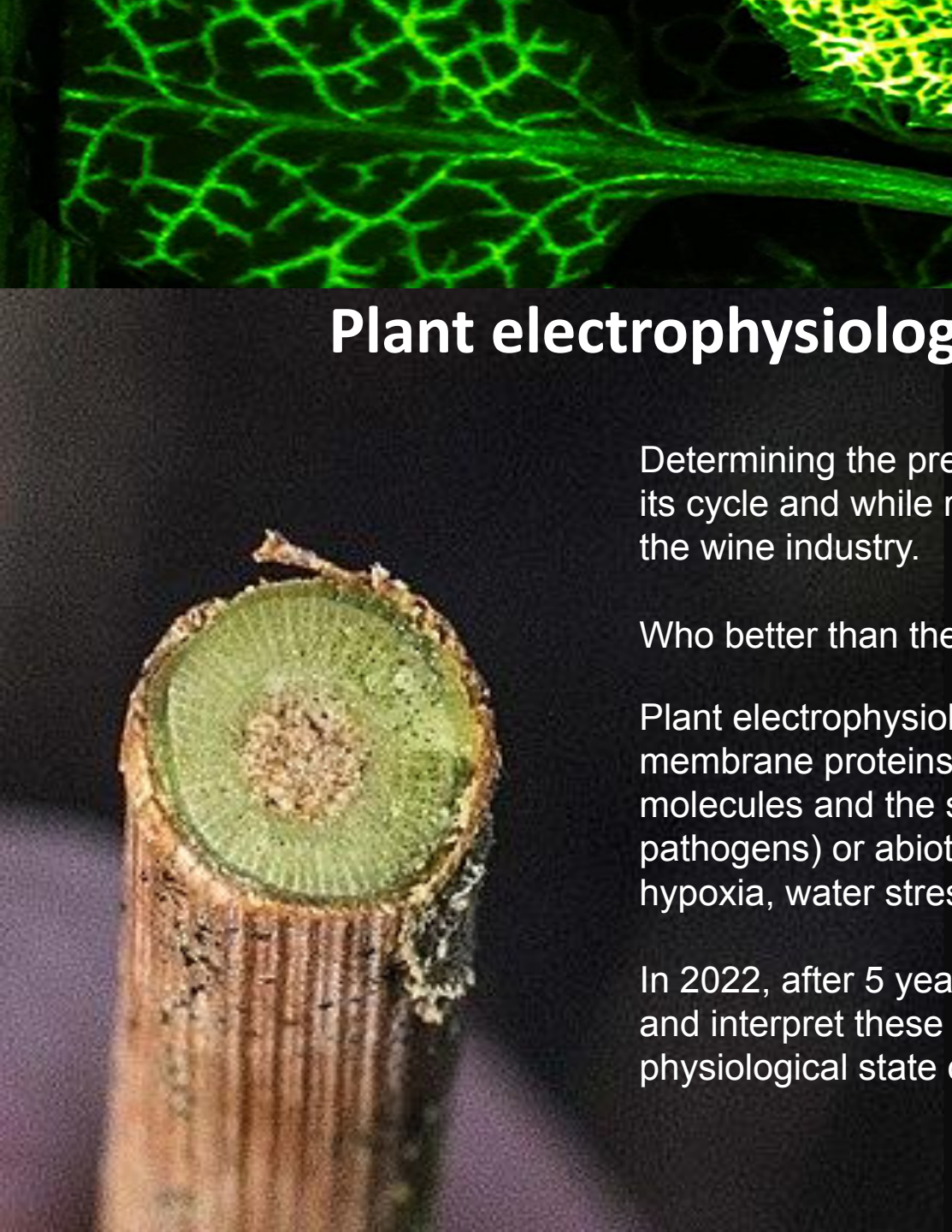


VS8 bio-interface

Our technology interprets biological signals into the plant to inform vine growers
in real time and continuously on the state of their vineyards
and develop innovative and efficient technical itineraries



Plant electrophysiology at the heart of our technology



Determining the precise needs of a plant and supporting it as best as possible during its cycle and while respecting its terroir and its environment is a major challenge for the wine industry.

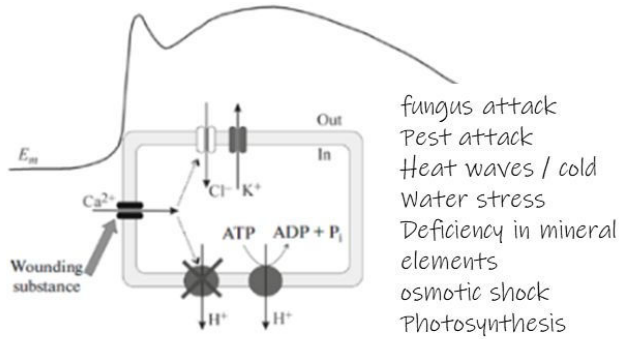
Who better than the plant can testify to its condition ?

Plant electrophysiology is a recent science. At the heart of the Phloem, at the level of membrane proteins, there is an electrical activity allowing the transport of essential molecules and the signaling of environmental stresses of biotic origin (aggressions by pathogens) or abiotic (excess or defect of light, sudden fluctuations in temperature, hypoxia, water stress, salinity, etc.).

In 2022, after 5 years of R&D, the Vegetal Signals team managed to capture, process and interpret these electrical signals to provide useful information to farmers on the physiological state of vines in real time.

vegetalsignals , our technology

Technology principle

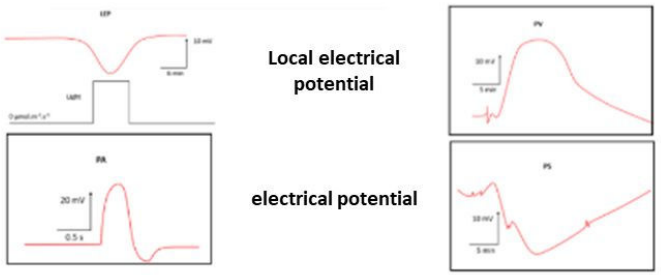


fungus attack
Pest attack
Heat waves / cold
Water stress
Deficiency in mineral elements
osmotic shock
Photosynthesis

Cell
Tissue
Organ
Organization

H^+
K^+
Cl^-
Na^+
Ca^{2+}

Electrical potentials



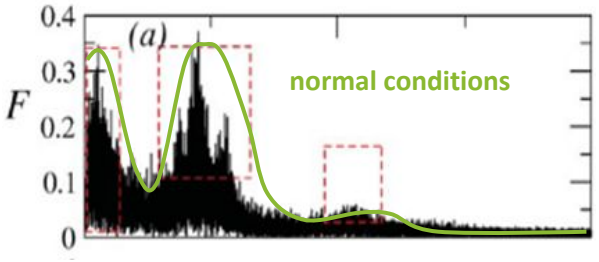
Local electrical potential

electrical potential

Variation potential

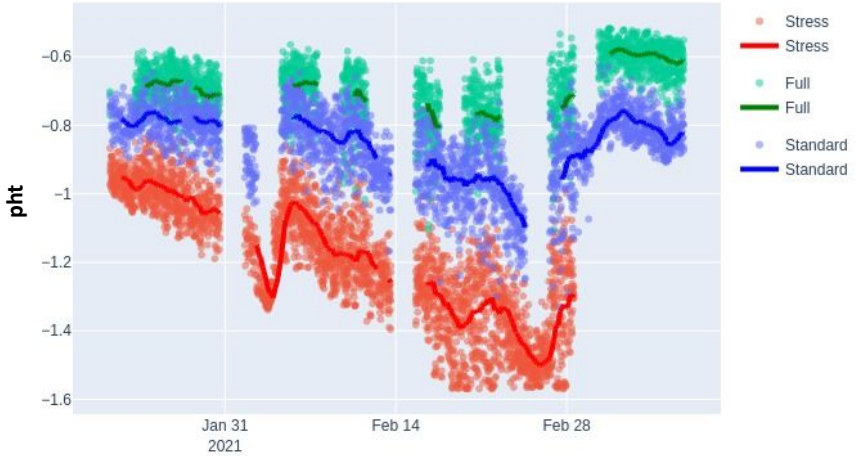
System potential

What distribution of electrical activity by frequency?



(Souza et al, 2017)

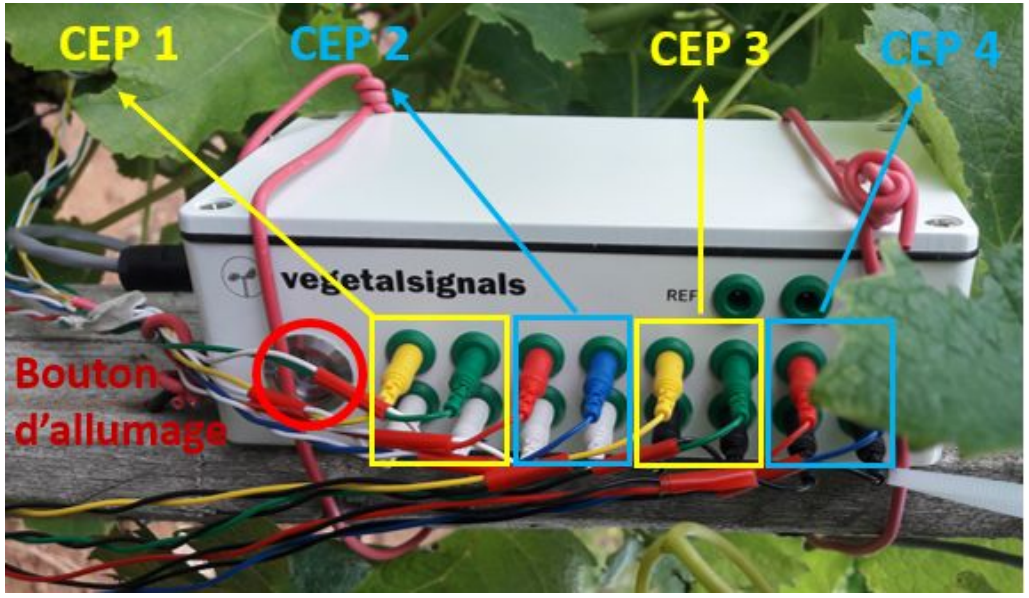
Example: Differentiation of vine irrigation modalities from signals in Stellenbosch - 2021

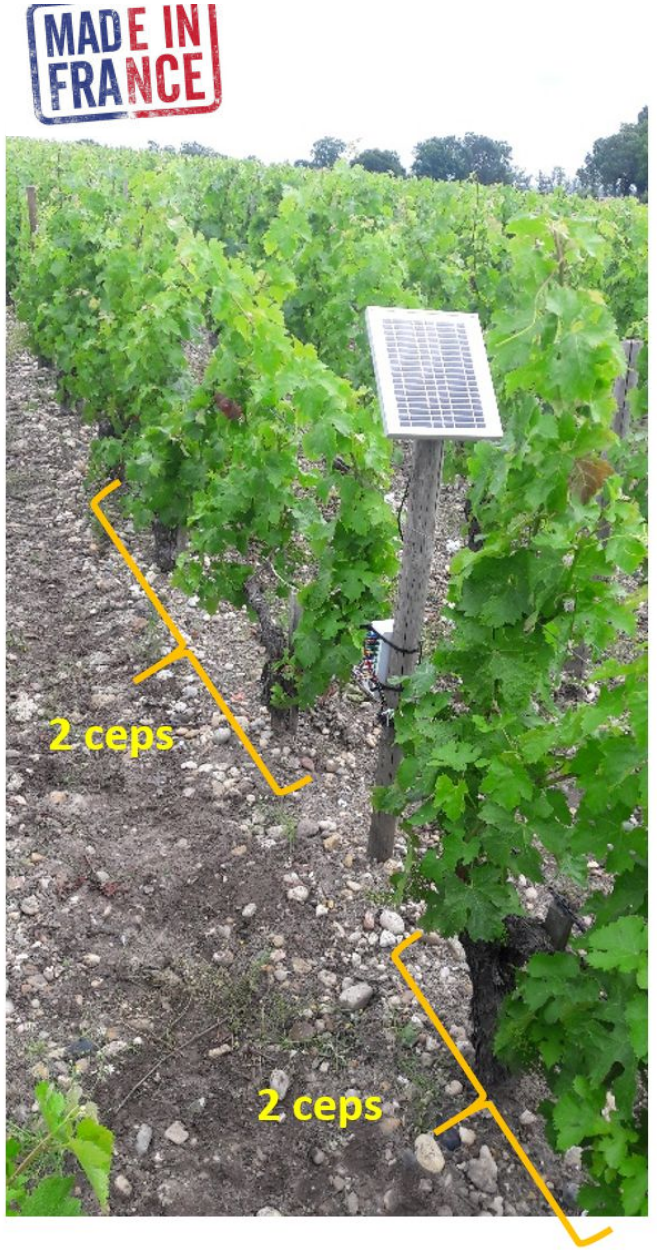


A kit ready to install in the vineyard

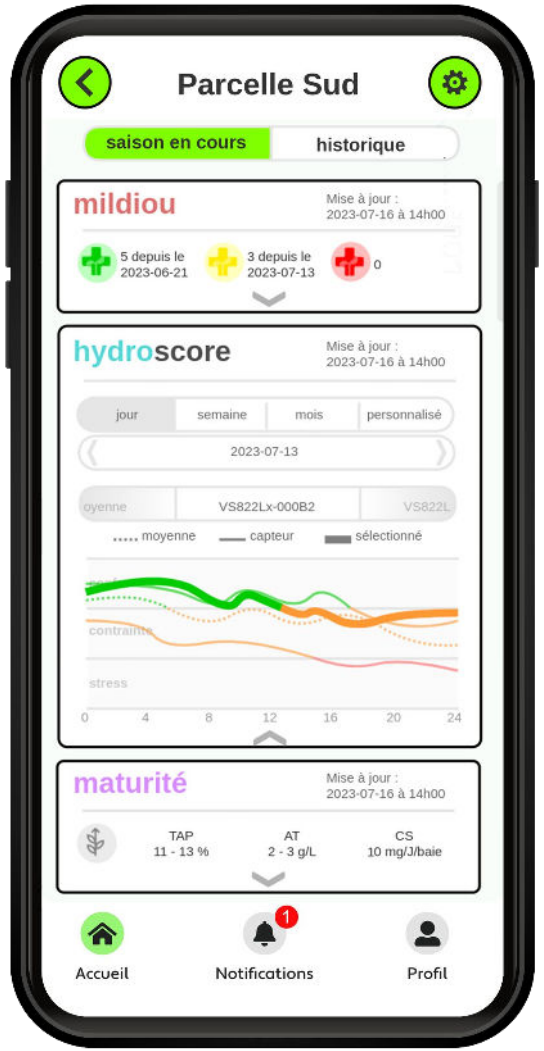
- 1 sensor made up of 8 pairs of electrodes
- Position of electrodes: primary branches
- Power supply: solar panel
- Data recording: micro SD card
- Data sent every 10 minutes via cellular network

20 minutes to install Each sensor and 5 minutes to uninstall





4 services for vine growers in 1 sensor



- **hydroscore**

Real-time monitoring of the water status of your vines

- **Deseases Presymptomatic Detection mildiou**

BETA TESTING

Beta test since 2022

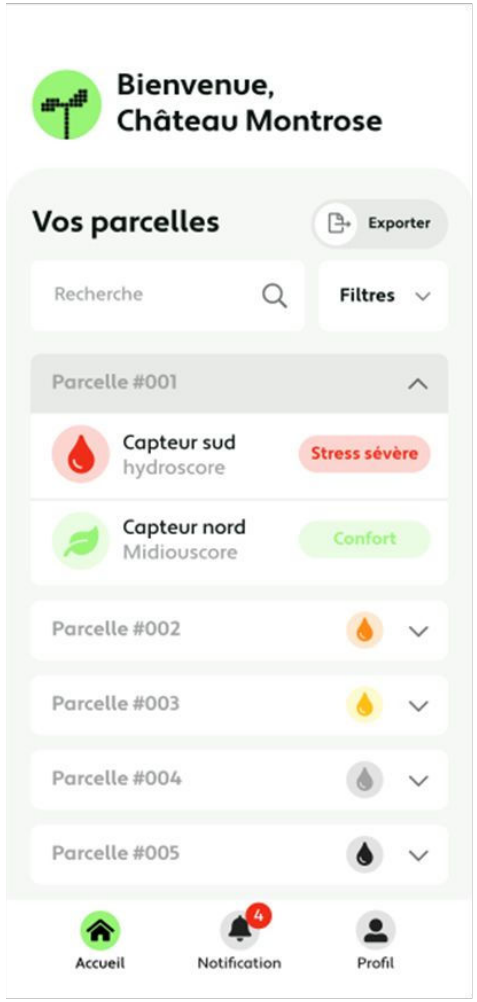
- **maturity monitoring** BETA TESTING

Beta test from 2023
Indicators : Evolution of the degree of potential alcohol, total acidity and sugar loading.

- **Premium service**

Tailor-made model trained on your vineyard

hydroscore


Bienvenue,
Château Montrose
Vos parcelles
Exporter
Recherche
Filtres
Parcelle #001
Capteur sud
hydroscore
Stress sévère
Capteur nord
Midiouscore
Confort
Parcelle #002
Parcelle #003
Parcelle #004
Parcelle #005
Accueil
Notification
Profil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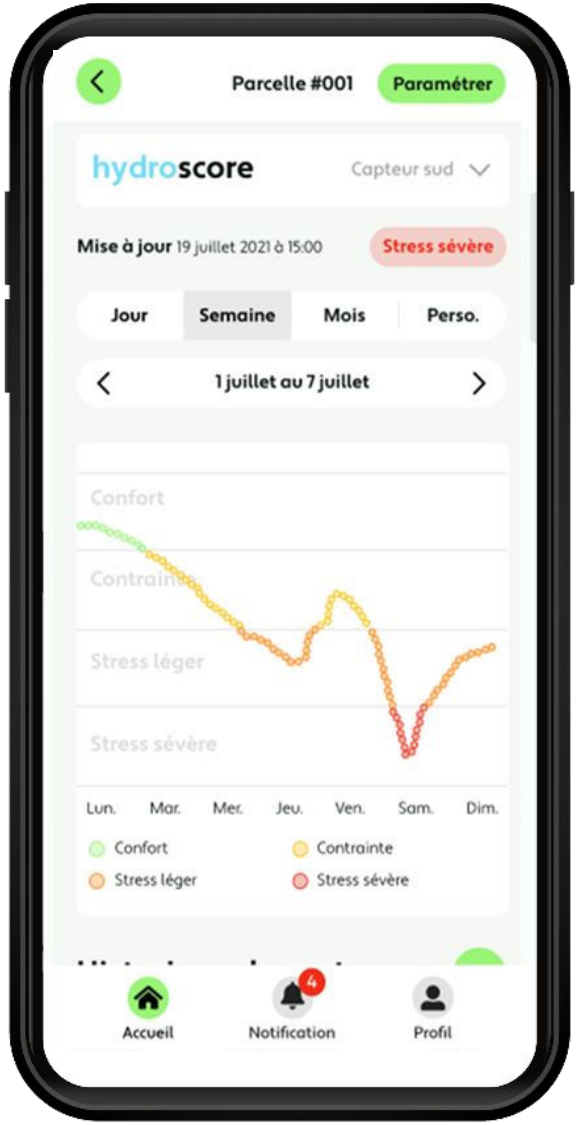
Céline MAUSSIRE
Coordinator R&D
Château Pichon Longueville Comtesse de Lalande
Pauillac
Listen to our users !
« Over the last decade, a dynamic of excellence has been led by the team of Pichon Comtesse and technical innovations have proven to be great tools in the service of this perpetual quest. We wanted to be less interventionist on the soil, while seeking more technological precision in the collection of data.
For more than 8 years, we have already been carefully monitoring the water status of our vines at Pichon Comtesse. The new technology offered by Vegetal Signals appealed to us because it makes it possible to increase the number of measurements and reduce the difficulty of this task for our teams.
In addition to other field observations, this tool is an aid for steering our strategies of cultural practices in the vineyard in order to better adapt to global warming".


Parcelle #001
Paramétrer
hydroscore
Capteur sud
Mise à jour 19 juillet 2021 à 15:00
Stress sévère
Jour
Semaine
Mois
Perso.
1 juillet au 7 juillet
Confort
Contrainte
Stress léger
Stress sévère
Lun.
Mar.
Mer.
Jeu.
Ven.
Sam.
Dim.
Confort
Contrainte
Stress léger
Stress sévère
Accueil
Notification
Profil

hydroscore



Calibrated with stem water potential measurements

110 plots on
3 vintages: 2020 to 2022

What's the point ?

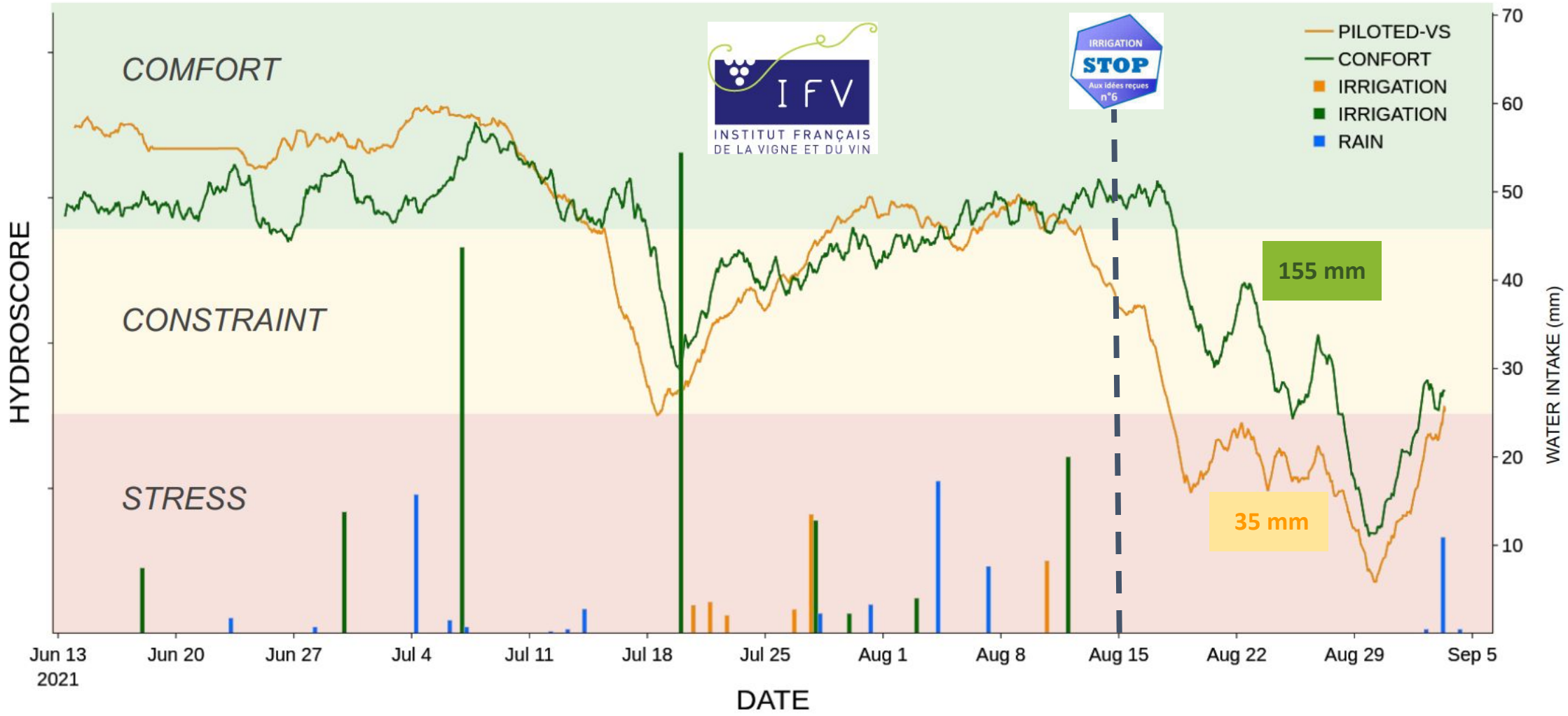
- Real-time monitoring of the water status of the vine
- smartphone app
- History of your data
- In-app note taking

Uses cases ?

- Optimization of your irrigation according to the real needs of your vines
- Significant water savings
- Positioning of biostimulant products
- Comparison of plots
- Comparison of technical itineraries
- Monitoring of a young planted plot for which excessive water stress can be fatal or conversely too much water comfort high may affect its future resilience.

hydroscore : use case example

Merlot Plot in Marguerittes / Nîmes - South of France - Vintage 2021



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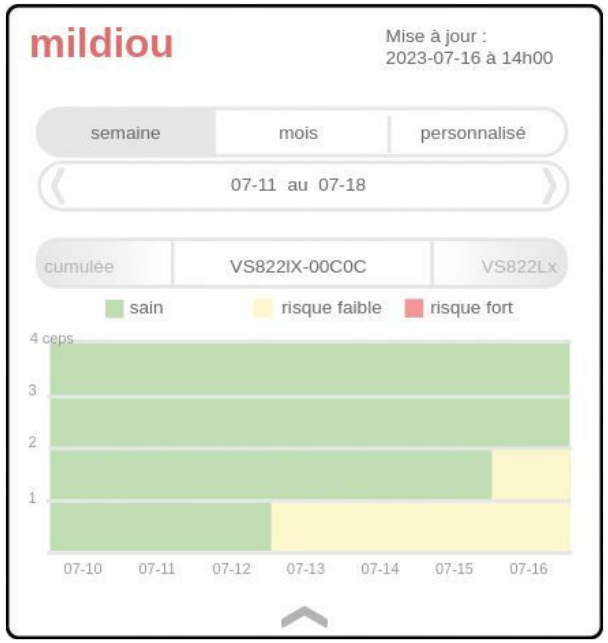
Mildew Presymptomatic Detection

Listen to you crops !

Calibrated with health monitoring observations in the vineyard

50 plots on 2 vintages : 2021 & 2022

BETA TESTING



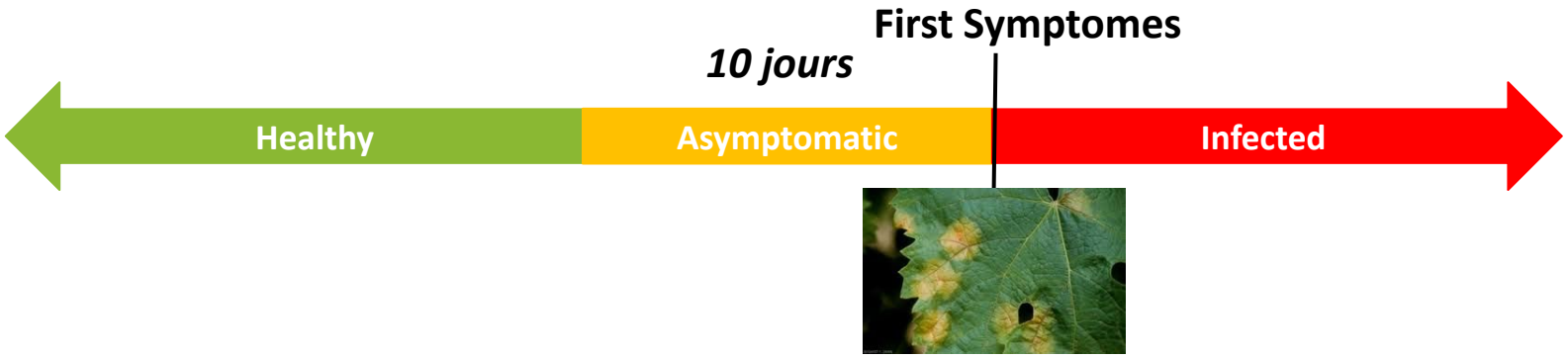
What's the point ?

- Detect in real time a late blight infection before the appearance of the first visible symptoms (D-5)
- 4 feet monitored by sensor
- Smartphone app
- Alert system
- In-app note-taking

To do what ?

- Monitor disease pressure on a network of reference plots (Untraited controls or others)
- Reduction of first treatments
- Adaptation of phytosanitary treatments according to the pressure

Pre-symptomatic detection of Mildew (beta-test)



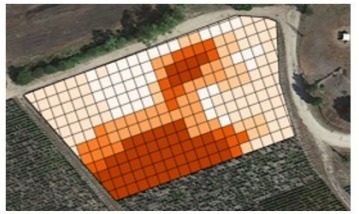
Preventive treatments, but possibilities of ….

Pre-symptomatic strategy

- Notice the infection before symptoms
- Spray infected zones with curative products

Attack frequency strategy

- Monitor the disease frequency index in real time
- Adapt the concentration of the spraying product



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Mildew Pre-symptomatic detection

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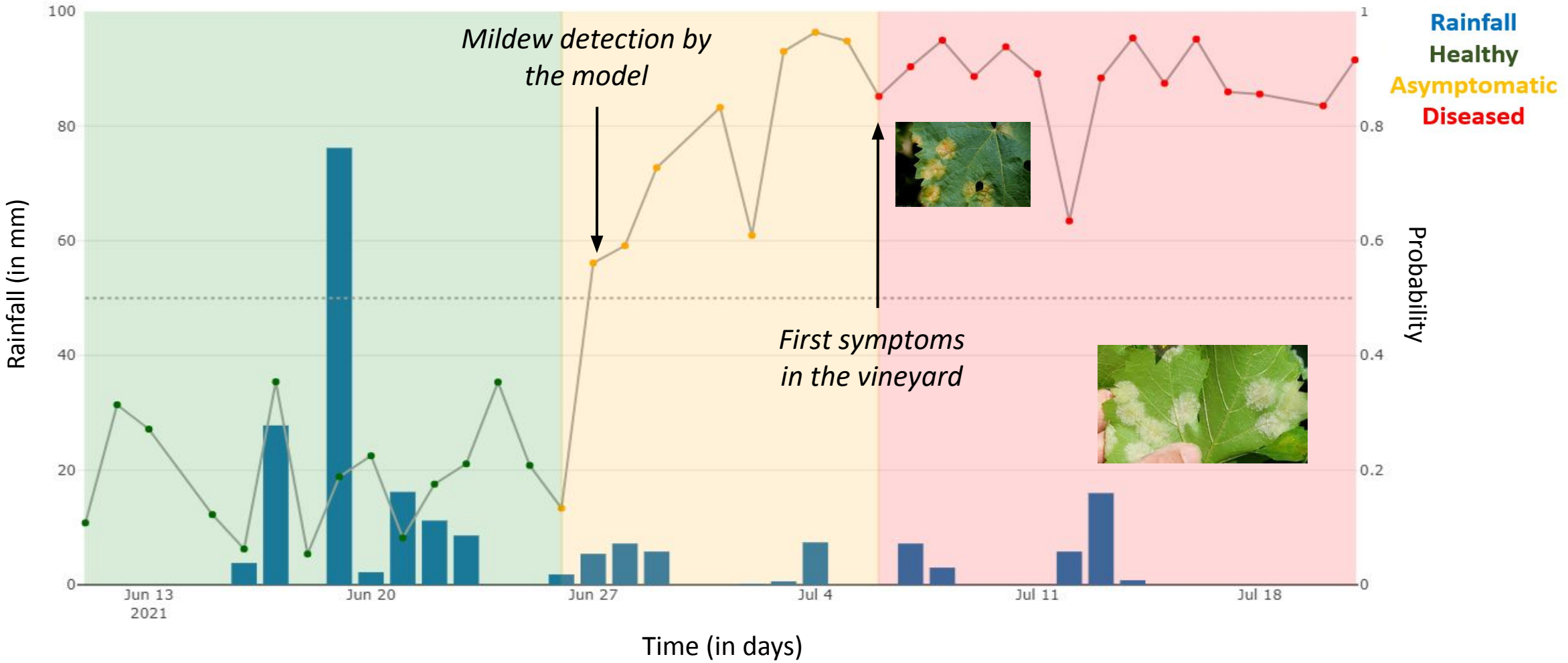
BETA TESTING

Model accuracy: 86%

Average: - 5 d

Evolution of attack probability during the season



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Maturity Monitoring

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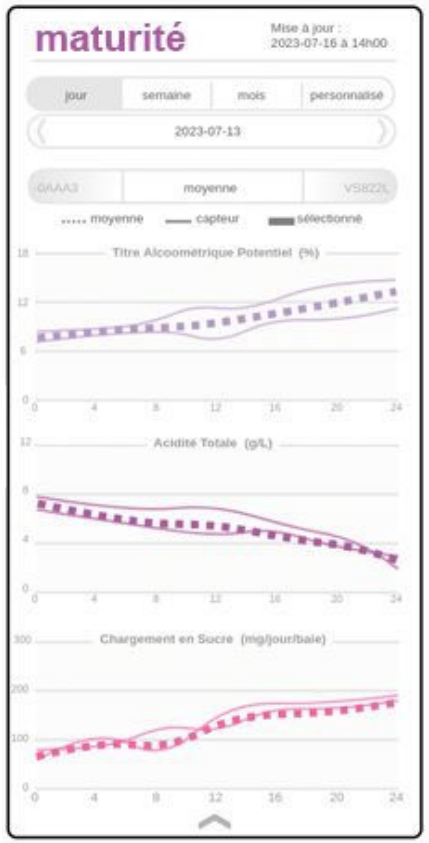
BETA TESTING



What's the point ?

- Track the maturity of your arrays in real time
- TAP, Total acidity, sugar loading speed
- Alert system
- In-app note-taking

To do what ?

- Save man time / multiplying measures
- Plan your harvest more finely
- Do not see its degree soar too quickly in a context of global warming
- Compare maturity curves from one year to the next to anticipate the profile of the vintage in the cellar

Bordeaux vineyard: 40 plots on 2 vintages: 2021 and 2022

PACA vineyard: 40 plots in 2022

Indicators calibrated on 120 plots over 2 vintages: 2021 and 2022
7 grape varieties

Maturity monitoring model methodology

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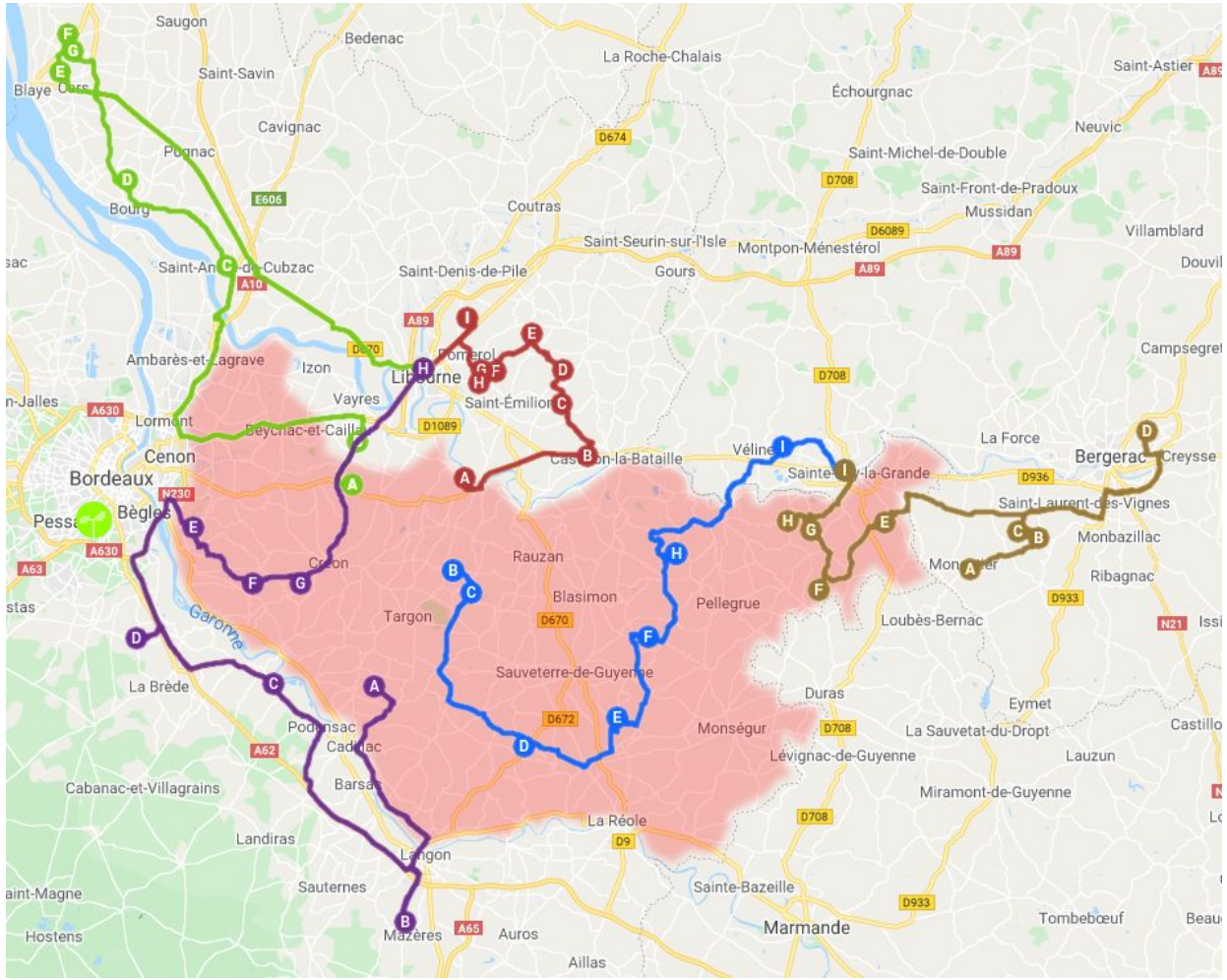
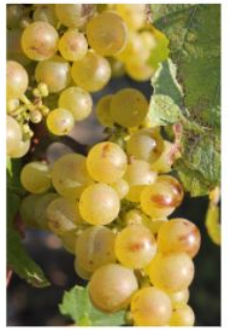


Experimental vineyard = a network of 80 plots

40 entre-deux-mers + 40 languedoc/méditerranée

Merlot noir	Cabernet sauvignon	Cabernet franc	Sauvignon blanc
			

+ syrah, grenache & chardonnay

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INFOGRAPHY 2022

KEY STRENGTHS

- Real-time monitoring
- Continuous service (no clouds dependent)
- Non-destructive technique
- Direct approach = at the core of the plant
- 1 multiservices sensor
- Energy autonomous
- Robustness (adapted to the vineyard)
- Easy installation
- An affordable price (no equipment cost)
- Alerts and notes-taking
- Simple and intuitive interface
- Reliable and trained models
- Made in Bordeaux

android

Our collaborations

Bernard Magrez
COMPOSITEUR DE VINS RARES

Château Montrose

MARTELL
COGNAC
FONDÉE EN 1715

cn.iv
Comité National

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INSTITUT FRANÇAIS
DE LA VIGNE ET DU VIN

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DEPUIS 1840

COOPÉRATIVE
BOURGOGNE
DU SUD

ARRDHOR
CRITT HORTICOLE

CHATEAU DE
BERNE
EN PROVENCE

Domaines

...

ABADIA RETUERTA
CRAFTED SPANISH WINES

THELEMA
MOUNTAIN VINEYARDS

ALMAVITIS
more nature, more science

euralis

ERTUS
GROUP

aGRICULTURES
& TERRITOIRES
CHAMBRES D'AGRICULTURE
CÔTE-D'OR

azoeno
ENOLOGÍA VIVA

Coming from R&D, the company relies on a highly qualified and interdisciplinary team

WE ARE vegetalsignals

TEAM

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Eng. Electronics

Riska Madisse
Administration & finance