



I<sup>a</sup> Degustazione  
vini Pinot Grigio  
2022

Prva degustacija  
vin - sivi pinot  
2022

*Paolo Sivilotti*

*Project Manager, LP - Università degli studi di Udine*

*VP - Univerza v Vidmu*

Degustazione vini sperimentali/Degustacija poskusnih vin

*Corno di Rosazzo (UD)*

*19.03.2024*

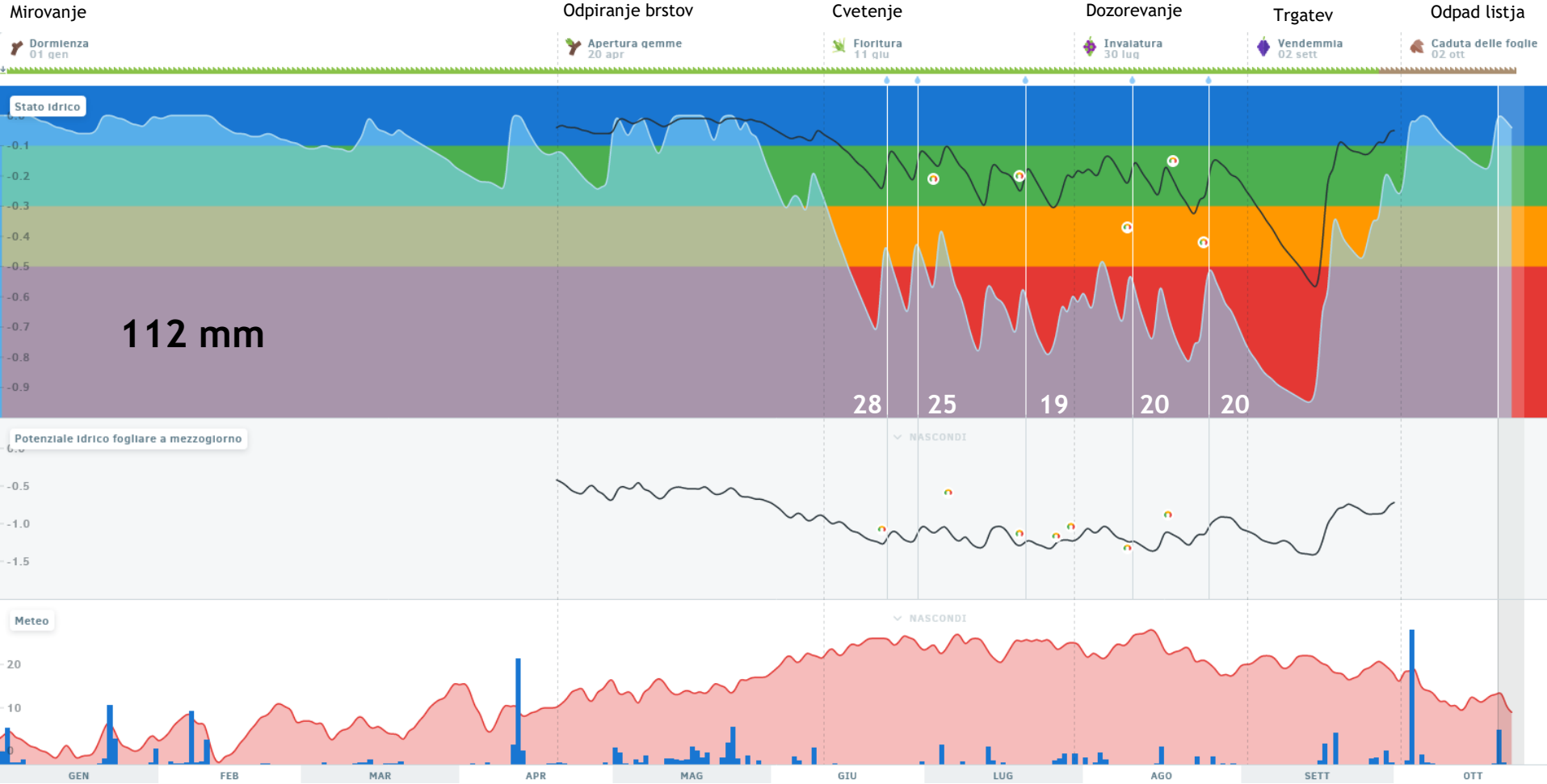
# Irrigazione fisiologica

## Fiziološko namakanje

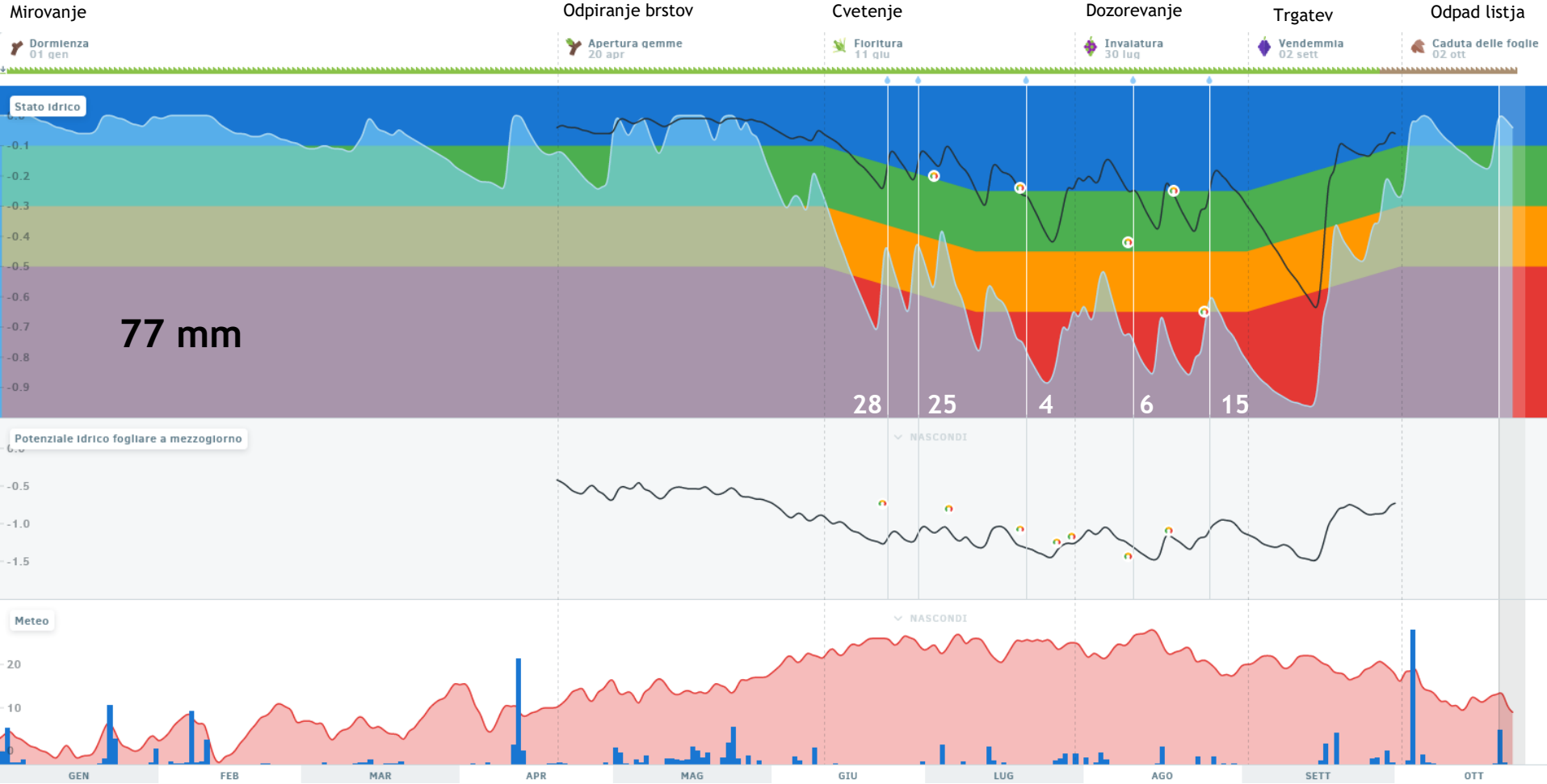
- Le necessità idriche cambiano durante la stagione:
  - crescita della chioma
  - temperatura e umidità dell'aria
  - pioggia e riserva idrica del suolo
- Possiamo calcolare il fabbisogno idrico giornaliera con i lisimetri
- Ma un leggero stress idrico è positivo per la qualità delle uve

- Potrebe po vodi se spreminjajo med sezono:
  - rast krošnje
  - temperatura in vlažnost zraka
  - deževnica in rezerva vode v tleh
- Dnevno potrebo po vodi lahko izračunamo z lizimetri
- Manjši vodni stres pa je lahko pozitiven in ima dober vpliv na kakovost grozdja

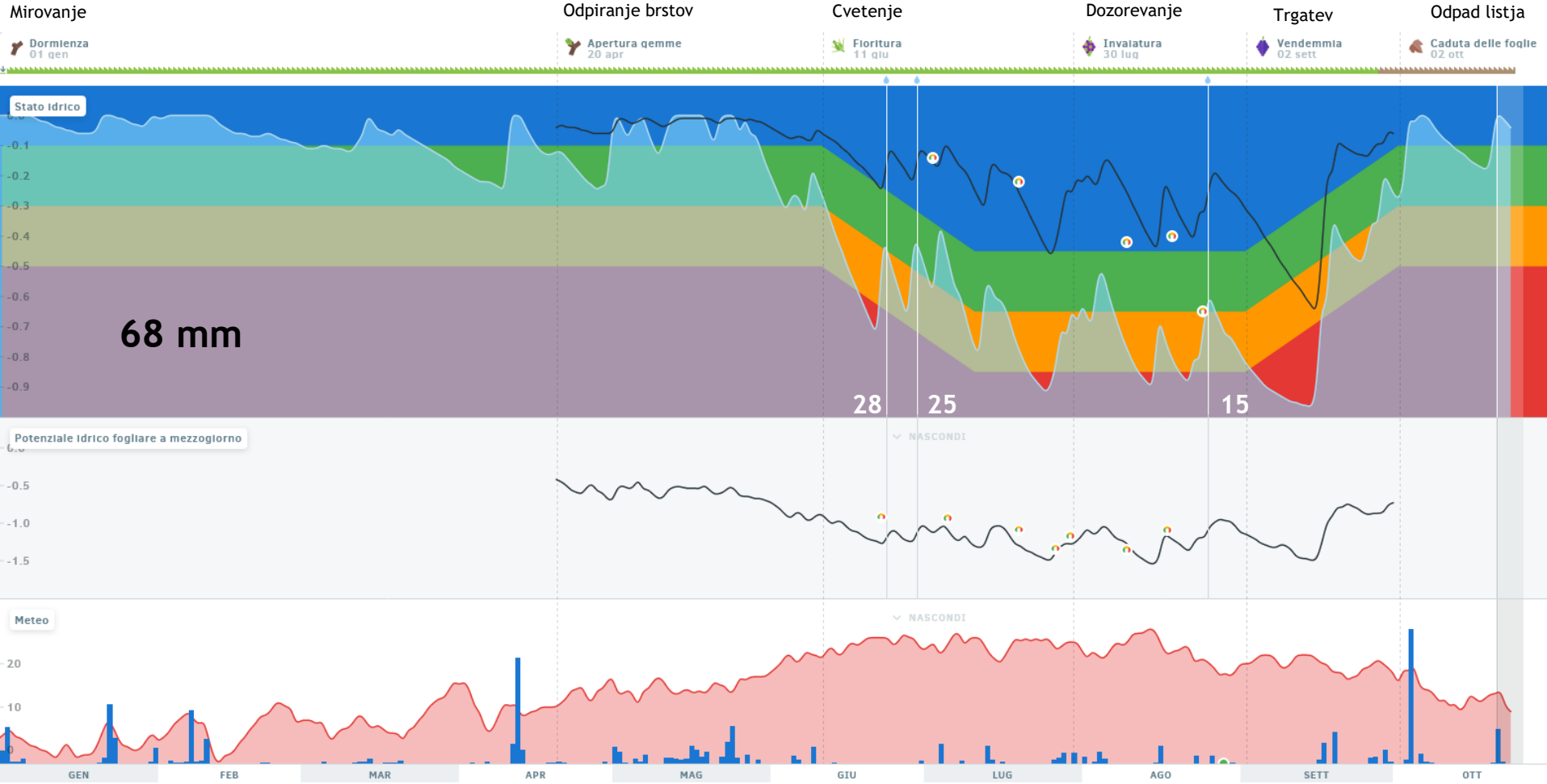
# IL DSS VINTEL / Sistem za podpora odločanju VINTEL



# IL DSS VINTEL / Sistem za podporo odločanju VINTEL



# IL DSS VINTEL / Sistem za podporo odločanju VINTEL



# IL DSS VINTEL / Sistem za podporo odločanju VINTEL



# IL DSS VINTEL / Sistem za podpora odločanju VINTEL

Odpiranje brstov

Cvetenje

Dozorevanje

Trgatev

Odpad listov

Apertura gemme  
15/04/22

Floritura  
27/05/22

Invalitura  
28/07/22

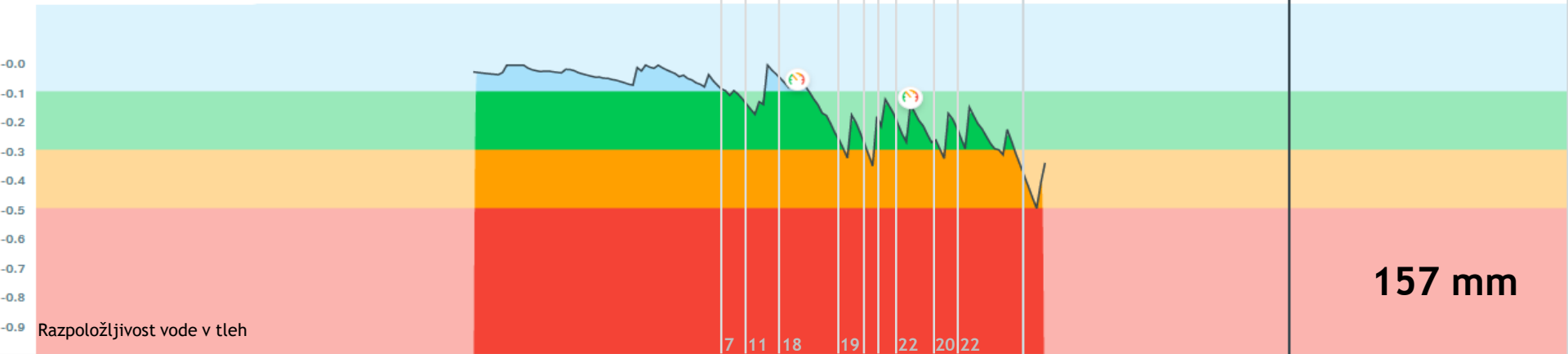
Vendemmia  
06/09/22

Senescenza  
06/11 26/10

Vodni potencial lista



Potenziale fogliare pri...

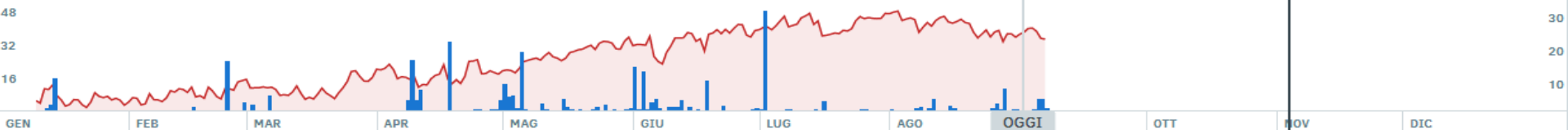


Disponibilità idrica del suolo



Temperatura in padavine

Temperatura e pioggia



# IL DSS VINTEL / Sistem za podporo odločanju VINTEL

Odpiranje brstov

Cvetenje

Dozorevanje

Trgatev

Odpad listov

Apertura gemme  
15/04/22

Floritura  
27/05/22

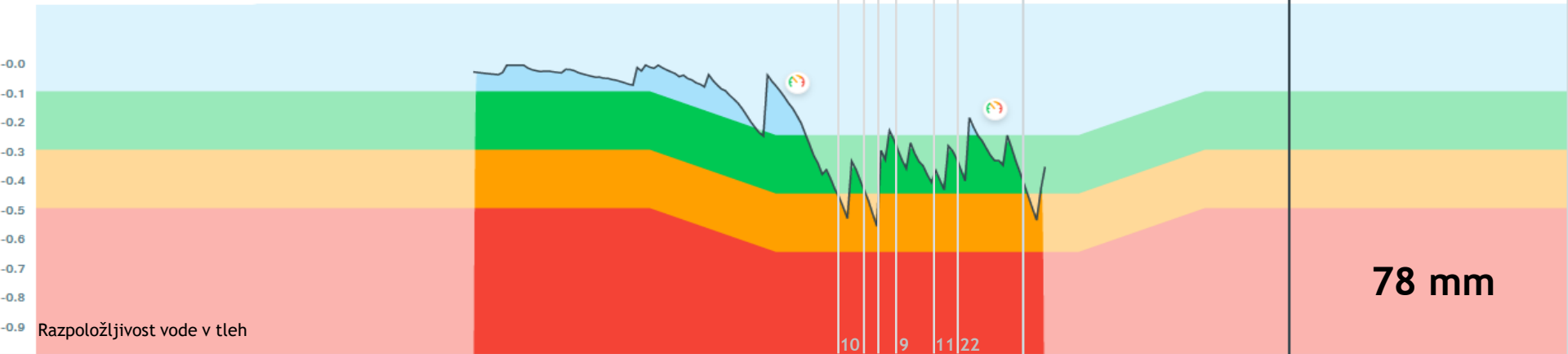
Invalitura  
28/07/22

Vendemmia  
06/09/22

Senescenza  
06/10 26/10

Vodni potencial lista

Potenziale fogliare pri...

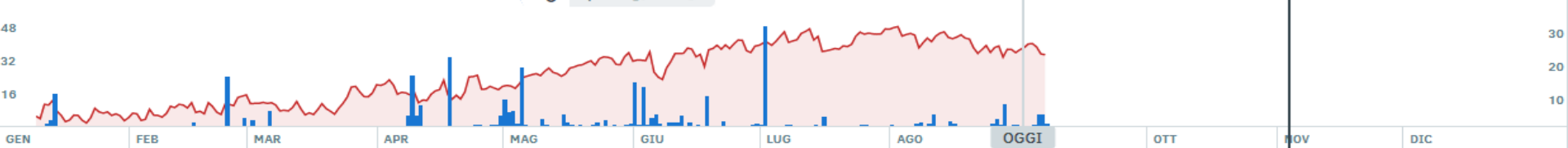


Disponibilità idrica del suolo



Temperatura in padavine

Temperatura e pioggia





# IL DSS VINTEL / Sistem za podporo odločanju VINTEL

Odpiranje brstov

Cvetenje

Dozorevanje

Trgatev

Odpad listov

Apertura gemme  
15/04/22

Floritura  
27/05/22

Invalatura  
28/07/22

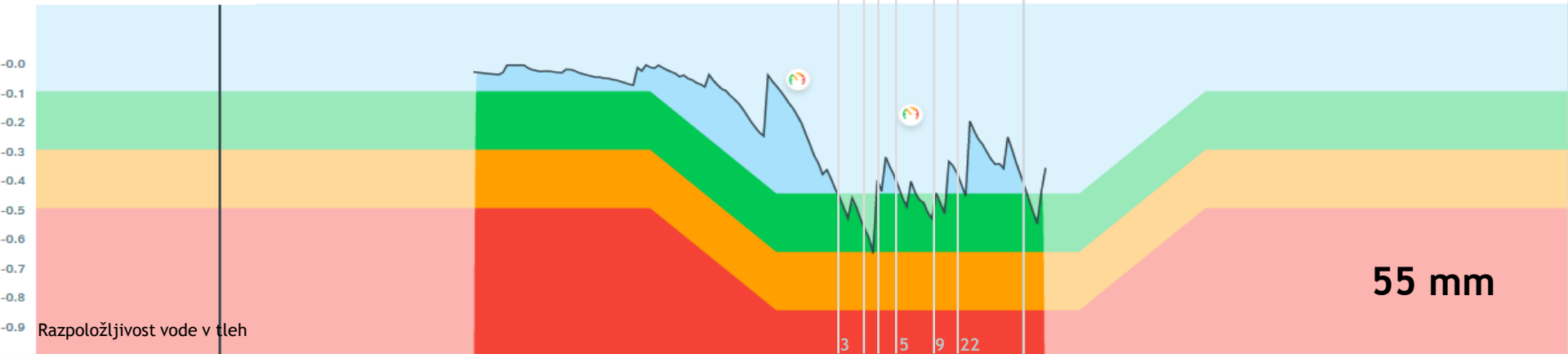
Vendemmia  
06/09/22

Senescenza  
06/10/22

13/02

Vodni potencial lista

Potenziale fogliare pri...



Razpoložljivost vode v tleh

3 5 9 22  
8 8

55 mm

Disponibilità idrica del suolo

85.9 %

Temperatura in padavine

Temperatura e pioggia

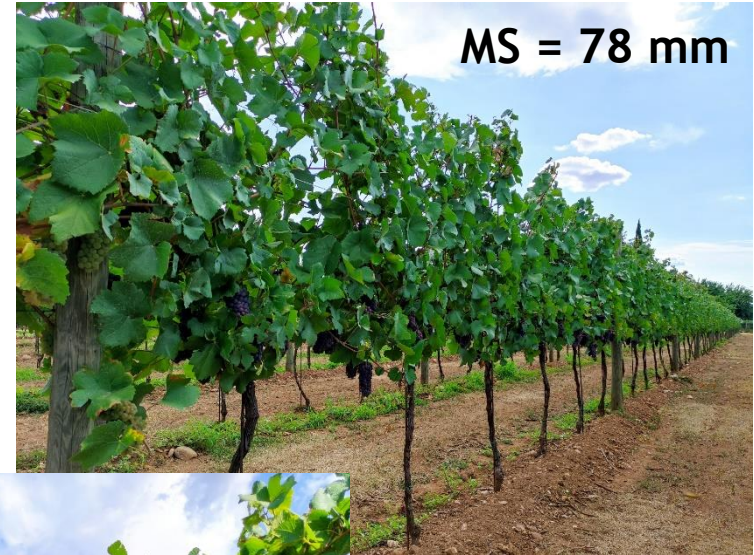
Temperatura padavine usrezna kol. padavin

● Temperatura ● Pioggia ● Pioggia corretta

0 mm (MANUAL)

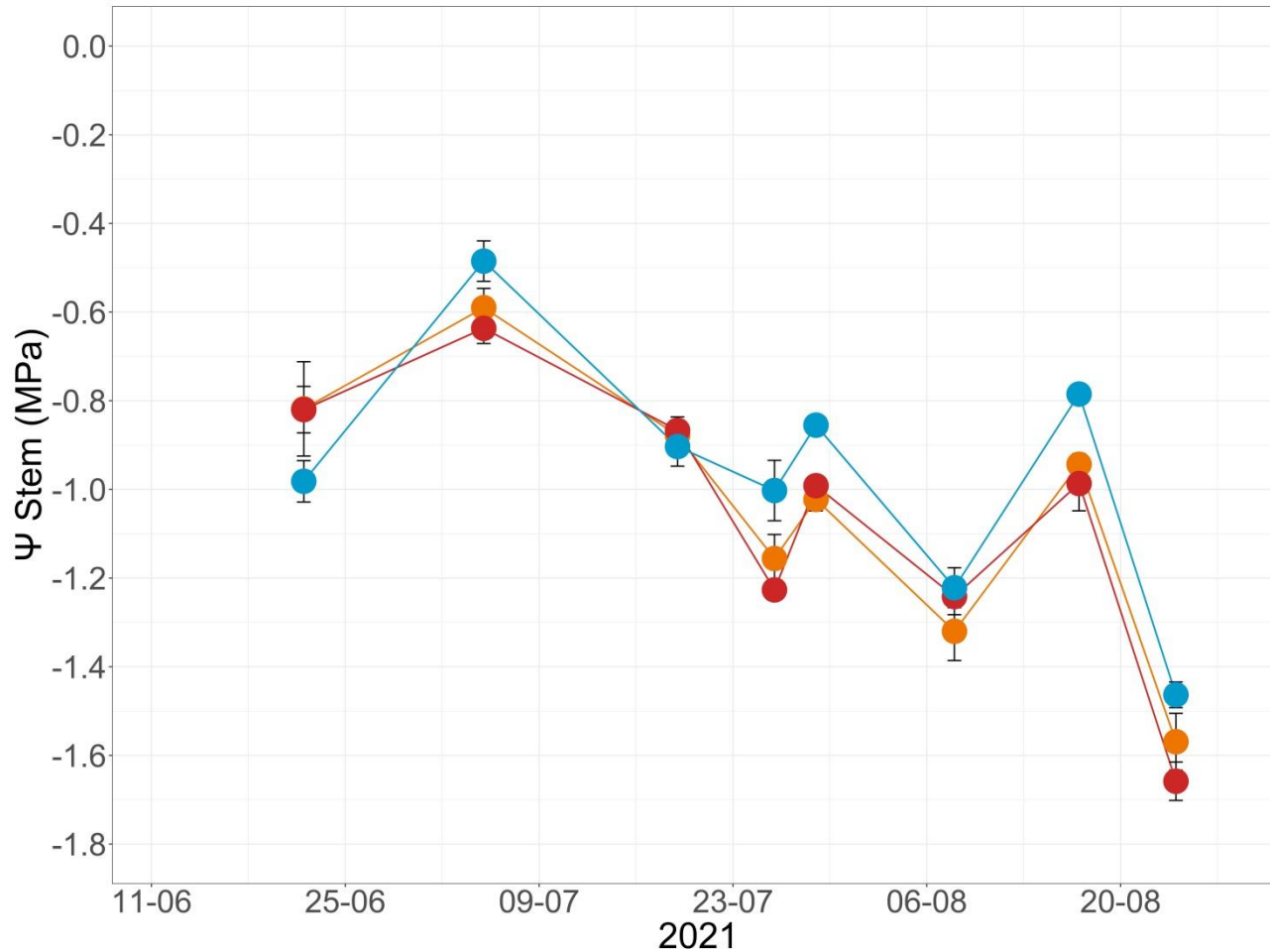
GEN FEB MAR APR MAG GIU LUG AGO OGGI OTT NOV DIC

# IL DSS VINTEL / Sistem za podporo odločanju VINTEL



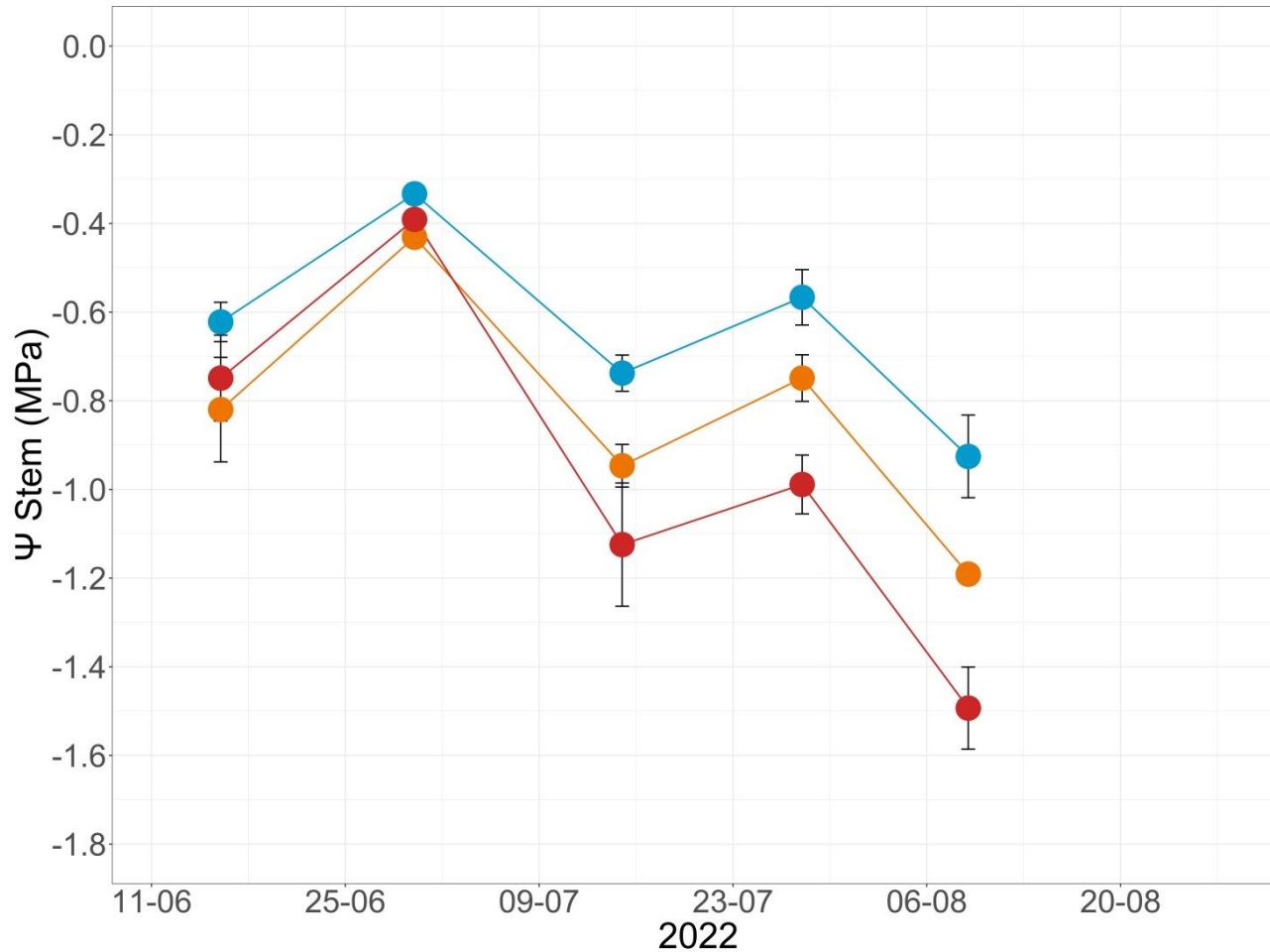
# Potenziale idrico stem 2021

## Vodni potencial steblo 2021



# Potenziale idrico stem 2022

## Vodni potencial steblo 2022



Anno/ Leto	Trattamento vigneto / Obravnava vinograda	numero grappoli / število grozdov	produzione (kg/pianta) / masa pridelka (kg/trta)	peso medio grappolo (g) / teža grozda (g)
2021	irrigato / dobro namakan	27,8	3,15	116
	stress moderato / zmeren stres	26,9	<b>2,76</b>	<b>102</b>
	stress severo / močan stres	28,0	<b>2,89</b>	<b>104</b>
2022	irrigato / dobro namakan	23,8	3,98	171
	stress moderato / zmeren stres	23,0	<b>3,48</b>	<b>153</b>
	stress severo / močan stres	<b>19,9</b>	<b>3,11</b>	<b>156</b>

Anno / Leto	Trattamento / Obravnava	zuccheri / sladkor (°Brix)	acidità titolabile / titracijske kisline (g/L)	pH
2021	irrigato / dobro namakan	17,4	8,6	3,21
	stress moderato / zmeren stres	16,5	8,5	3,21
	stress severo / močan stres	17,0	8,8	3,20
2022	irrigato / dobro namakan	20,0	5,5	3,50
	stress moderato / zmeren stres	19,8	4,8	3,52
	stress severo / močan stres	18,1	4,8	3,57



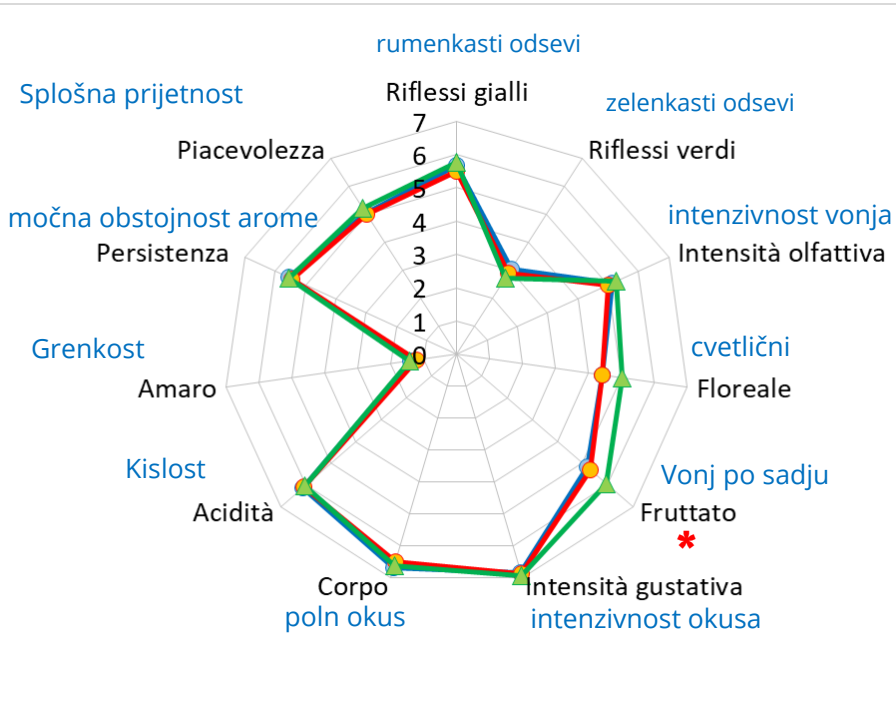
# Aromi vini 2021-22

## Vinske arome 2021-22

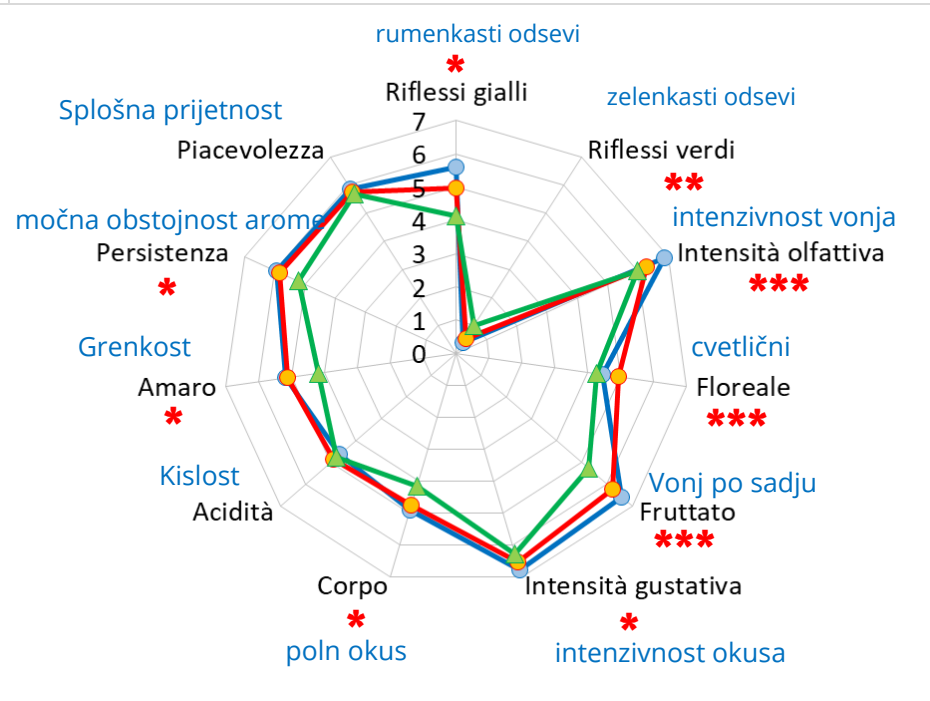
2021		WW	MS	SS
MONOTERPENI	Citronellolo/ citronelol	11,45	10,65	15,99
	Geraniolo/ geraniol	6,81	4,03	2,63
	Nerolidolo/Nerol	8,99	7,94	0,00
SESQUITERPENI	Farnesolo/Farnesol	12,69	13,57	11,73
2022		WW	MS	SS
MONOTERPENI	Linalolo/Linalol	1,73	1,22	0,87
	$\alpha$ -Terpineolo/ $\alpha$ -terpineol	0,78	0,50	0,41
SESQUITERPENI	Farnesene/Farnesen	1,21	0,69	0,38
NORISOPRENOIDI	$\beta$ -Damscenone/ $\beta$ -damscenon	12,16	6,24	4,90



# Aromi sensoriale vini Senzorične vinske arome



● WW ● MS ▲ SS





ELSEVIER

Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

### Smart Agricultural Technology

journal homepage: [www.journals.elsevier.com/smart-agricultural-technology](http://www.journals.elsevier.com/smart-agricultural-technology)

## An analysis of the effects of water regime on grapevine canopy status using a UAV and a mobile robot

Diego Tiozzo Fasiolo <sup>a</sup>, Alessandro Pichierri <sup>b,c</sup>, Paolo Sivilotti <sup>c</sup>, Lorenzo Scalera <sup>a,\*</sup><sup>a</sup> Polytechnic Department of Engineering and Architecture, University of Udine, Via delle Scienze 206, Udine, 33100, Italy<sup>b</sup> Department of Life Sciences, University of Trieste, Via Licio Giorgieri 5, Trieste, 34127, Italy<sup>c</sup> Department of Food, Environmental, and Animal Sciences, University of Udine, Via delle Scienze 206, Udine, 33100, Italy

#### ARTICLE INFO

Editor: Spyros Fountas

##### Keywords:

Precision viticulture

Robotics

Water potential

Vegetation indexes

3D reconstruction

#### ABSTRACT

In this paper, we propose a novel approach for analyzing the effects of water regime on grapevine canopy status using robotics as an aid for monitoring and mapping. Data from an unmanned aerial vehicle (UAV) and a ground mobile robot are used to obtain multispectral images and multiple vegetation indexes, and the 3D reconstruction of the canopy, respectively. Unlike previous works, sixty vegetation indexes are computed precisely by using the projected area of the vineyard point cloud as a mask. Extensive experimental tests on repeated plots of Pinot gris vines show that the GDVI, PVI, and TGI vegetation indexes are positively correlated with the water potential: GDVI ( $R^2 = 0.90$  and  $0.57$  for the stem and pre-dawn water potential, respectively), PVI ( $R^2 = 0.90$  and  $0.57$ ), TGI ( $R^2 = 0.87$  and  $0.77$ ). Furthermore, the canopy volume and the canopy area projected on the ground are impacted by the water status, as well as stem and pre-dawn water potential measurements. The results obtained in this work demonstrate the feasibility of the proposed approach and the potential of robotic technologies, supporting precision viticulture.

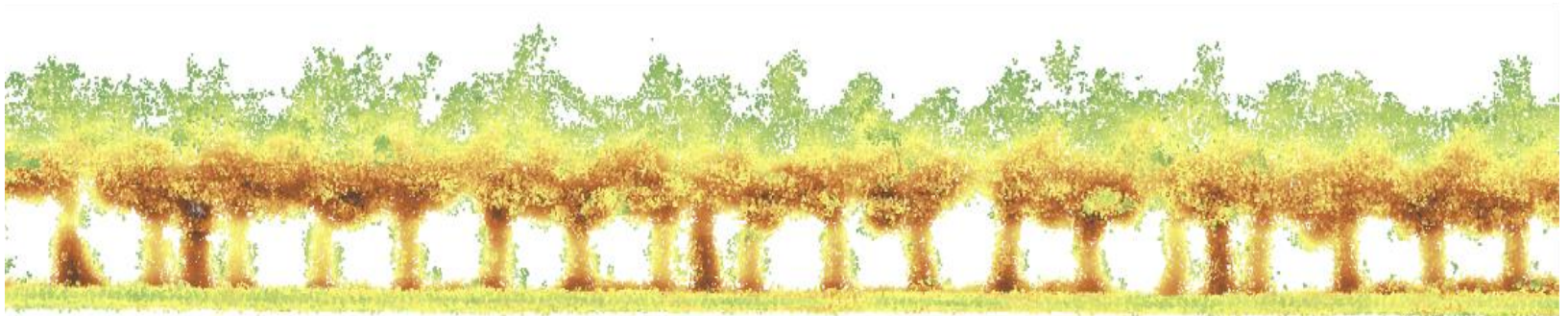
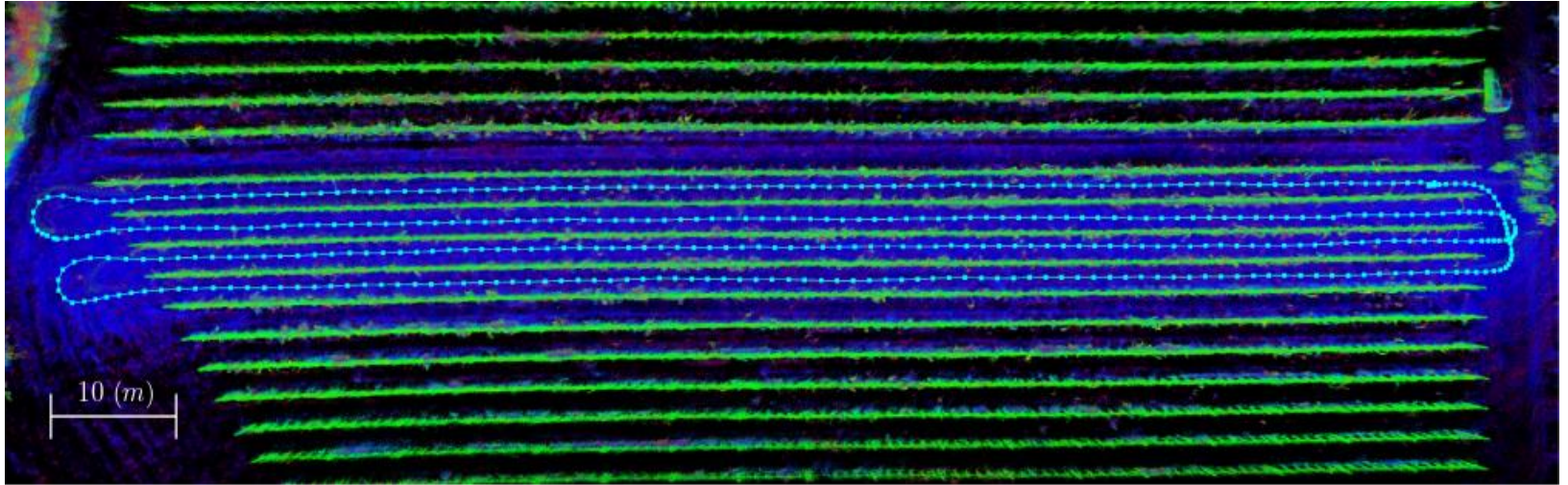
# Analisi droni e stress idrico

## Analiza z droni in vodni stres



# Analisi droni e stress idrico

## Analiza z droni in vodni stres



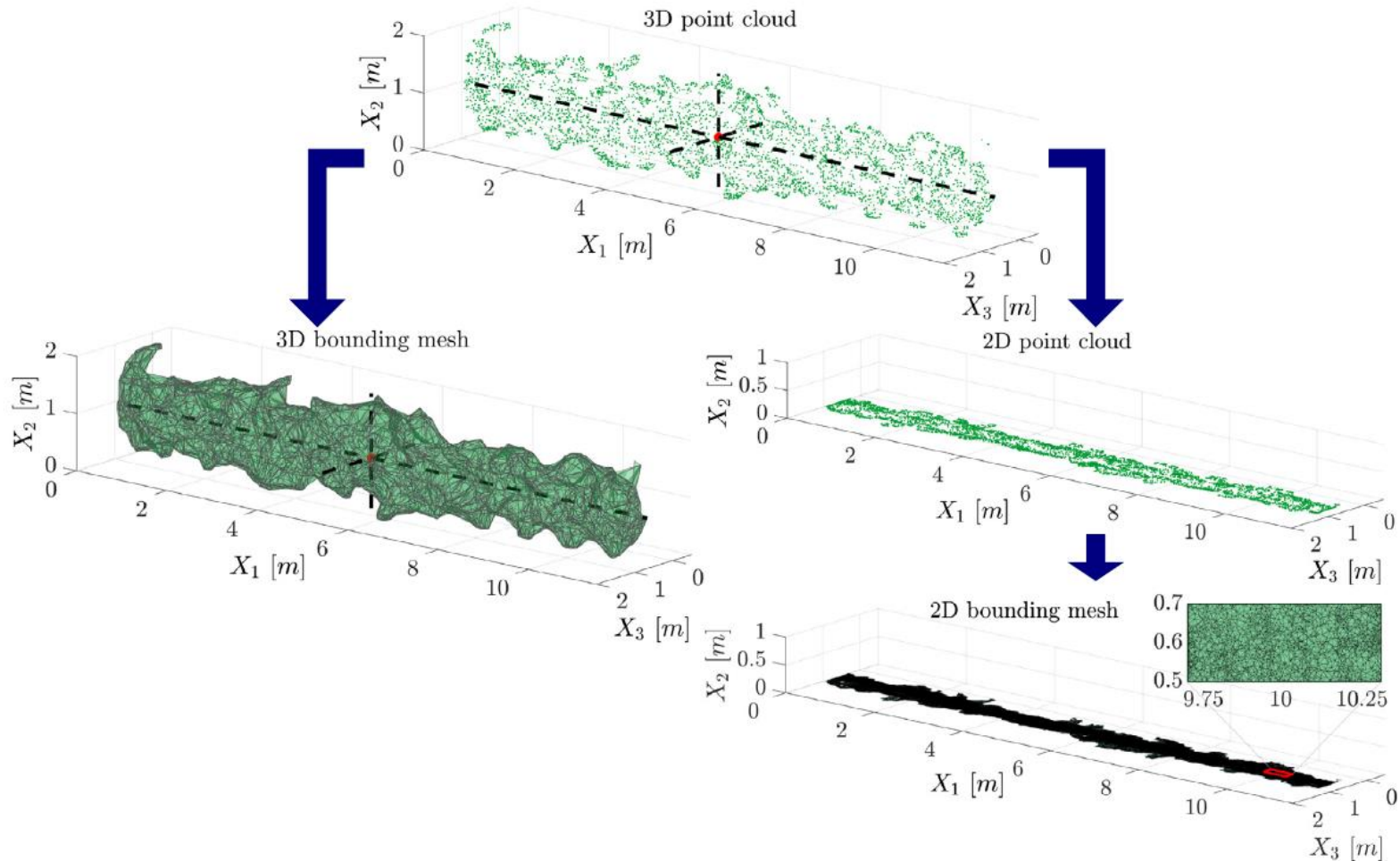
29

(pts/m<sup>3</sup>)  
 $44 \cdot 10^3$

1 (m)

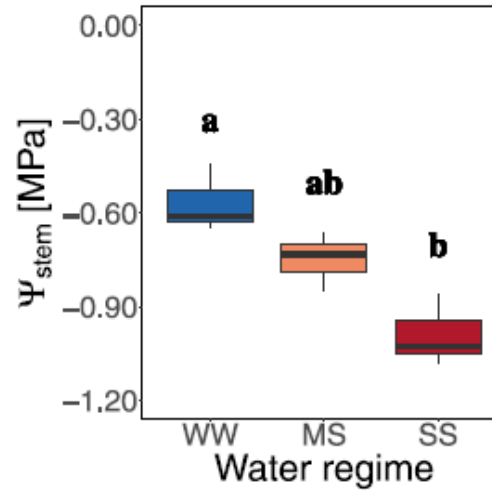
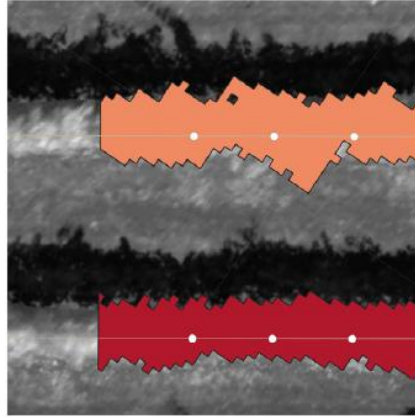
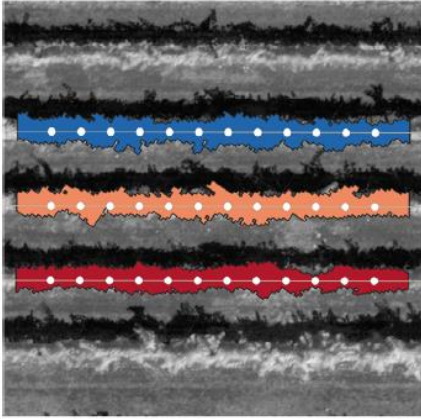
# Analisi droni e stress idrico

## Analiza z droni in vodni stres

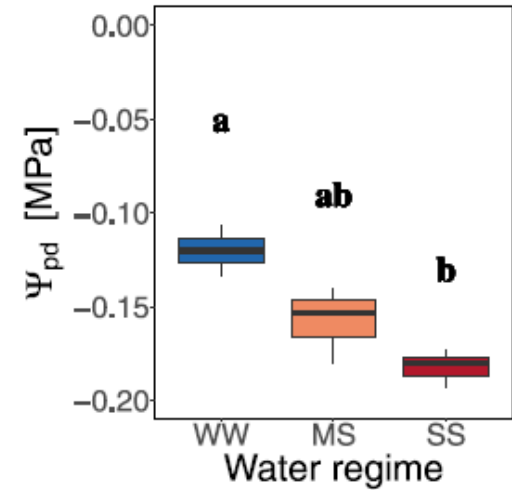


# Analisi droni e stress idrico

## Analiza z droni in vodni stres



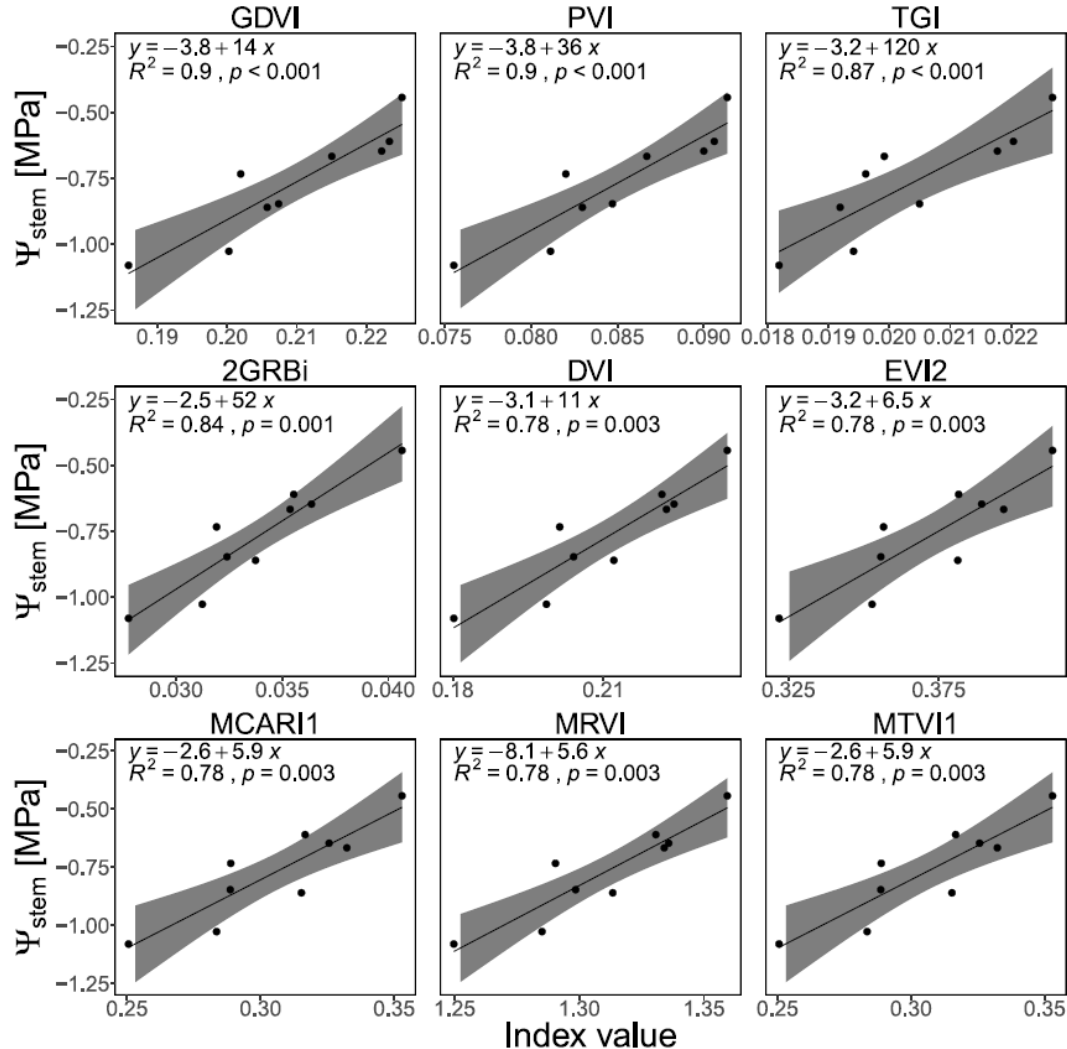
(a)



(b)

# Analisi droni e stress idrico

## Analiza z droni in vodni stres





Grazie per l'attenzione!  
Hvala za pozornost!

*Kick-off Meeting*  
*Paolo Sivilotti*  
*Project Manager*  
*LP – Università degli studi di Udine*



[www.ita-slo.eu/IRRIGAVIT](http://www.ita-slo.eu/IRRIGAVIT)

[www.ita-slo.eu/ACQUAVITIS](http://www.ita-slo.eu/ACQUAVITIS)

[www.acquavitis.eu](http://www.acquavitis.eu)



[www.facebook.com/IrrigavitAcquavitis](http://www.facebook.com/IrrigavitAcquavitis)



[www.twitter.com/irrigavit](http://www.twitter.com/irrigavit)



[www.instagram.com/irrigavit.acquavitis.project](http://www.instagram.com/irrigavit.acquavitis.project)



[https://www.youtube.com/watch?v=nJ1ZniWfVyU&list=PLjeYOLSdpD-xYOfaVok3pht\\_9ZpQVrVka](https://www.youtube.com/watch?v=nJ1ZniWfVyU&list=PLjeYOLSdpD-xYOfaVok3pht_9ZpQVrVka)



<https://www.linkedin.com/in/irrigavit-acquavitis-2-20775b29b/>

Il progetto IRRIGAVIT è co-finanziato dall'Unione europea nell'ambito del Programma Interreg VI-A Italia-Slovenia 2021-2027.  
Projekt IRRIGAVIT sofinancira Evropska unija v okviru Programa Interreg VI-A Italija-Slovenija 2021-2027.

Partner di progetto/Projektne partnerji: