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evja

12/07/2023

CREA-OF Pontecagnano (SA) – ITALY

EVJA: ABOUT US

OFFICES: Naples, Italy and Wageningen, Netherlands

CUSTOMERS: 100+ (300+ sensor node devices)

MONITORED FARMLAND: 1000+ HA horticulture.

MARKETS: active in all main horticultural (leaves, tomatoes, berries, potatoes, etc.)

GEOGRAPHIES: present in 9 countries, 4 continents.

PATENTS: 4 approved, of which 3 WIPO granted.

INVESTORS

PARTNERS & PROJECTS

EVENTS AND AWARDS

KEY ASSETS

Software platform

- IoT device managements
- NoSQL database
- Microservices architecture
- Progressive WebApp

Agronomic algorithms & models

- Predictive models of Diseases and Harvest
- Agronomic and Climatic Algorithms
- AI: Machine learning
- Test field for Validations and Calibrations

Data Collection and Analysis

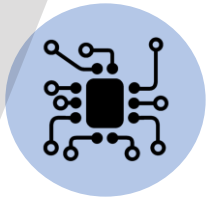
- Micro-Climate Data
- Weather Data
- Field monitoring Data

Agronomic Technical Services

- Training courses
- Manuals & Guides
- Remote Assistance & Support

Wireless Sensor Networks

- Sensor Nodes
- COTS Device Customization
- Network design & deployment
  [Patent Approved]



Electronics

- Design, prototyping and industrialization
- Fully Wireless proprietary micro-board
  [Patent Approved]

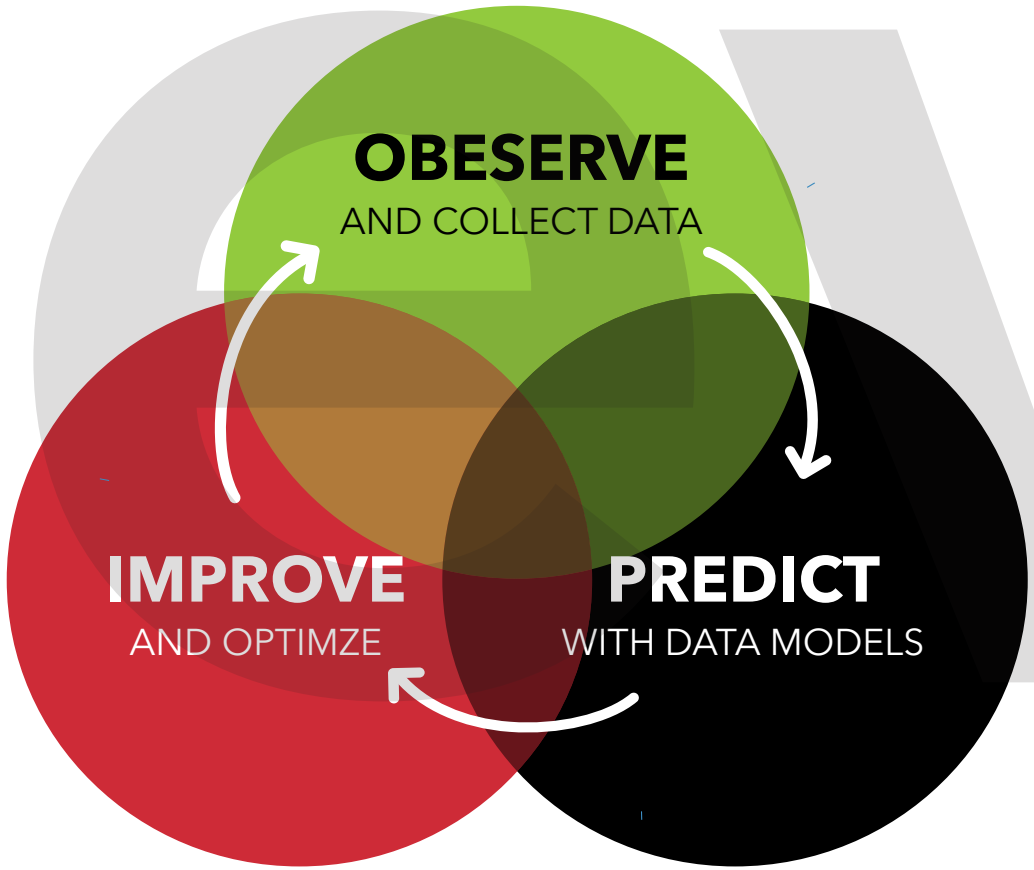
Mechanics

- Design, prototyping and industrialization
- Custom telescopic-rotating Arm Holder

Operations

- Assembly and Testing
- Inspections & Installation
- Field repairing and intervention

SUPPORT MAKE THE BEST AND MOST SUSTAINABLE DECISIONS



opi

- **WATER MANAGEMENT**
- **NUTRITION OPTIMIZATION**
- **IMPROVED EFFICIENCY OF AGROCHEMICALS**
- **YIELD PREDICTION**

SUSTAINABLE DEVELOPMENT GOALS

OPI Decision Support System

The OPI Decision Support System (DSS) developed by Evja is a hardware and software bundle based on a proprietary Wireless Sensor Networks:

- The **Sensor Node devices** collect Climate, Pedoclimate and Weather data, via special sensors.
- The collected data are wirelessly sent to OPI platform by consuming **APIs** via **cellular network**
- The data are stored and aggregated by our **Data Processing Engine** for processing and calculations.
- The data by mean the **responsive web portal**, accessible by any desktop or mobile device.

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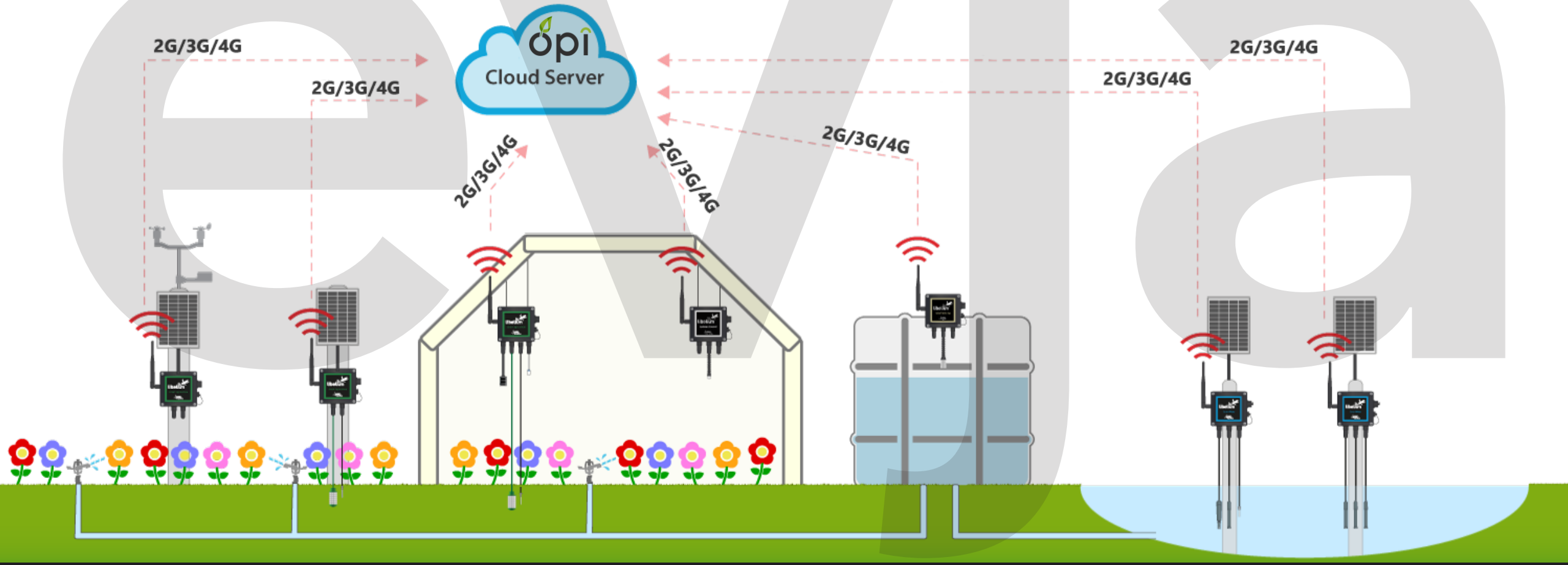
OPI Wireless Sensor Network

OPI Wireless Sensor Network

Each Sensor Node device is directly connected to EVJA's cloud servers via **cellular network** (2G/3G/4G/5G).

They have a direct connection to **OPI Cloud Platform** by consuming **our APIs** by means cellular data transmission.



OPI Sensor Node: main features

Energy independent

The internal battery is recharged by a small solar panel.

Very low-power consumption

Work for weeks even in case of lack of battery charging.

Internal Memory

Avoid the loss of acquired data in case of network communication interruption.

Connectivity

Secure internet connection via Cellular network.
Wi-Fi, NB-IoT, Sigfox and LoRa versions are also available.

Geolocalization & Motion

Keep track of the position and every movement of your device on field thanks the GPS-GLONASS-GALILEO receiver module and internal Accelerometer and Gyroscope.

Remote upgrade and maintenance

Remote firmware upgrade and Built-in test equipment for remote fault diagnosis.

Robust waterproof chassis

The enclosure meet the standard UL 746 C) with ingress protection IP65 and impact resistance IK08 to ensure full performance also in outdoor and moving applications.

OPI Sensor Node: installation on field

Comfortable mounting

The device comes with a convenient mounting kit:
Arm, Pole or Tripod with special holders and brackets.

Easy installation

Turn it on and go live thanks to remote configuration and customization.

Internal Memory

Avoid the loss of acquired data in case of network interruptions.

No Software Setup

System ready and accessible upon user login. Only an internet browser and internet connection are needed.

Support & Maintenance

Fast support and easy maintenance, thanks to:

- Convenient connectors to add or replace sensors
- Built-in test equipment for remote fault diagnosis
- Remote upgrades
- Customer Support by phone, email and WhatsApp

OPI Sensor Node: installation on field












OPI Sensor Node: iGUESSmed Trial Fields installation

OPI Sensor Node: iGUESSmed Trial Fields installation

OPI Sensor Node: iGUESSmed Commercial Greenhouse installation

OPI Sensor Node: iGUESSmed Commercial Greenhouse installation

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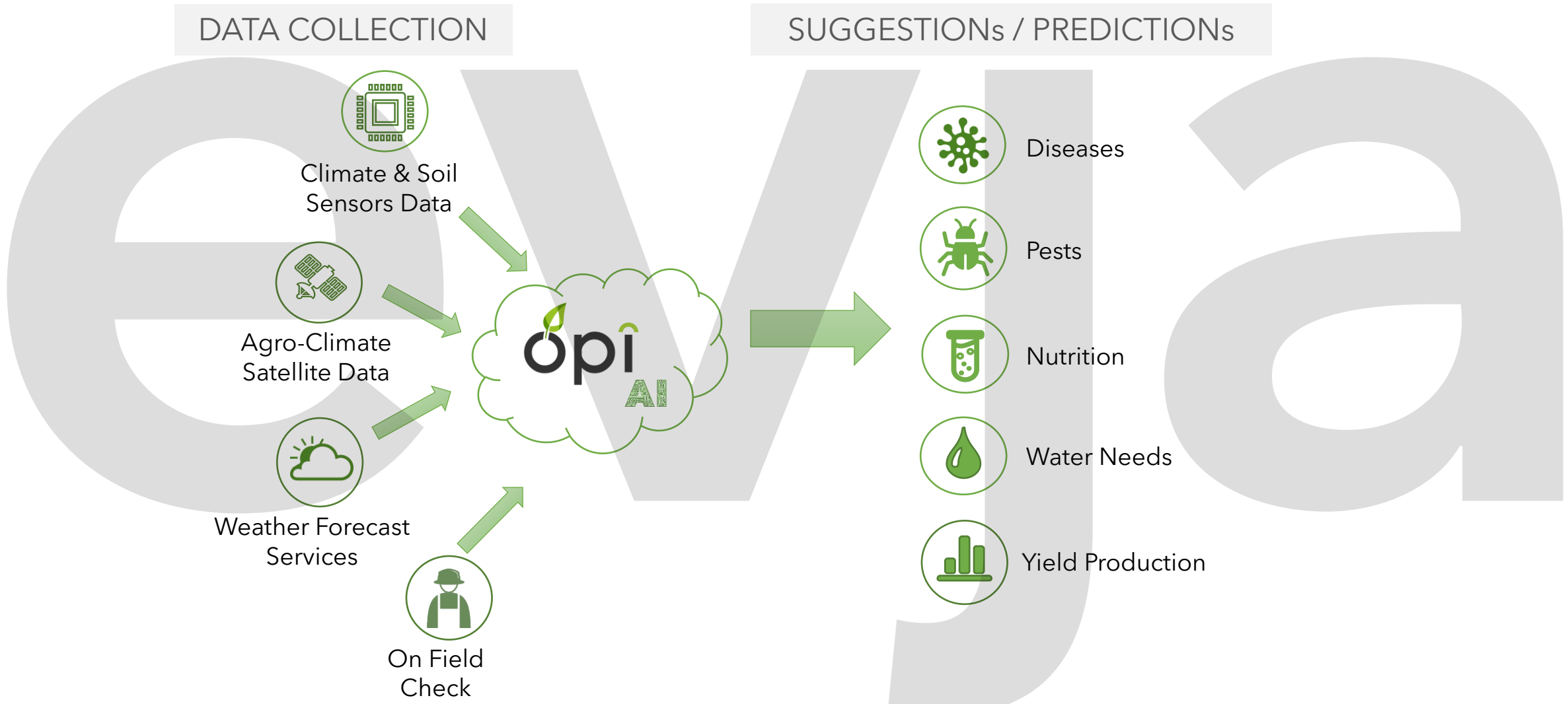
OPI Cloud Platform for iGUESSmed project

OPI Data Collection



OPI Platform: Main Features

Crop Stats

- Data every 15/30 mins
- Averages and Statistics

Custom Alerts

- Thresholds for Real Time alerts
- Email and Web notifications

Agronomic Data Analysis

- Real time and hystorical analysis
- Compare and analyze your trends

Weather forecast for comparison at-a-glance

Alert from the Field

Maps Integration & Device Geolocation

Shared Calendar for daily field operations

Customizable Profile for Enhanced Access

Data and Charts Export

Cross Platform Web Application

Clean and Product–specific User Interface

Cloud Platform whenever-wherever accessible

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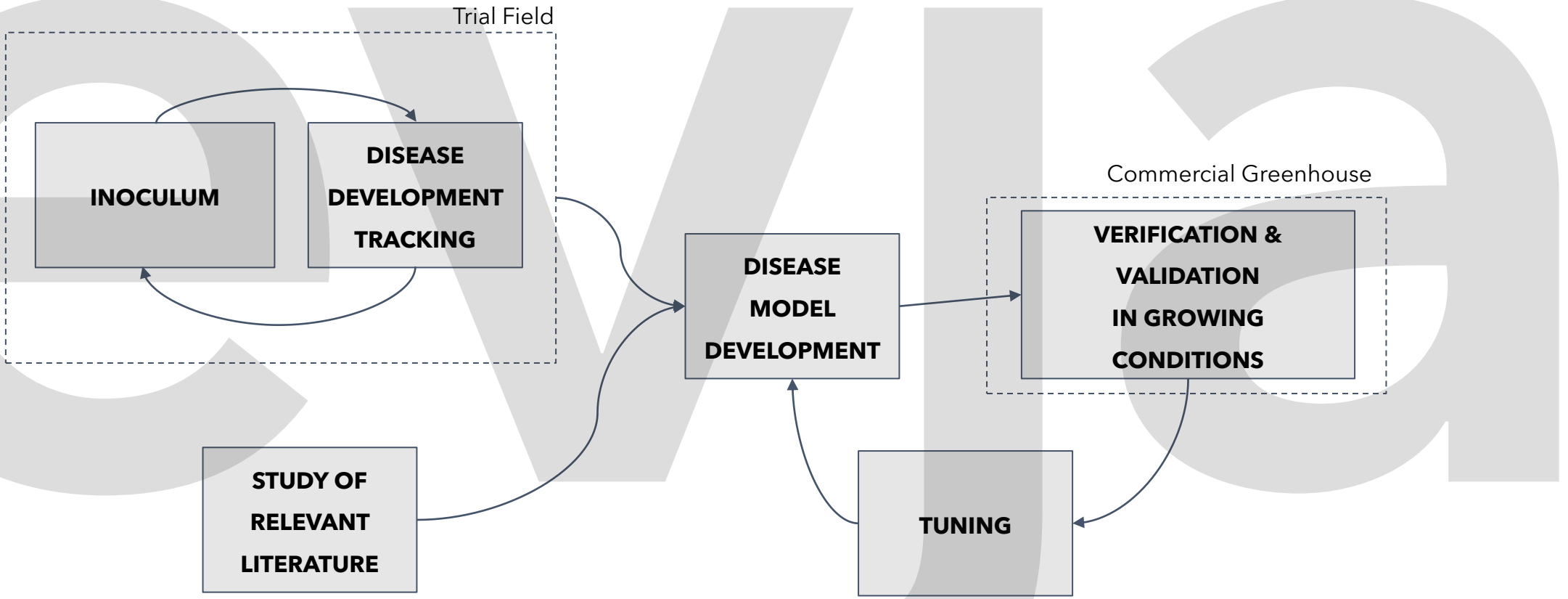
Agronomic Algorithms & Models

Agronomic Algorithms & Models

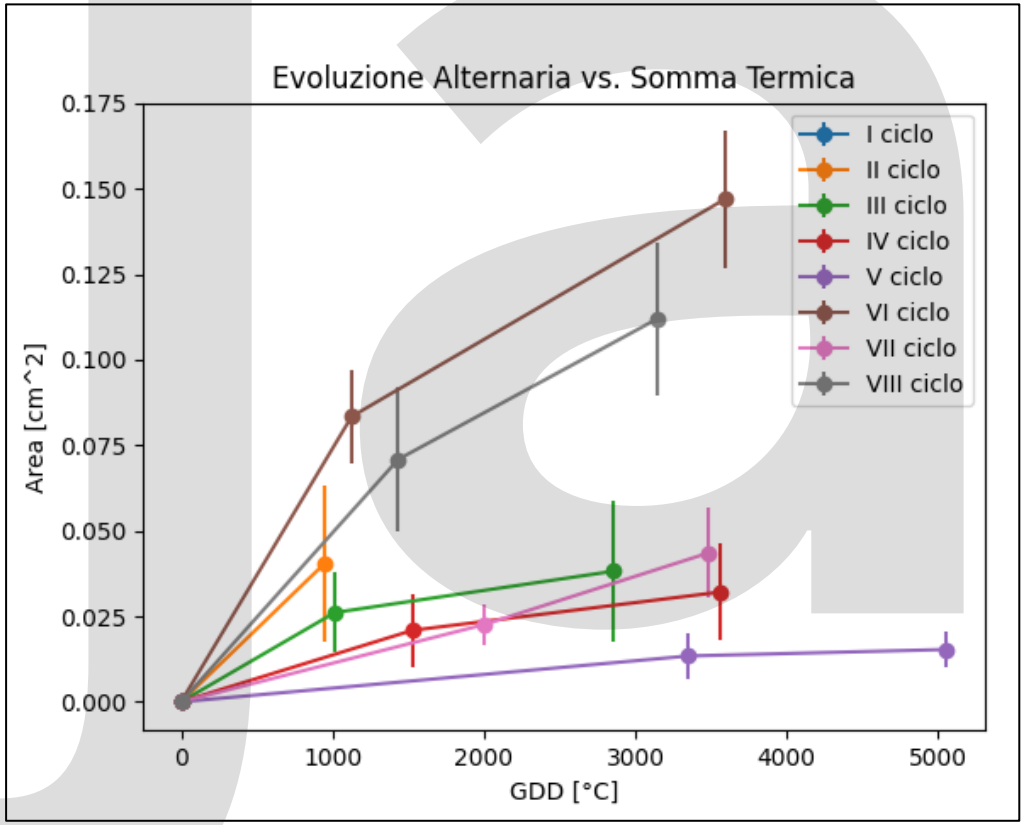
- **Pathogen models**:
  - *Alternaria*
  - *Botrytis*
- **Greenhouse climate control algorithms**
- **Fertigation models:**
  - Water requirements: *PrHO*
  - Fertigation in soil: *VegSyst*
  - Fertigation in soilless cultivation: *SimulHydro*

PATHOGEN MODELS DEVELOPMENT PATH



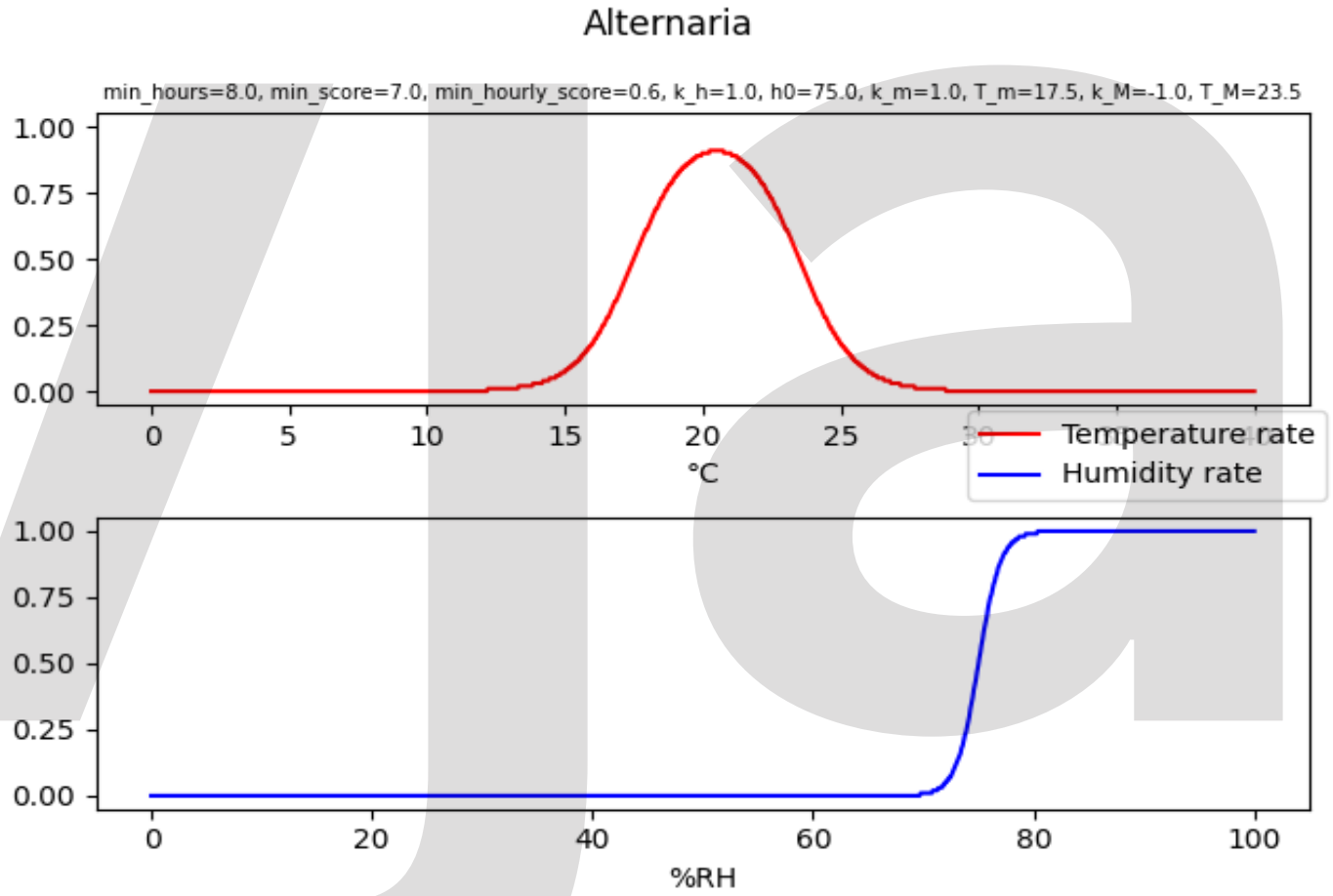
PATHOGEN MODELS DEVELOPMENT PATH

INOCULUM → **DISEASE DEVELOPMENT** → **DISEASE DEVELOPMENT TRAKING**

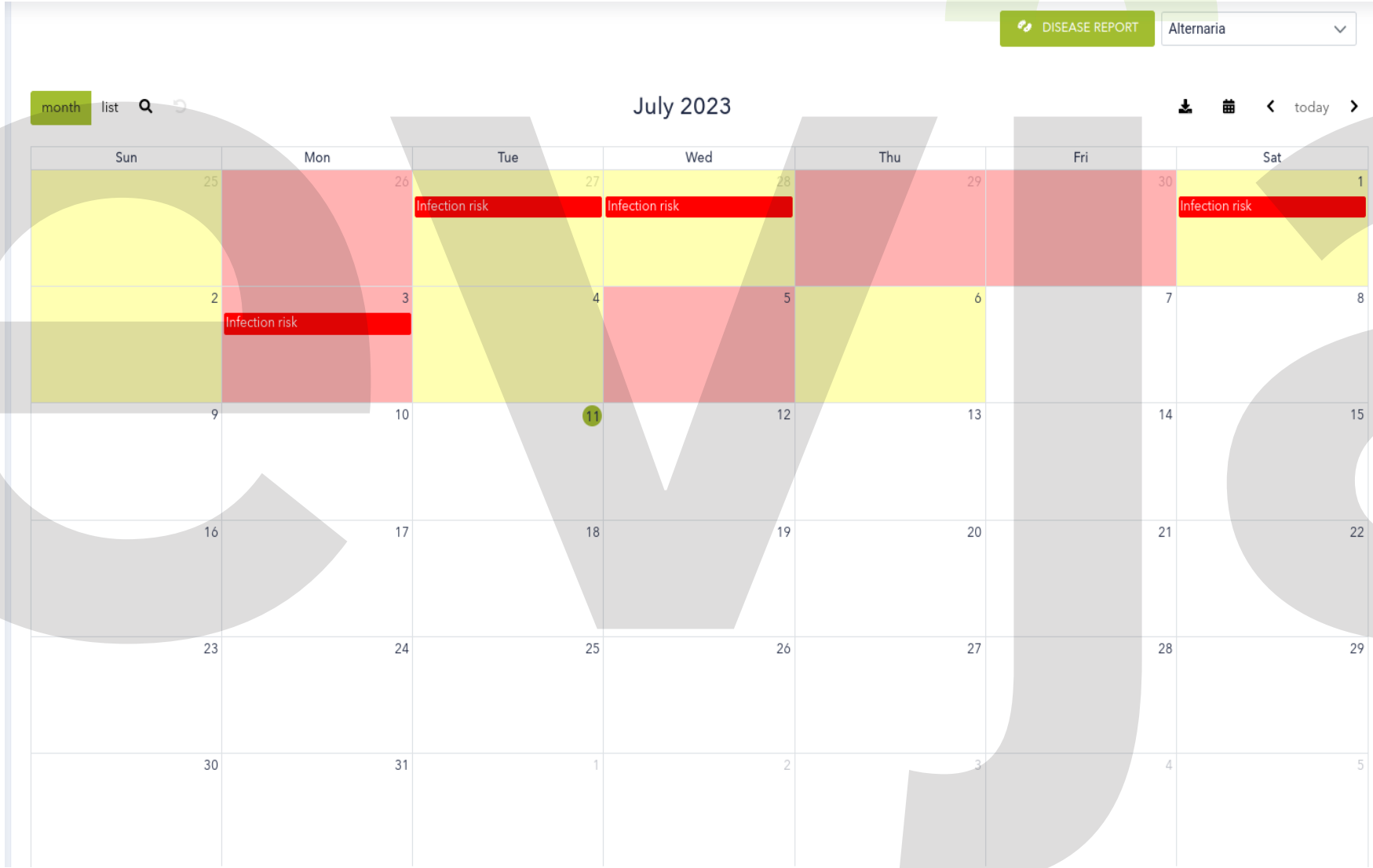


ALTERNARIA PREDICTIVE MODEL

- Hourly infection risk scores based on temperature and humidity
- Dry climate only pauses pathogen development
- Infection is predicted with long enough favourable climate

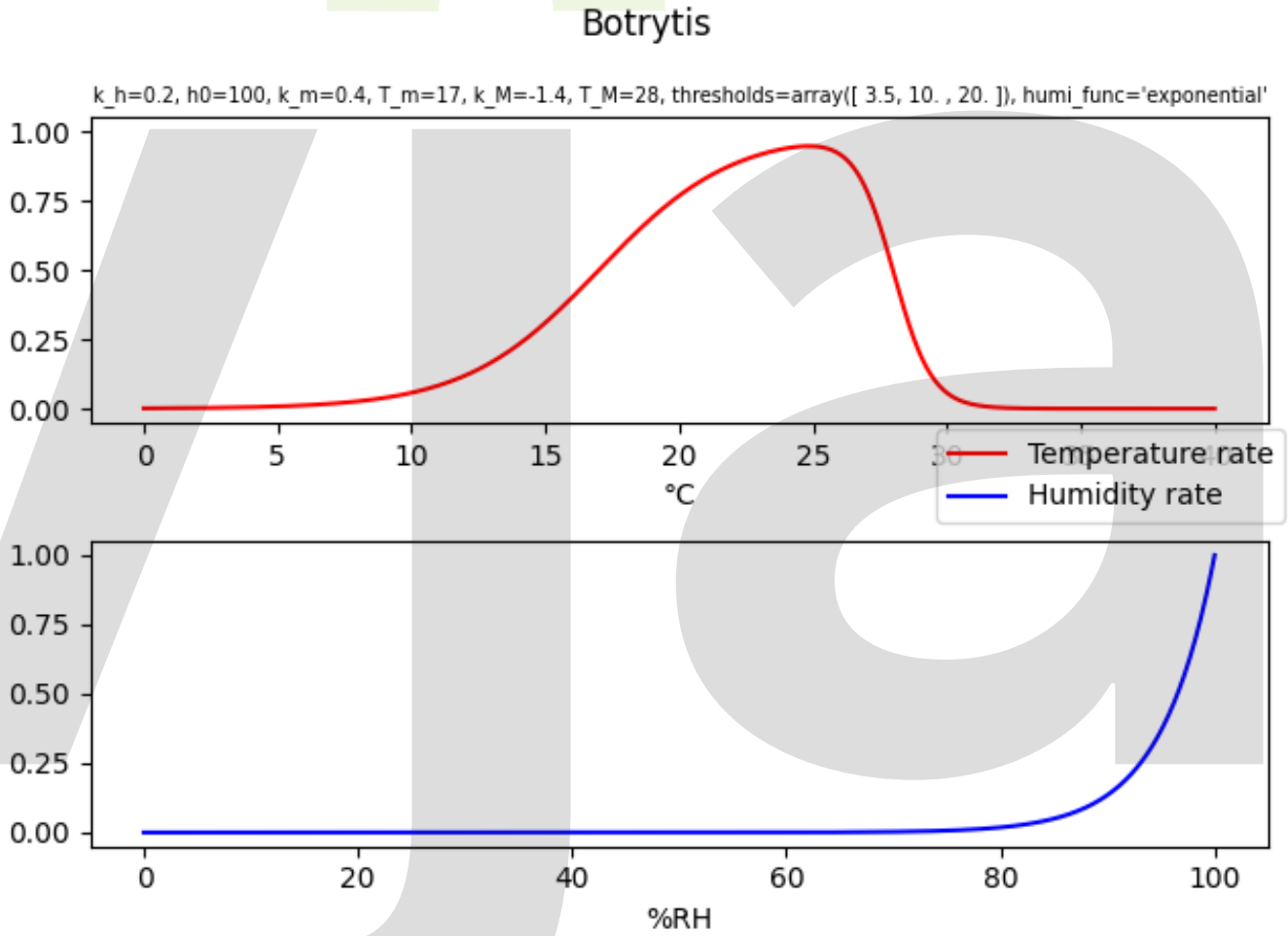


ALTERNARIA PREDICTIVE MODEL

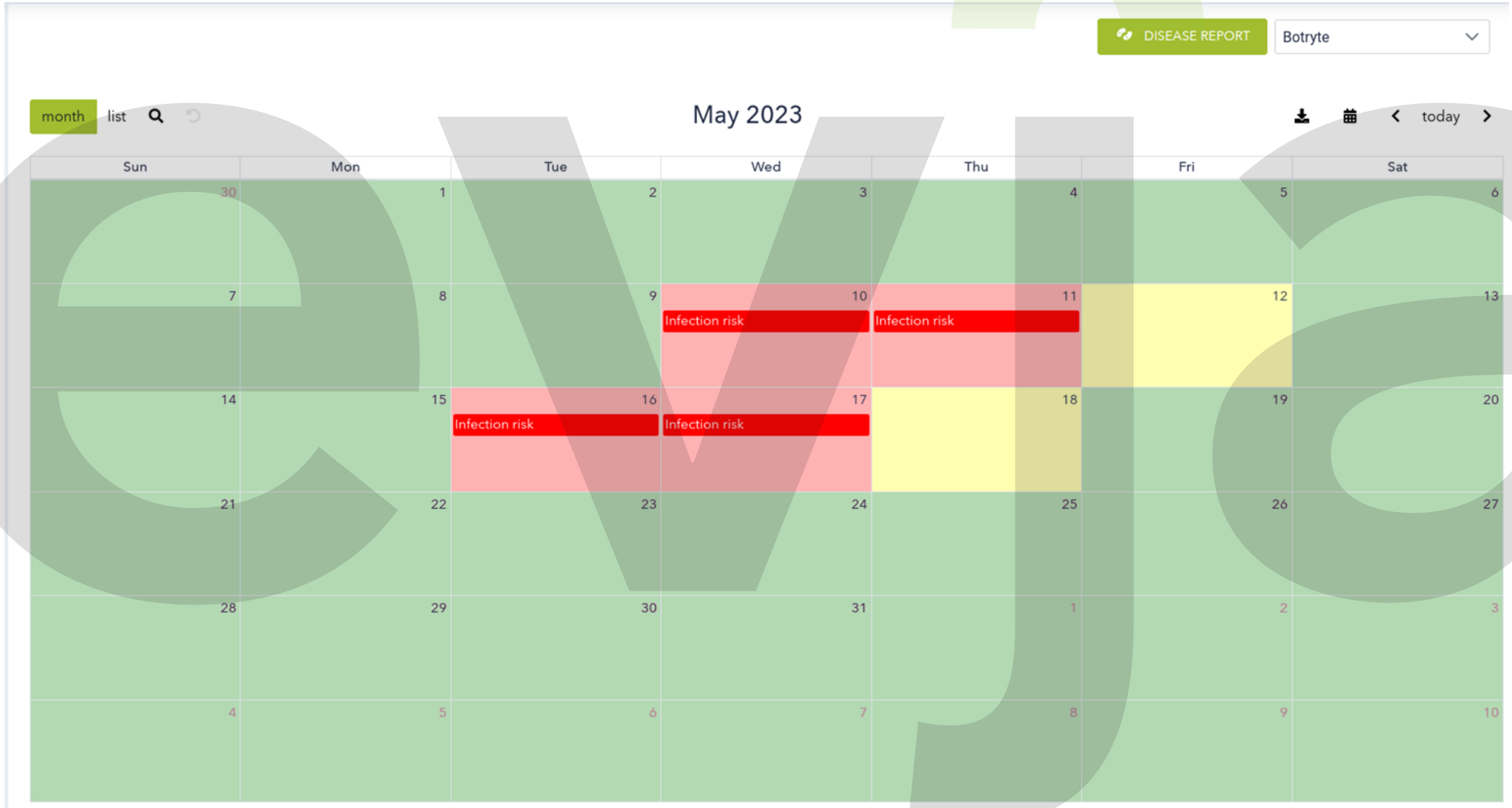


BOTRYTIS PREDICTIVE MODEL

- Hourly infection risk scores based on temperature and humidity
- Dry climate only pauses pathogen development
- Infection is predicted with long enough favourable climate, with 3 damage levels



BOTRYTIS PREDICTIVE MODEL



Greenhouse climate control algorithms

- *Greenhouse cover transmissivity estimation*
- *Whitewash removal/application advice*
- *CO2 depletion alert*
- Condensation alert on:
  - Leaves
  - Fruits
  - Greenhouse cover

GREENHOUSE CLIMATE CONTROL ALGORITHMS

PRHO: WATER REQUIREMENTS MODEL

Water requirements model estimates:

- **Evapotranspiration** from Temperature and Solar Radiation
- **Crop coefficient** from Growing Degree Days (GDD), plantation density and transplant season
- **Water requirements**, correcting for irrigation water EC and irrigation system

PRHO: WATER REQUIREMENTS

Configuration

Transplant date	30/12/2022	
Plant density	2	plants/m^2
Irrigation water EC	0.6	dS/m
Irrigation uniformity coefficient	0.95	

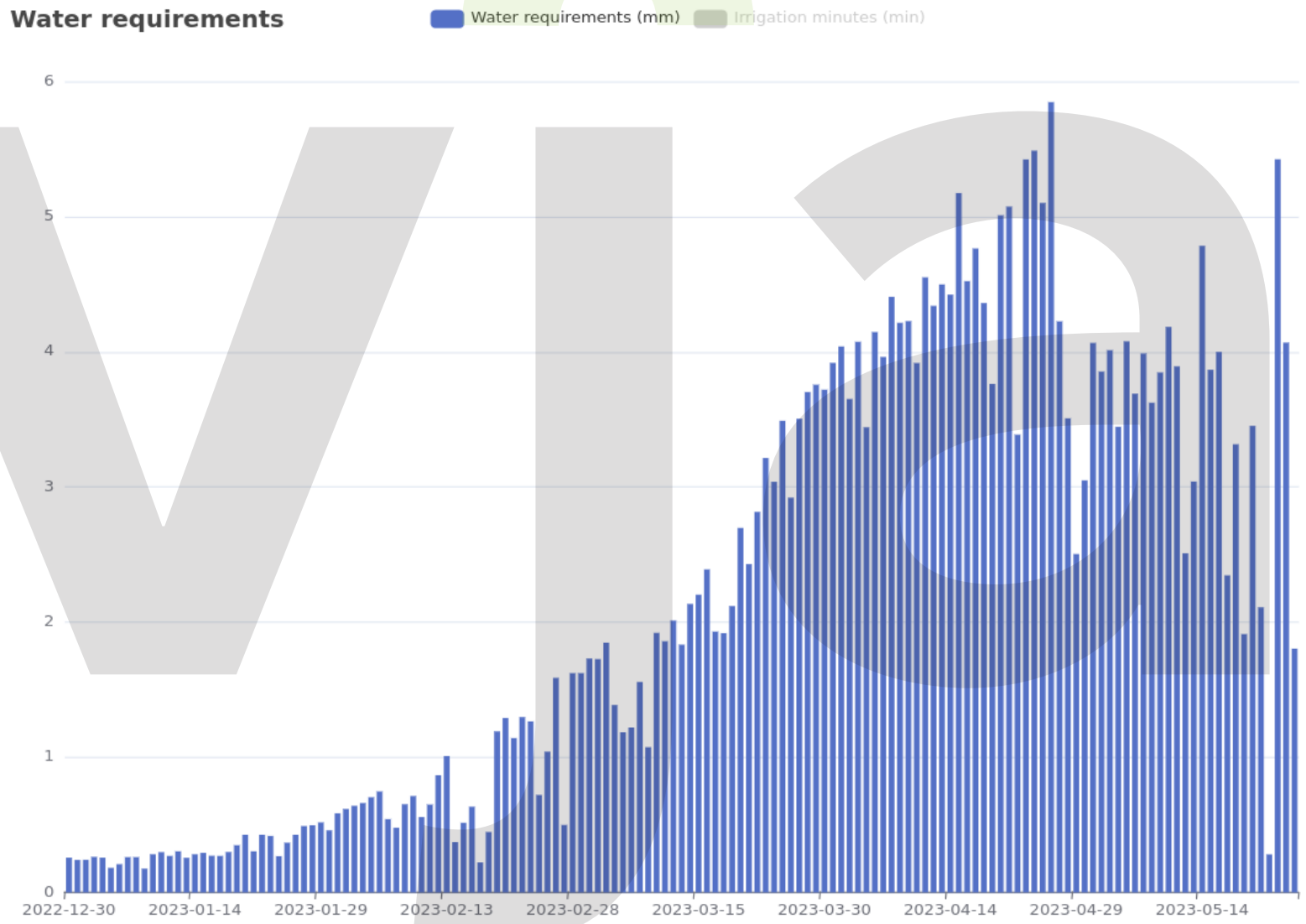
Save

Irrigation system

Single line | Grouped lines

Dripper flow rate	3	l / h
Distance between drippers	0.5	m
Distance between line groups	1.2	m
Number of lines in a group	2	
Flow rate density	0.17	l / min m2

Save



PRHO: AGGREGATED RESULTS

Configuration

Transplant date	30/12/2022	
Plant density	2	plants/m^2
Irrigation water EC	0.6	dS/m
Irrigation uniformity coefficient	0.95	

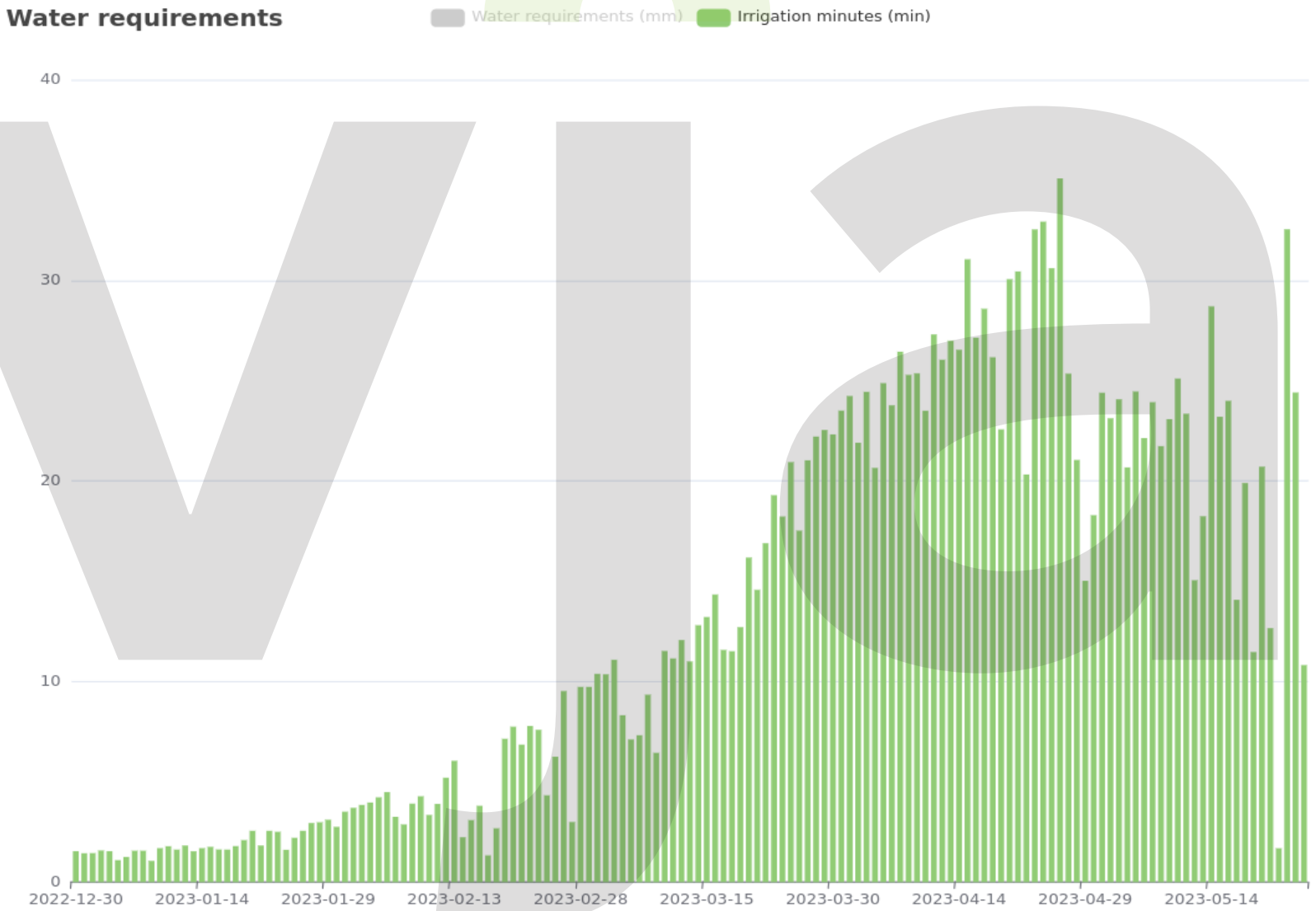
Save

Irrigation system

Single line | Grouped lines

Dripper flow rate	3	l / h
Distance between drippers	0.5	m
Distance between line groups	1.2	m
Number of lines in a group	2	
Flow rate density	0.17	l / min m2

Save



PRHO: IRRIGATION MINUTES

Configuration

Transplant date	30/12/2022	
Plant density	2	plants/m^2
Irrigation water EC	0.6	dS/m
Irrigation uniformity coefficient	0.95	

Save

Irrigation system

Single line | Grouped lines

Dripper flow rate	3	l / h
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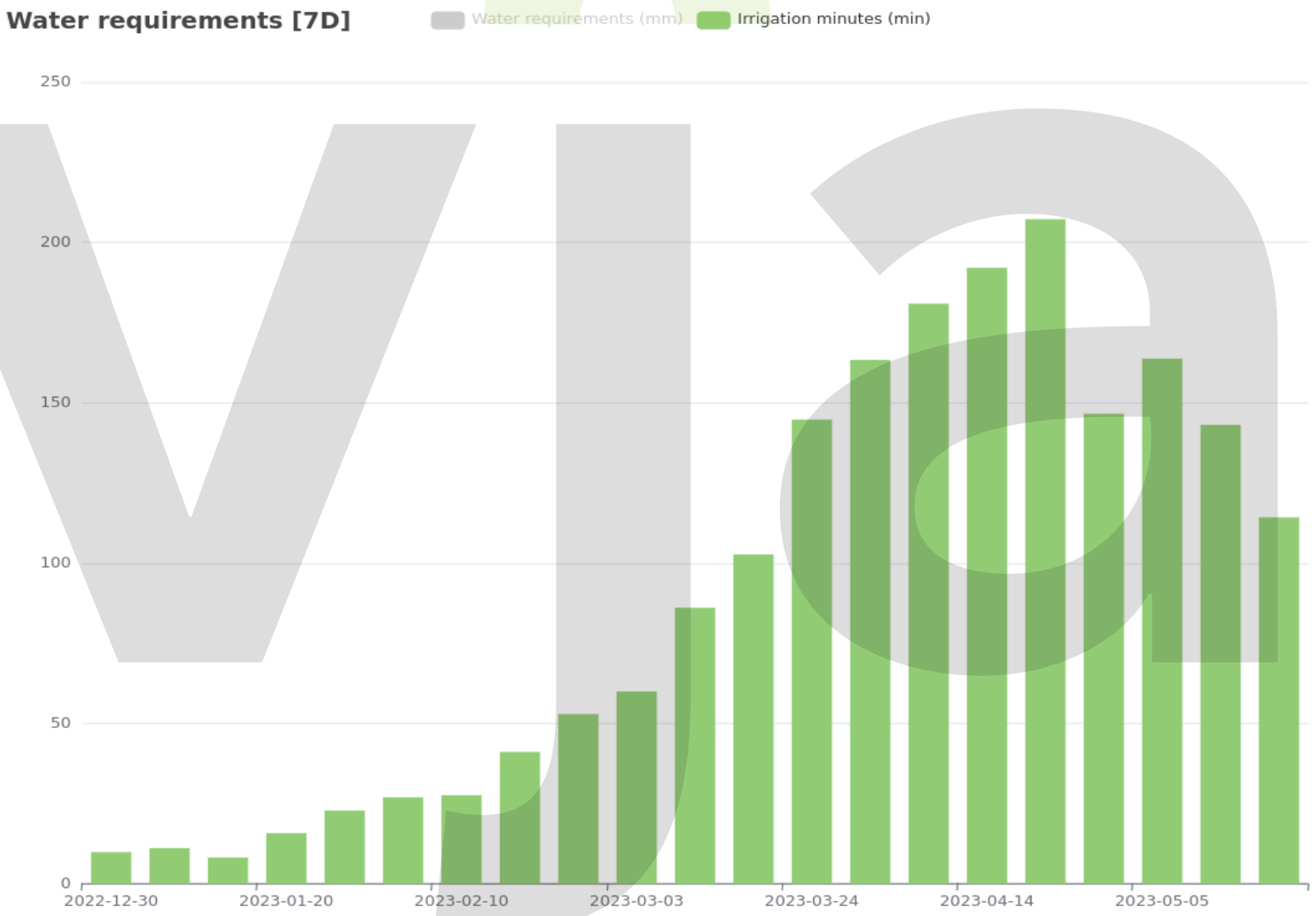
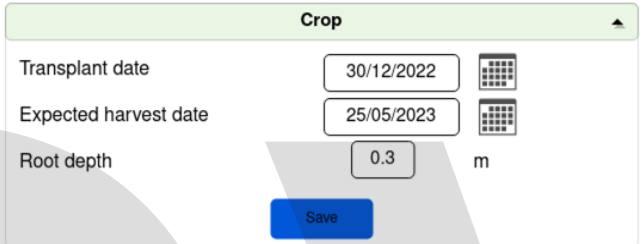
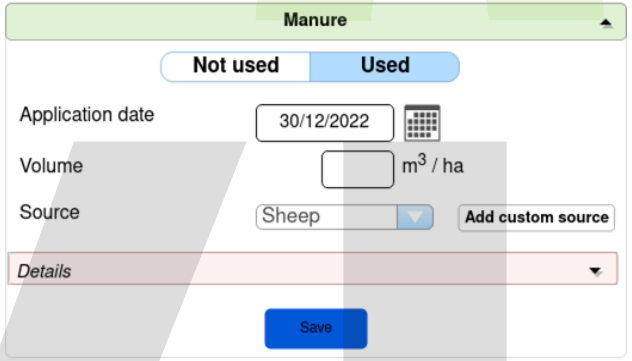


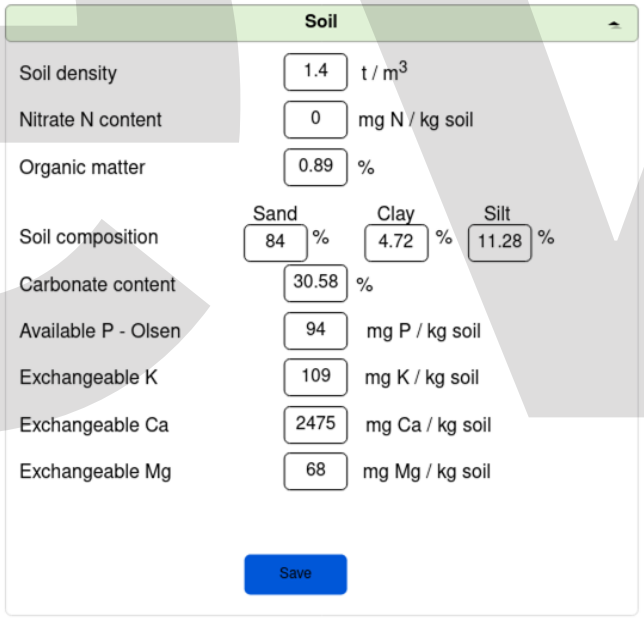
VegSyst: Fertigation in soil

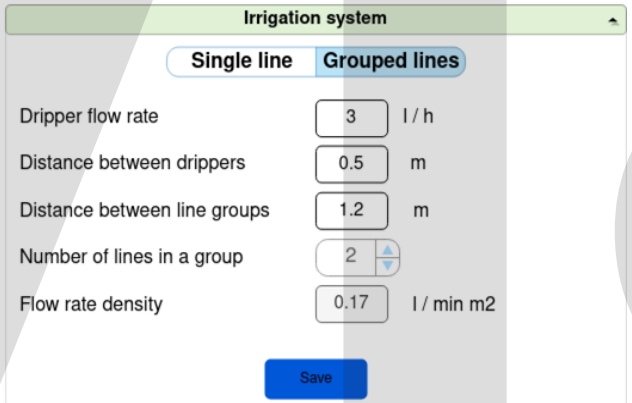
- The VegSyst model simulates **crop dry matter** from growing degree days and absorbed solar radiation
- The model computes **nutrient uptake** from experimentally calibrated dilution curves
- Nitrogen in the soil from **manure fertilization** is also considered
- Using evapotranspiration from PrHO, **required nutrient concentrations** are computed
- The requirements are adjusted by soil nutrient content at transplant, to **avoid over/under-fertilization**

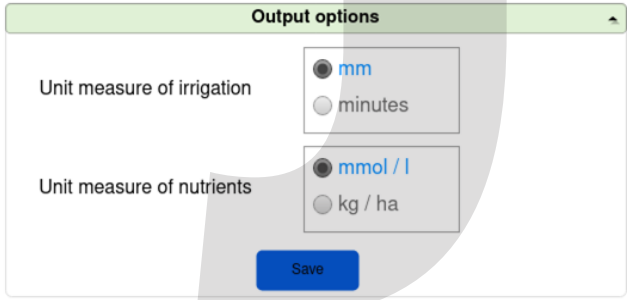
VEGSYST: CONFIGURATIONS



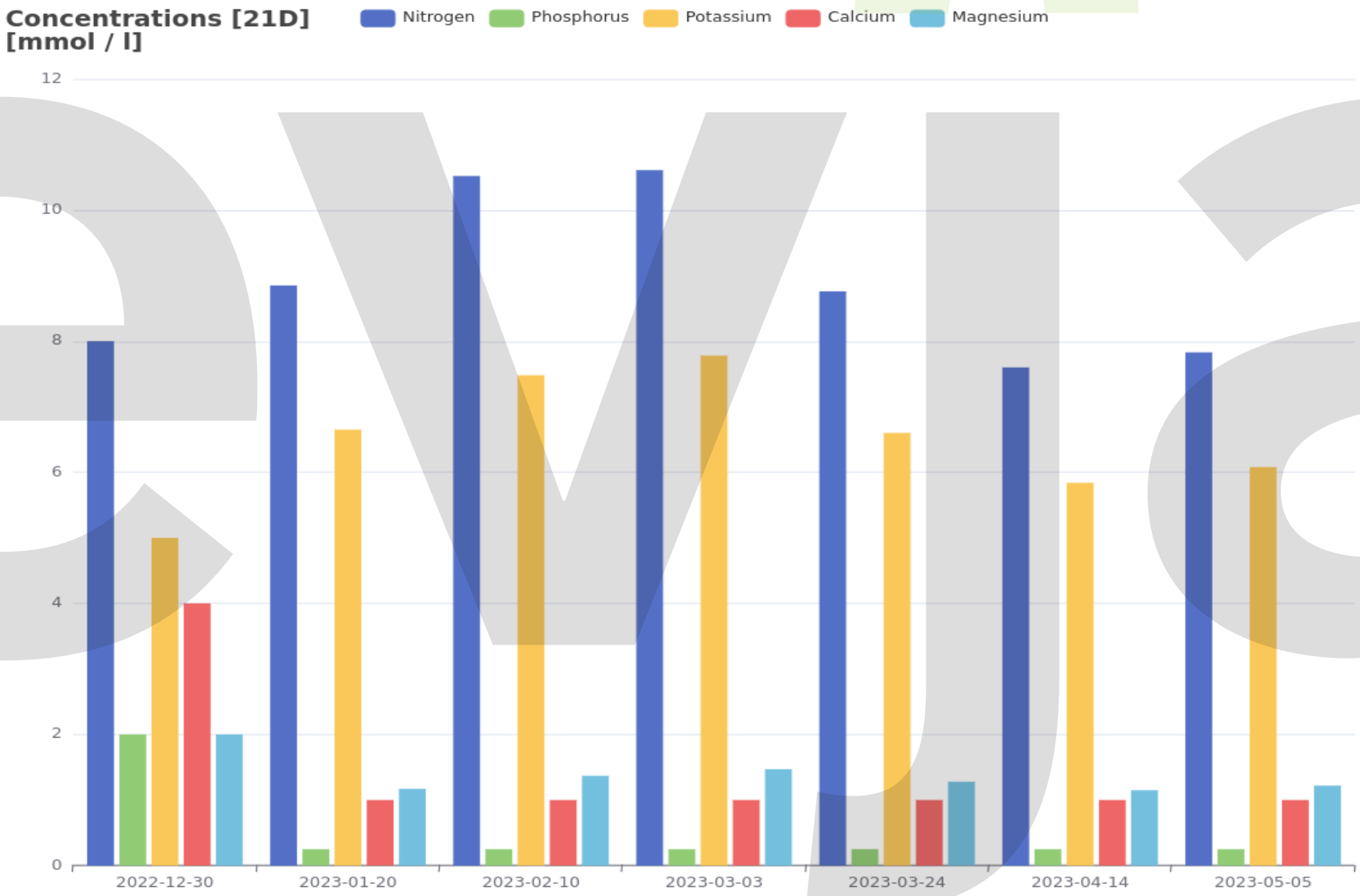




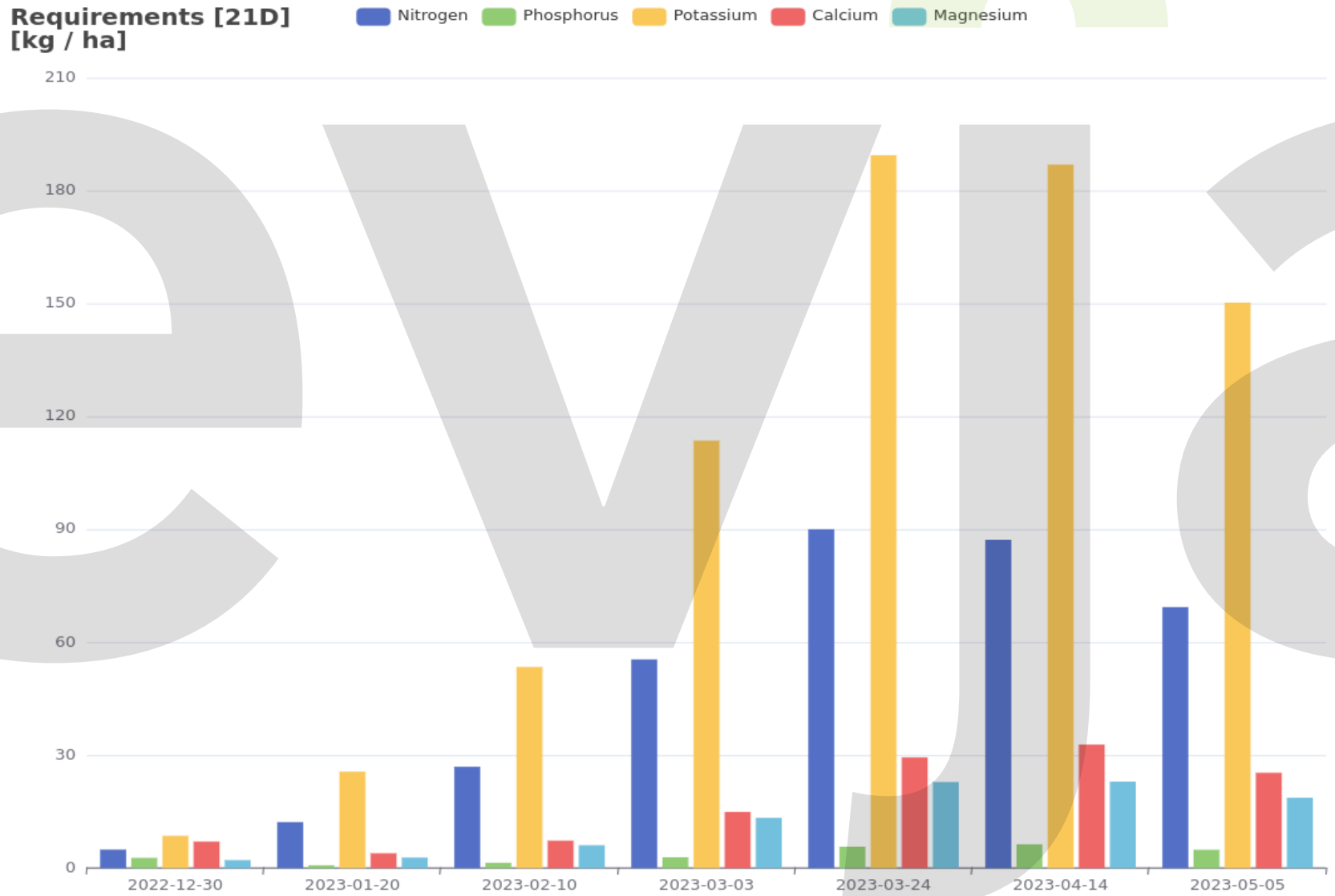




VEGSYST: NUTRIENT CONCENTRATIONS



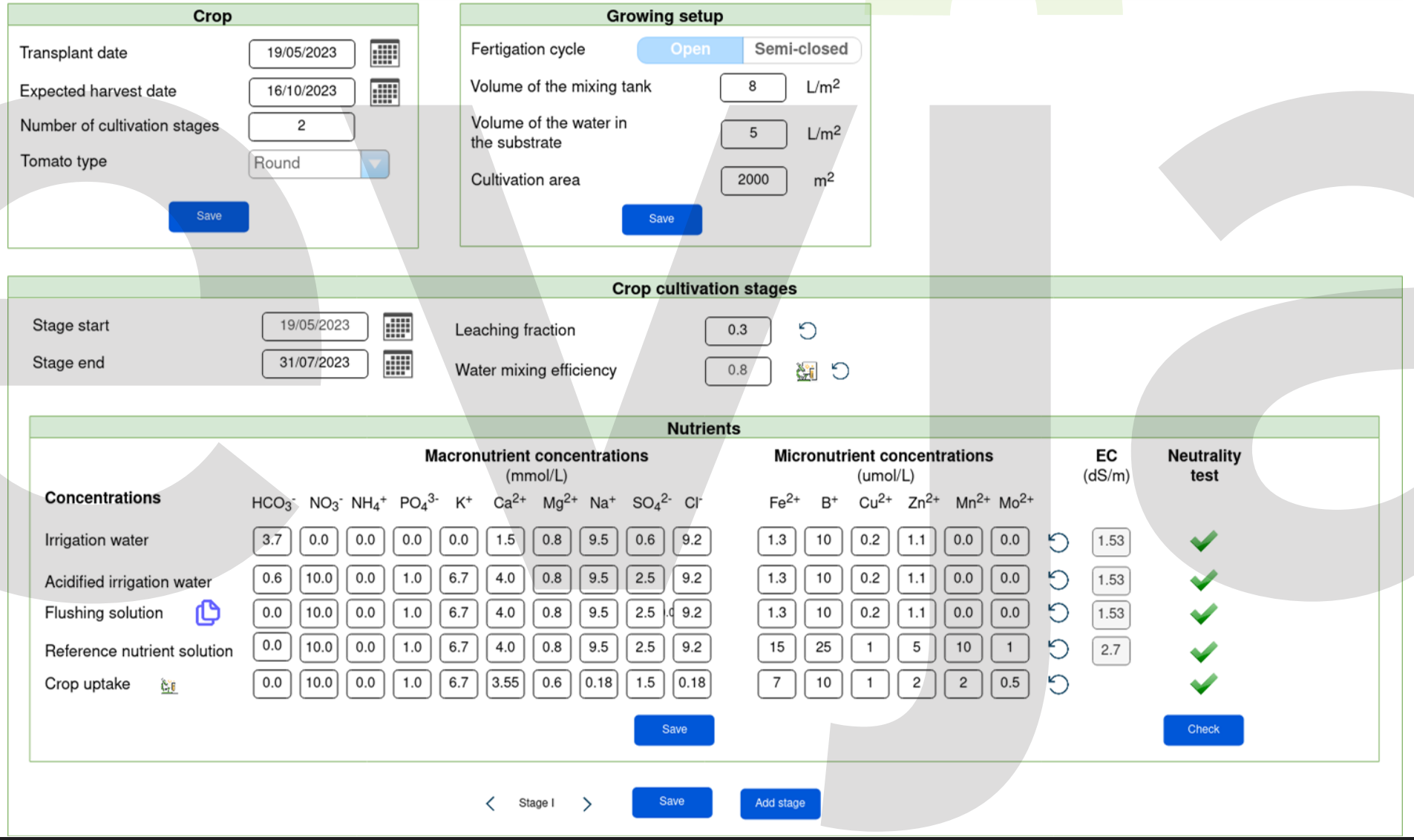
VEGSYST: NUTRIENT REQUIREMENTS



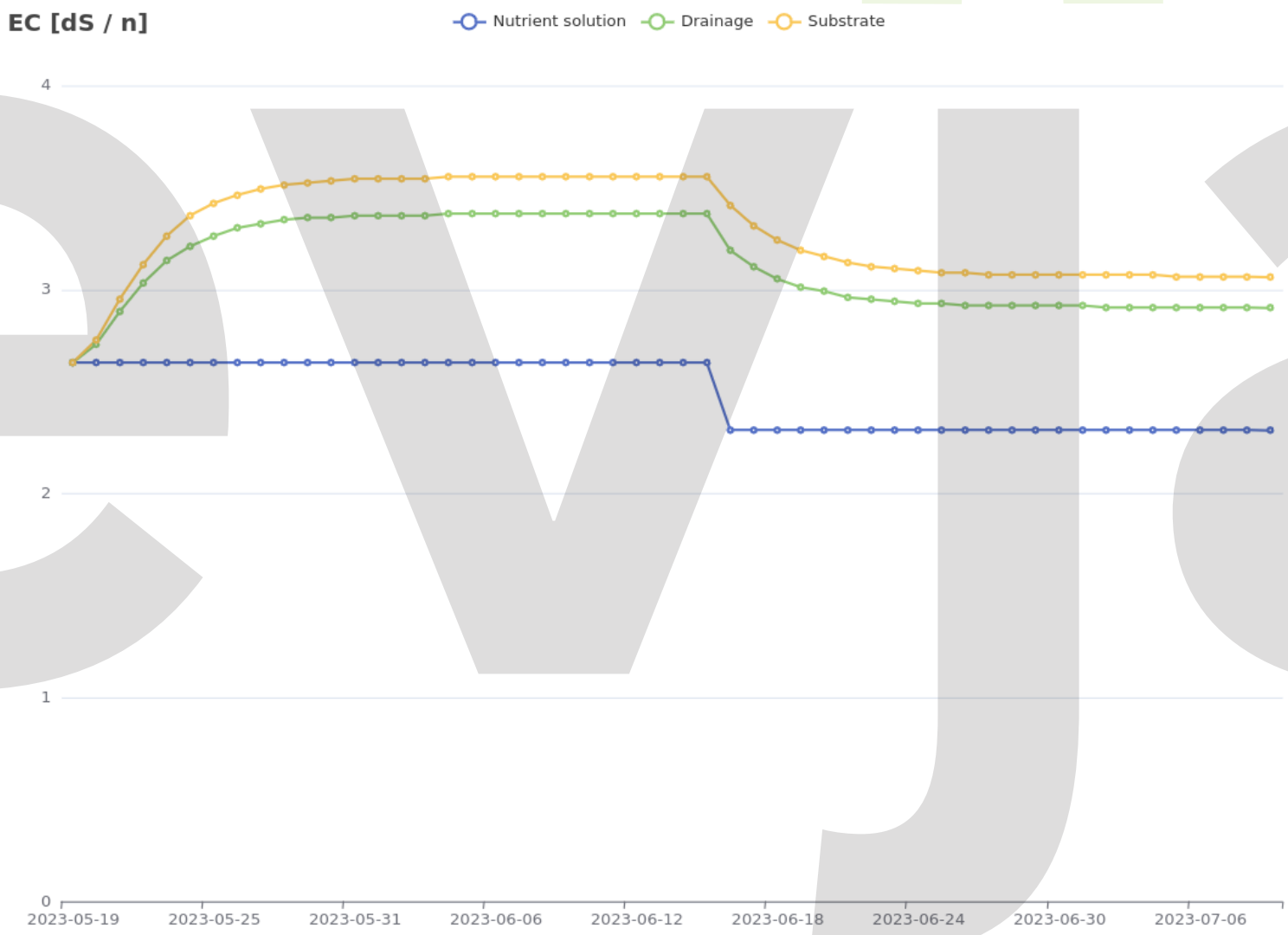
SIMULHYDRO: FERTIGATION IN SOILLESS

- Tracks the nutrient solution that goes in the **crop uptake**, the **substrate** and the **drainage tank**
- Simulates in every compartment the nutrient concentrations and EC, that grow due to **ballast ions**
- Applies to both **open systems** (drainage runs off) and **semi-closed systems** (drainage goes back to the main tank)
- Gives advice about **water use** and **flushing**, considering drainage regulations

SIMULHYDRO: CONFIGURATIONS



SIMULHYDRO: SOME RESULTS



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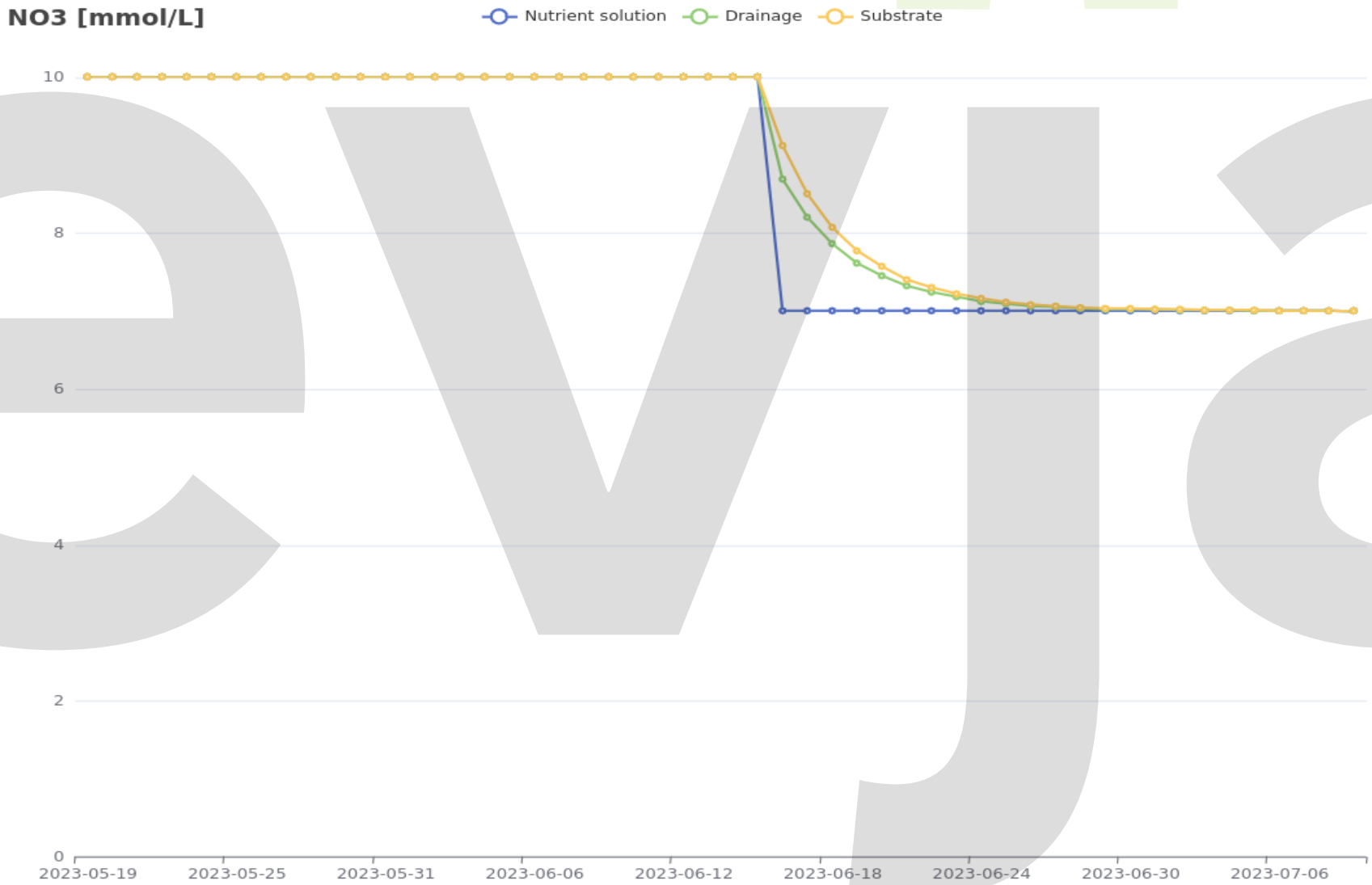
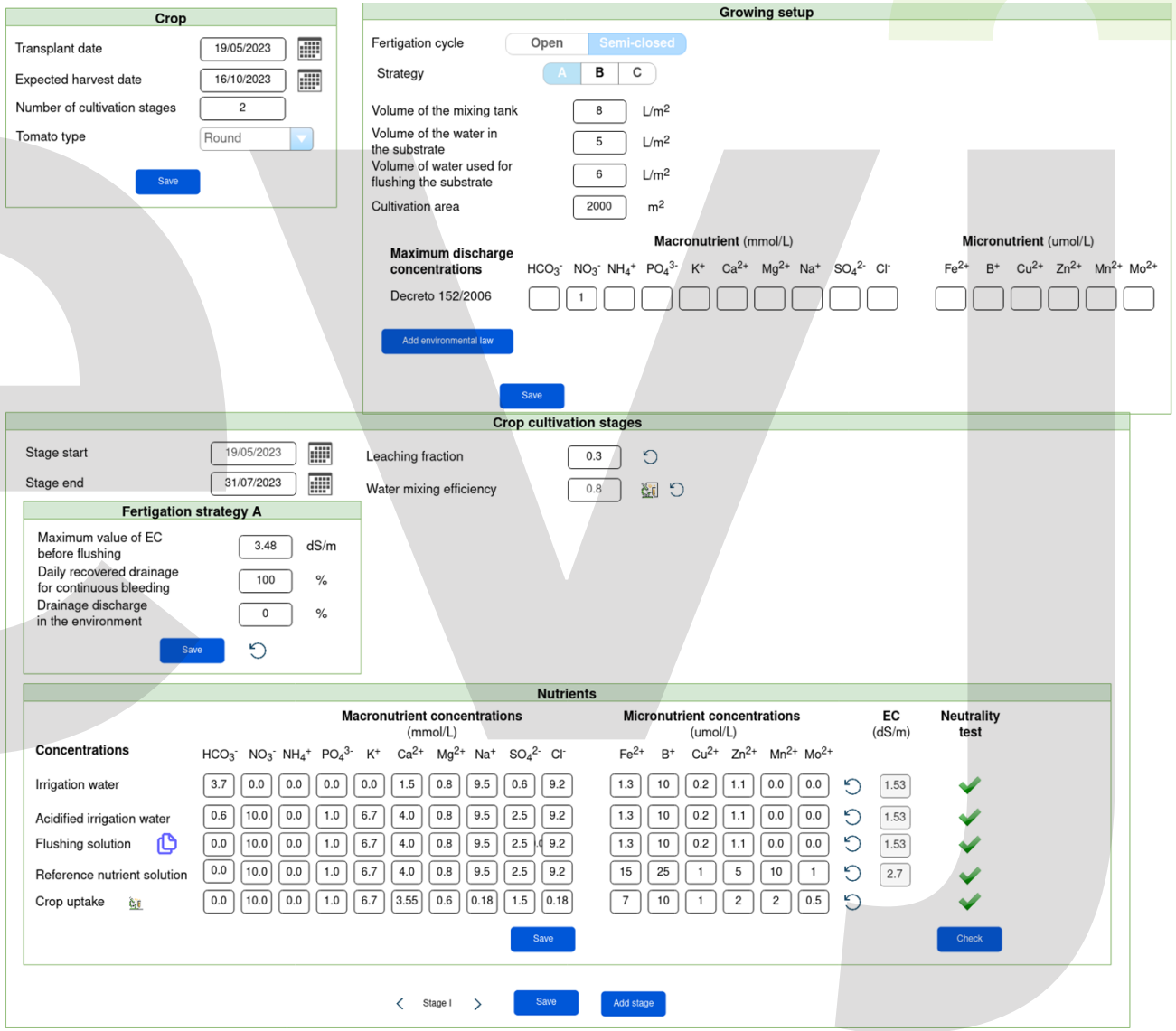
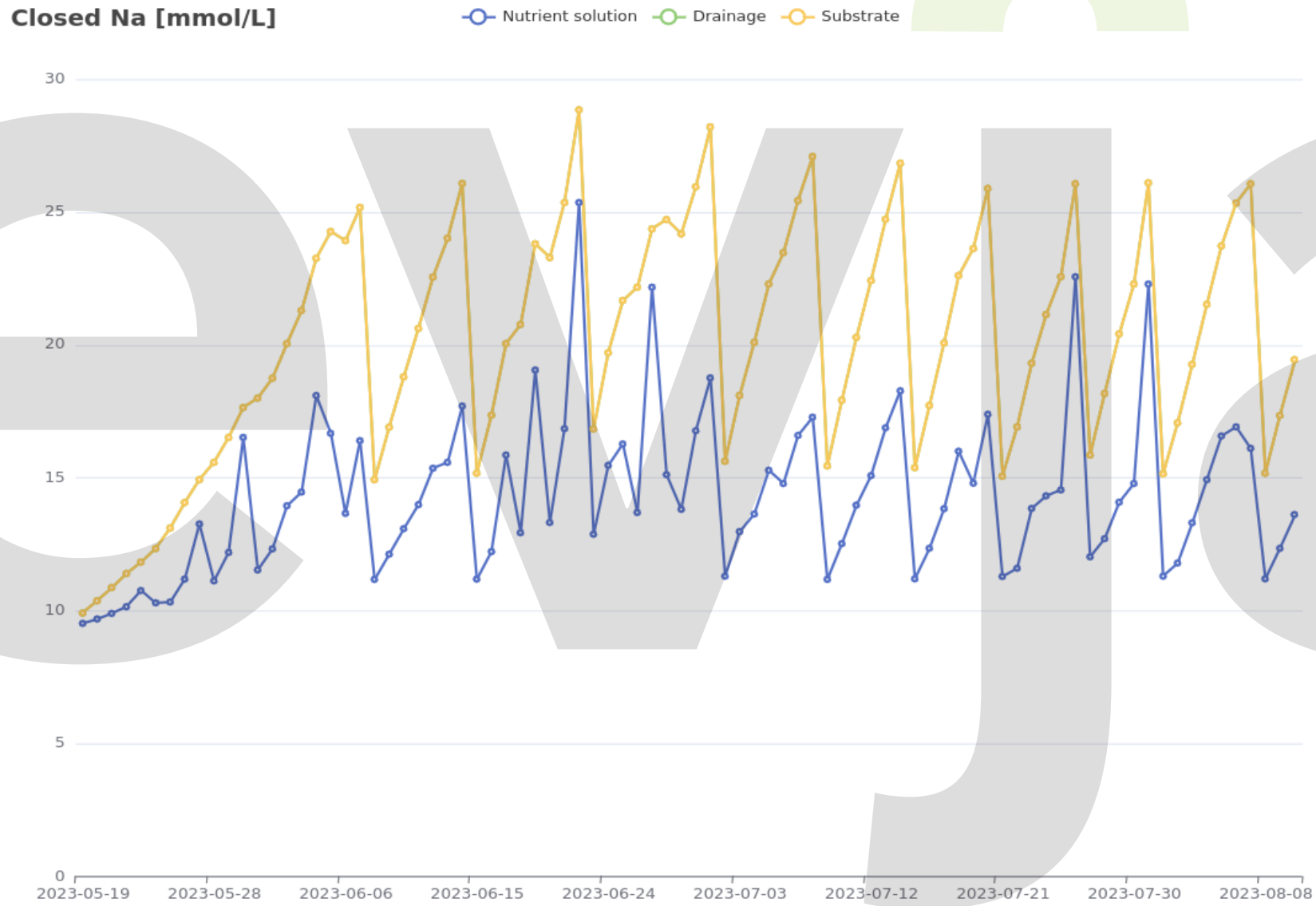


SIMULHYDRO: SEMI-CLOSED CONFIGURATION



SIMULHYDRO: SEMI-CLOSED RESULTS



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