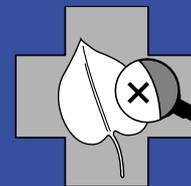


MULTIPLEX 330™

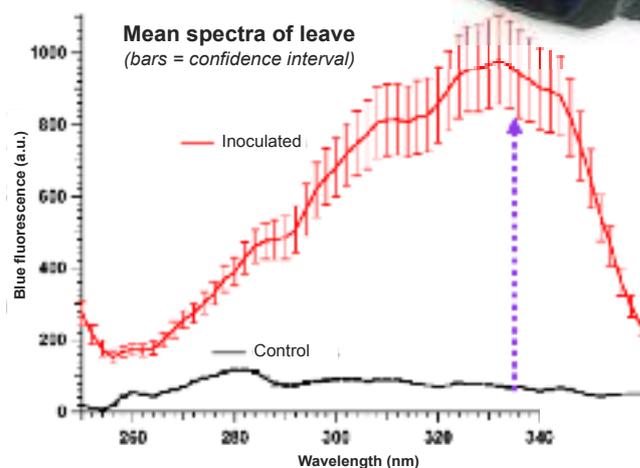


FIELD FLUOROMETER FOR EARLY DISEASE DETECTION

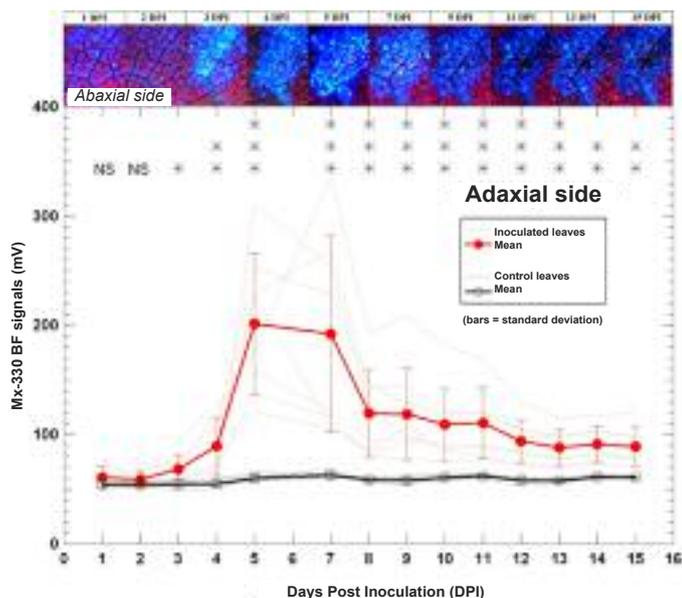


The MULTIPLEX 330™ sensor is a portable fluorometer that allows exciting the fluorescence of molecules under UV, that were unattainable before. The fluorescent molecules, phytoalexins for instance, are measured in real-time and in a non-destructive way. The polyphenols are produced by the plant due to pathogen presence, making the MULTIPLEX 330™ a field fluorimeter for pathogen detection.

Detecting grapevine downy mildew is one of the many applications of the MULTIPLEX 330™. In the presence of *Plasmopara viticola*, the downy mildew pathogenic agent, the grapevine leaf produces stilbenes (resveratrol and viniferins) that are fluorescing blue light under UV excitation.



Excitation spectrum of the blue fluorescence (400 nm) of stilbenes on grapevine leaves infected by downy mildew (adaxial side). The arrow points out the excitation wavelength of the MULTIPLEX 330™ sensor.

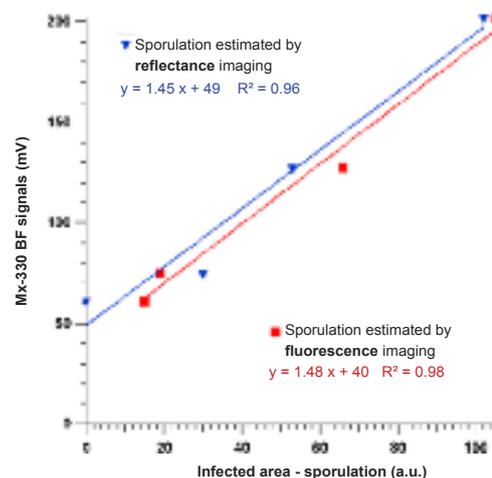


Kinetics of downy mildew development measured by the MULTIPLEX 330™ on the leaf adaxial side. On top: fluorescence macroscopy of the abaxial side (UV excitation, detection in the visible spectrum).

Main indices provided by the MULTIPLEX 330™ sensor:

- BF_UV: blue fluorescence under UV excitation.
- ANTH: anthocyanin index (stress).
- FLAV: flavonol index (light, protection).
- SFR_R and SFR_G: chlorophyll indices (chlorosis).

It is possible to customize the signals measured by the fluorometer, upon request.



Comparison of the BF_UV index of the MULTIPLEX 330™ sensor with surface measurements of leaves covered by sporangiophores of *Plasmopara viticola*.

The MULTIPLEX 330™ sensor is a portable fluorometer for field as well as laboratory measurements having the following features:

- Non-destructive and real-time measurements.
- Geolocated measurements (GPS).
- Large sampling area (30 cm²).
- Multispectral (UV-VIS).
- Datalogger (data classification, SD card).
- All kinds of plant – leaves and fruits.

MULTIPLEX 330™ TECHNICAL SPECIFICATIONS

Measured material	Any plant material: leaves, needles, berries, fruits and seeds
Measured parameters	9 fluorescence signals including BF_UV: blue fluorescence under near UV-B SFR_R and SFR_G: chlorophyll indices FLAV: flavonol index ANTH: anthocyanin index It is possible to customize the signals measured by the fluorimeter, upon request.
Measurement process	Pressure on one of the two main buttons
Measured area	28 cm ² (6 cm diameter), or 12.5 cm ² (4 cm diameter) as an option
Acquisition time	1 measurement (250 acquisitions) < 1 s
Storage capacity	1 million of multiparametric measurements (512 Mo SD card)
Measurement mode	One shot
Data classification	4 levels (file, group, sample and measurement numbers)
Temperature range	From 5 to 45°C
Light sources	LED (pulsed operation) 3 excitation channels: UV, green and red
Detectors	Silicon photodiodes 3 detection channels: blue, red and near-infrared
User interface	3.2" graphic LCD panel with touchscreen Sound warning
Data downloading	SD card Data compatible with any data processing software
Battery	External Li-ion rechargeable battery
Battery life	10 hours
Charge time	3 hours
Total weight	2.5 kg (without battery)
Size	320 mm x 280 mm x 170 mm
Positioning	Internal GPS
Relative accuracy	< 2.5 m (CEP, 50%, 24 h static)
Languages	English, French and Spanish
Safety	Strap

Picture of the leaf

Blue fluorescence

Fluorescence in the visible spectrum



Three views of the same leaf. The FORCE-A logo has been drawn on a grapevine leaf by UV-C application, which induces the stilbenes, through a stencil. Fluorescence measurement under UV-A excitation.

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