



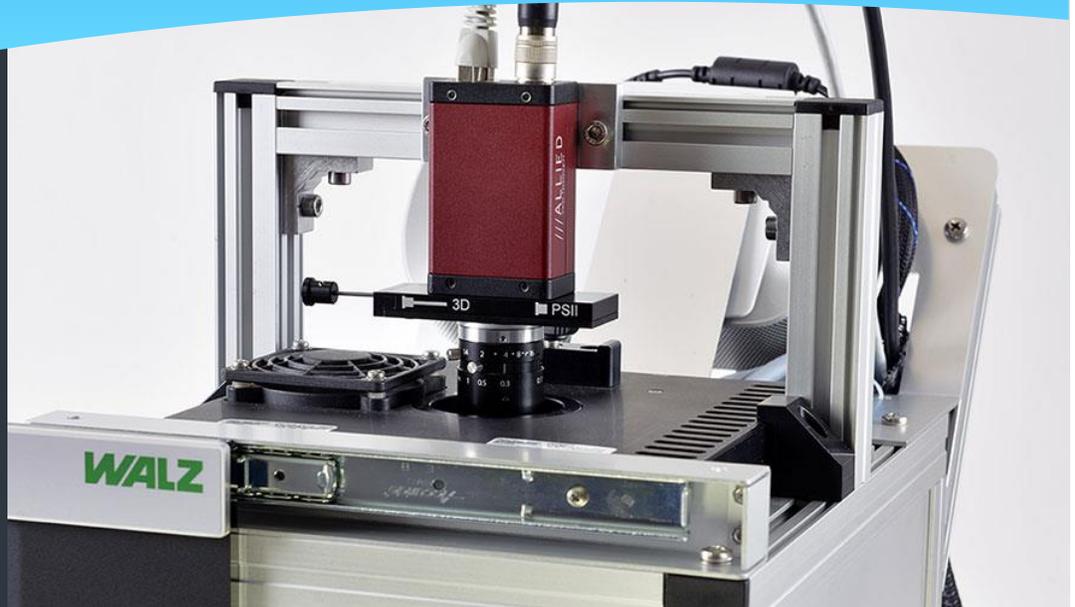
IMAGING-PAM M-Series, Chlorophyll Fluorescence System

DESCRIPTION

The IMAGING-PAM family comprises the versions MAXI, MINI and MICROSCOPY. The different versions employ the same Multi Control Unit IMAG-CG. Also, the same camera can be used for different versions. This modularity permits easy and most cost-effective switching between various applications and magnifications provided by the IMAGING-PAM M-Series.

The MAXI and MINI versions can be combined with the Gas-Exchange System GFS-3000 and, thus, integrates detailed spatial information on photosynthesis with exact analysis of photosynthetic carbon fixation.

Most recently, an advanced method to create three-dimensional plant images has been added to the MAXI version. This new configuration opens the way to project data of fluorescence analysis on the three-dimensional plant image so that photosynthesis can be analyzed in the context of whole plant architecture.



IMAGING-PAM Elevating Chlorophyll Fluorescence to the 3D Level

The brand-new integration of a precise 3D scanner into the proven MAXI version of the IMAGING-PAM fluorometer combines saturation pulse analysis with knowledge on size, number, position and angle of leaves. As a result, the effective light intensity per unit of leaf area can be considered when light effects on photosynthesis or photoinhibition are evaluated.

The 3D configuration provides a multitude of additional morphological data for structural phenotyping of plants. Together, morphological parameters and fluorometrically characterized, functional parameters form a new realm in plant phenotyping.

Chlorophyll Fluorescence and PAM Fluorometry

Chlorophyll fluorescence is a very sensitive indicator of photosynthesis. Quantitative information on the quantum yield of photosynthetic energy conversion is obtained by PAM fluorometry and the saturation pulse method (Schreiber U (2004) Pulse-Amplitude-Modulation (PAM) Fluorometry and Saturation Pulse Method: An Overview, pp. 279-319. Kluwer Academic Publishers, Dordrecht, The Netherlands). A wide range of photosynthetic parameters can be derived from fluorescence measurements, giving insight into the physiological state of all photosynthetically active organisms, including higher plants, mosses and ferns as well as various types of algae, phytoplankton and biofilms.

ACCESSORIES

Configuration of the 3D Version

Multi Control Unit

- IMAG-CG Multi Control Unit to connect Measuring Head and GigE –Vision® CCD camera as M-Series IMAGING-PAM MAXI, MINI and MICROSCOPY version including ImagingWin GigE Software.

Measuring Head

- IMAG-MAX/L (blue measuring light version, 450 nm, standard applications)

Camera and Lens

- IMAG-K6/MOD3D with increased NIR sensitivity (2/3" chip, primary resolution 1280 x 960 pixels) with prime lens objective (F1.4/f=16 mm, c-mount). A filter slider with ND filter for 3D

Mounting Computer System Combination

IMAGING-PAM

Chlorophyll Fluorescence Imaging

With the advance of highly sensitive CCD cameras and extremely strong light emitting diodes (LED) development of IMAGING-PAM fluorometers has become possible that not only measure images of chlorophyll fluorescence but are also fully competent in providing all relevant chlorophyll fluorescence parameters using the saturation pulse method. In this way, images of photosynthetic activity and its spatio-temporal variations can be obtained.

All IMAGING-PAM fluorometers provide images for 17 different parameters. The fluorescence parameter Ft is continuously monitored. Fo and Fm are assessed after dark adaptation, serving as reference for fluorescence quenching analysis by the saturation pulse method.

Besides Fv/Fm, the PS II quantum yield after dark acclimation, also the PS II quantum yield during illumination, Y(II), and the quantum yields of regulated and non-regulated energy dissipation, Y(NPQ), Y(NO) as well as the apparent electron transport rate (ETR and PS) can be imaged.

A routine for measuring a PAR-absorptivity image is provided for the MAXI and the MINI version of the IMAGING-PAM (Abs.-image based on images of NIR and red light remission). From this parameter also the apparent rate of photosynthesis is calculated and does not need to use the commonly known PAR-absorptivity mean value of 0.84 (ETR) for all areas anymore. The parameter PS/50 is displayed in order to depict the apparent photosynthesis with the help of the false color code that is also used for the other photosynthesis parameters.

Contact info



Monitoring MENA

Insight into instrumentations

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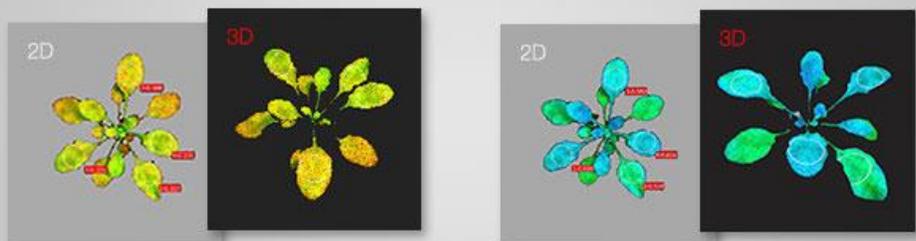
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Application



This Instrument is manufactured by our principle company

WALZ - Germany