

Manual for FluoroPen measurement of Chlorophyll *a* fluorescence kinetics



A) Measurement of quantum yield (QY) in light adapted leaves

QY is a measurement of the efficiency of the Photosystem II (PSII) to absorb light and use it to oxidise water and activate the electron flow through the electron transport chain. The QY value measured with FluoroPen should be between 0.1 and 0.8, and a higher value indicates higher efficiency of PSII.

How to use the device:

1. Push the **SET** button
2. Push **MENU** several times until the screen shows **MEASURE** and push **SET** again
3. Push **MENU** for choosing the **QY** setting for the measurements and push **SET**, the screen should show **QY** now
4. Attach a leaf clip on an undamaged part of the leaf, make sure that the metal aperture is open
5. Place the device with the sensor on the leaf clip so that it fits tight
6. Make sure that you don't move the sensor and push **SET** to start the measurement. The screen will show **WORKING**
7. After a few seconds the device shows two values: a value on the first line, which is the fluorescence value, and a value on the second line, which is the **QY** that you need to note
8. If the device shows **LOW VAL** then you might have had a bad contact of the sensor head with the leaf and should try again

Take five measurements on five different leaves of the Ivy plant (pseudoreplications) in order to have a good representation of the entire plant in your measurements.

For turning off the device, push **MENU** for several seconds until the device shows **GoodBye :-)**

B) Measurement of maximum quantum yield (QY) in dark adapted leaves

Before you take measurements: put five leaf clips on five different leaves per plant on all plants that you are going to measure. The metal aperture of the leaf clips must be closed to intercept light. Keep the leaves shaded for **20 minutes** before you start measuring. Make sure you don't move the leaf clip during the 20 minutes.

Take the same measurements as described in A), but be careful to **first put the sensor head on the leaf clip and then open the aperture** so that no light can reach the leaf before the measurement starts. Be aware that **you cannot measure again after a measurement on the same leaf clip**, because the device emits a light pulse and the leaf will not be dark adapted that light pulse anymore. If you have to do another measurement, you need to let the leaf dark adapt for another 20 minutes as described above.

How the fluoropen measures photosynthetic capacity of leaves using the QY (quantum yield) setting

