OPTI-SCIENCES, INC.

CCM-200*plus* Chlorophyll Content Meter

The CCM-200 series has more than 900 publication citations

Applications

- **Nondestructive Chlorophyll Content Measurement**
- **Monitor Effects of Environmental Stress**
- **Evaluate and Determine Plant Nutrient Performance and Requirements**
- **Nitrogen Management**
- **Teaching**
- **Measure Algae blooms -New!**

Features

- **Lightweight, allows operation with a single hand for rapid field work**
- **Graphic Display of Chlorophyll Content Index with built-in optional *Sample Averaging* of from 2-30 measurements**
- **Built-in Data-Logging - for more than 100,000 measurements**
- **USB output - comma delineated files**

The *proven* CCM-200*plus* Chlorophyll Content Meter provides fast and reliable, chlorophyll content readings on the intact leaves of plants. The measurement is rapid, and easy to make with single hand operation, allowing researchers to gather and evaluate data faster than ever before. The instrument is especially useful for improving **Nitrogen** and **Fertilizer** management programs with corn, wheat, and various other types of crops. The CCM-200*plus* can be used on a wide variety of both C_3 and C_4 plants.

The CCM-200*plus* was designed to be the most repeatable portable chlorophyll content meter available. It incorporates a slightly larger measuring area to improve signal averaging over that sample area. This approach takes into account small structural variations in leaves that can affect repeatability and reliability when compared to smaller area sampling.

Reliability of measurement has been determined by correlation with chemical tests. *More than 900 published citations*, on a great variety of different plant samples, establish the credentials of the CCM-200 series meters.

The CCM-200*plus* has the largest on-board memory of any absorption chlorophyll meter, with the ability to store more than 100,000 measurements internally. No separate data logger is necessary. Researchers can record months of measurements without having to return to the lab to download data or worry about limited memory.

Downloading of data is quick and easy through its USB port. The instrument becomes a hard drive for computers and comma delineated files open directly in standard spread sheet software.

Employing new MEDICAL grade strict tolerance LED sources increases accuracy and insures consistent meter to meter readings.

Nitrogen management - The instrument also allows averaging capability for nitrogen management and fertilizer applications. Researchers can select from 2 - 30 measurements for averaging.

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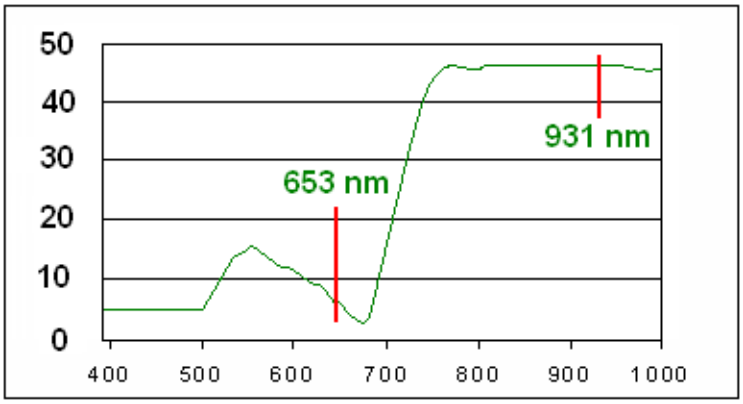
CCM-200*plus* Chlorophyll Content Meter

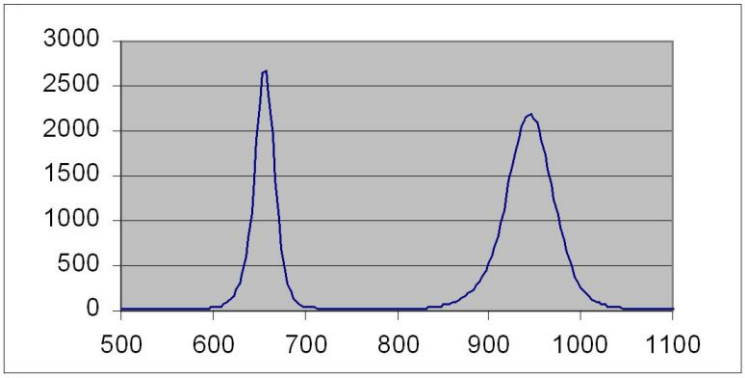
Nitrogen Status Agriculture Crop Production

Changes in chlorophyll content can occur as a result of nutrient deficiencies, exposure to environmental stress, exposure to certain herbicides, and differences in the light environment during growth. Chlorophyll content meters help manage nutrient optimization programs that can improve crop yield and help protect the environment. Testing for herbicide damage can indicate the need for a change in herbicide selection or application method, in order to maintain good weed control while having minimum impact on crop health.

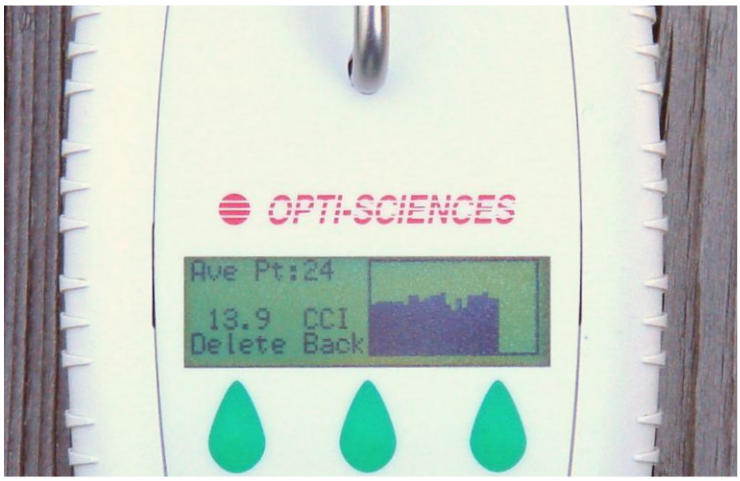
Laboratory methods for determination of chlorophyll content are both time consuming and destructive to the sample. Typically a sample must be detached, ground up in a solvent, then assayed with a spectrophotometer. A sample can be measured only once precluding the monitoring of trends in chlorophyll content over the growing cycle. The CCM-200*plus* provides non-destructive, rapid measurements with auto averaging calculations of relative chlorophyll content. It reduces the need for time consuming and costly chemical testing.



Chlorophyll Absorptance
CCI = %Transmittance at 931nm. / %Transmittance at 653nm



CCM-200*plus* LED spectrum



Technical Specifications

Measured Parameters: Optical absorbance in two different wavebands (653 nm and 931 nm). Designed to measure chlorophyll content and compensate for leaf thickness

Measurement Area: 3/8" diameter circle, or 9.53 mm area 0.11in^2, or 71.22 mm^2

Resolution +/- 1 CCI Unit

Repeatability +/- 1%

Source: (1) Medical grade LED (peak at 653nm)
(1) Infrared LED (peak at 931 nm)

Detector: Silicon photodiode with integral amplifier for absorbance measurement and source power monitoring for temperature compensation.

Storage Capacity: 1 Gigabyte of non-volitile memory allows between 94,000 and 160,000 measurements.

Modes: Single point measurement, or selectable averaging from 2 to 30 samples. Standard deviation is available for 10 samples or more.

User Interface: 128 x 32 pixel display, 6 keys for control and data manipulation, beep signal for status and warnings

Output: USB 1.1 interface for data transfer.
Either entire measuring files, or single measurements can be output by selection.

Temperature Range: 0-50 Deg C

Temperature Drift: Temperature compensated source and detector circuitry for minimum drift over full range.

Power Source: 9V Alkaline Battery

Auto Off Interval: 4 minutes (no key press or download)

Size: 152(L)x82(W)x25(D)mm

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CCM-200*plus* Chlorophyll Content Meter

Nitrogen Status Agriculture Crop Production

New- algae bloom measurement application

Journal Reference:

Trent T., Hendrickson J., Harwell M.C. (2017) A rapid, cost-effective screening tool for measuring Chl-a in water samples. Lake and Reservoir Management, Pages 1-6, Published online: 11 Jul 2017, http://dx.doi.org/10.1080/1040

Researchers from the Florida US environmental protection agency and St. Johns River Water Management District used the CCM-200*plus* chlorophyll content meter to quantify algae blooms.

"We believe this CCM provides a useful screening tool for rapid measurement of Chl-a concentrations in the lower St. Johns River and has the potential for being an algal bloom screening tool elsewhere. However, we emphasize that calibrations are required for applying our method in different water bodies."

More Journal References:

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