

Conductivity and Elephant's Foot Testing

LAQUAtwin is a series of pocket ION meters. Using Ion Selective Electrode (ISE) technology, they are available for measuring Conductivity, Calcium, Nitrate, Potassium, Sodium, Salt concentration and pH measurement. Using just a tiny amount of sample, the LAQUAtwin proprietary flat sensors can quickly and accurately measure the values of the chemical parameters in the field.

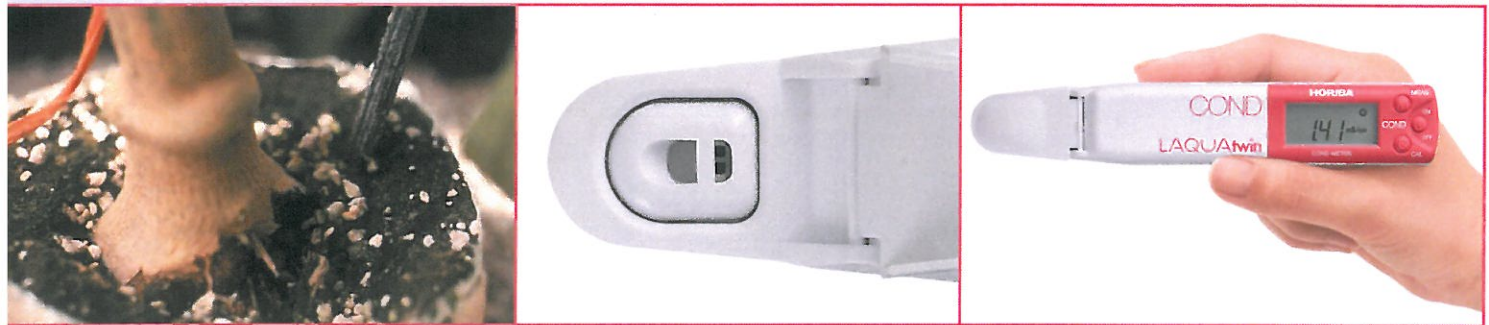


Photo Credit: Elio Jovicich, University of Florida.

Introduction

A physiological disorder in greenhouse hydroponic sweet pepper (*Capsicum annuum* L.), where the base of the plant's stem becomes swollen below the cotyledon level and wounds develop at the base of the stem's epidermis has been named "Elephant's Foot".

Sodium is a mineral constantly present in soil, but an excess of it concentrated at the base of the plant stem has been shown to have a correlation with Elephant's Foot in plants. It is necessary to analyse the conductivity of soil in which hydroponic sweet pepper is grown to consider the extent to which the stem of the plant has accumulated salt.

To determine the conductivity of the soil, the Horiba LAQUAtwin Conductivity meter can be used. This is an easy and quick method used to measure the conductivity of soil.

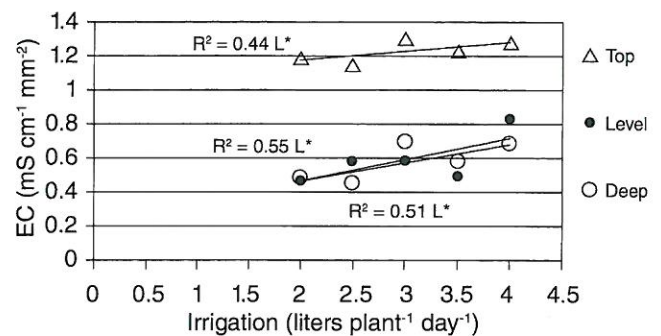
Method

1. A small 5g soil sample is watered down with 20 ml of water.
2. The water and soil mixture is shaken, thus 'washing' the soil.
3. A small sample can be extracted via pipette
4. This is placed on the sensor of the LAQUAtwin Conductivity meter and the conductivity is measured after one minute.
5. To repeat sampling, wash the sensor with tap water and pat dry with a paper tissue.

Results and Benefits

The use of the Horiba LAQUAtwin Conductivity meter to measure the conductivity of soil will improve farmers' knowledge of the sodium accumulation and hence choose the best land to grow sweet pepper crops and avoid Elephant's Foot disorder.

The LAQUAtwin Conductivity meter is small and compact, and convenient to carry for easy on-site testing. Its easy-to-use interface is simple for anyone to use the LAQUAtwin hand held Conductivity meter.



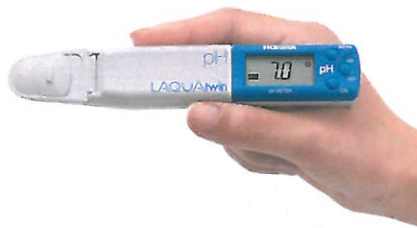
Salt accumulation on the stem base (measured by EC) and volumes of nutrient solution per plant per day at the three transplant depths: "Top": plants transplanted to half of the container height, "Level": plants transplanted to the cotyledons level, and "Deep": plants transplanted to the 2nd node. Electrical conductivity values for each transplant depth and irrigation volume average four soilless media type (coconut coir, peat mix, perlite, and pine bark). L*, linear polynomial effect at 5% level of significance.

Jovicich, E. and Cantliffe, D.J. 2001. "Transplant Depth, Irrigation, And Soilless Media Effect On 'Elephant's Foot' Plant Disorder In A Hydroponic Greenhouse Sweet Pepper Crop". Acta Hort. (ISHS) 559:515-520

Pocket ION Meter

LAQUAtwin

Unique Features



Calibrate and measure at the touch of a button—the smiley face will tell you when the result can be read.

Hassle-free automatic calibration with a few drops of standard solution reassures you of your measurement accuracy. Two-point calibration is also possible.*1

*1 Except for B-711

LAQUAtwin: the only meters with flat sensor technology.

HORIBA's highly-sensitive, flat sensor technology opens up new possibilities for sampling and sample types. Only a small amount of sample is required, so you can easily sample in situ without the need for beakers or other labware. Sensors are easily replaced as required.



LAQUAtwin is fully waterproof and dustproof.

The meter and sensor are fully waterproof³ and dustproof, so you can take it anywhere.

³ IP67 rated. Will withstand immersion for 30 minutes at 1 m. Not suitable for underwater use.

Carry case comes as standard for handy portability.

The compact carry case contains everything you need for your measurements, including the standard solution and sampling sheets.



1 X 6

One meter, six methods.

Only LAQUAtwin allows you to be this flexible!

Choose the best method according to your sample, your situation, and your needs.



01 Immersion

When you're in the lab, you can test the sample in a breaker. Ensure the sensor guard sliding cap is open.



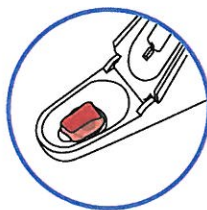
02 Scoop

Use as a scoop to test water eg from a river. A vertical scoop for an aquarium is also available with a unique sensor guard.



03 Drops

Place a drop of the sample onto the sensor with a pipette. LAQUAtwin meters can measure sample volume as low as 0.1mL



04 Solid Samples

Foods containing some moisture can be tested by placing a small piece directly onto the sensor.



05 Powders

LAQUAtwin meters can also test dry powders. Simply place the powder sample onto the sensor and drop on your defined volume of pure water.



06 Paper and textiles

To test sheets of paper and textiles, cut up the sample into small pieces and place directly onto the sensor. Drop on your defined volume of pure water.

Lineup

pH



Accurate pH measurements in a few seconds, from a single drop.

Water pH varies in different environments, and a slight change can often have a major effect.

Whether you need to keep the pH of an aquarium within tight limits, are checking for the acidity of rain water or for the quality of meat and fish products, LAQUAtwin compact pH meters are ideal for you. No matter where and when you need to test.

COND



Determine water conductivity with as little as 0.12 mL of sample.

The conductivity of rain water is a trusted guide to determining atmospheric purity. In agriculture, measuring the conductivity of soil allows farmers and agronomists to determine optimum fertilizer usage and check the 'health' of soil after salt water damage. The LAQUAtwin meter makes conductivity testing simple, anywhere.

Na+



Only compact meter for a quick and reliable measurement of sodium ion at the scene using ion selective membrane.

K+



Only compact meter for a quick and reliable measurement of potassium ion at the scene using ion selective membrane.

NO3-



Only compact meter for a quick and reliable measurement of nitrate ion at the scene. Special application packages for crop (B-741) and soil (B-742) are also available.

Ca2+



Only compact meter for a quick and reliable measurement of ionized calcium at the scene using ion selective membrane.



<http://www.horiba.com/iaquatwin>

IMS

HORIBA Group is operating Integrated Management System (IMS)
ISO9001 JOA-0298 / ISO14001 JOA-E-90039 / ISO13485
JOA-MD0010 / OHSAS18001 JOA-OH0068



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