

From Forest Nursery Notes, Summer 2008

**171. You should be doing greenhouse soil tests.** Smith, T. Greenhouse Management and Production 28(8):64-65. 2008.



By Tina Smith

# You should be doing greenhouse soil tests

SOIL TESTING IS USED BY GROWERS to diagnose a suspected fertility problem and to monitor crop nutrition to prevent problems from developing. Regular testing can also alert growers to potential problems of nutrient leaching and runoff caused by too much fertilizer or water.

Three common methods of testing soilless media are saturated media extract, 1:2 dilution method and PourThru. The major difference between them is the way nutrients and soluble salts are extracted for analysis.

### Saturated media extract (SME)

Saturated media extract is "the" method of testing soilless greenhouse media. It's almost universally done by commercial and university labs. In this test, a paste is made using soil and water and then the liquid portion (the extract) is separated from the solid portion for pH, soluble salts and nutrient analysis.

Special skills and laboratory equipment are needed. SME is probably not suitable for most growers unless the operation is large enough to support a lab, has a trained person to conduct tests and there is a commitment to do frequent testing and track the results.

### 1:2 dilution method

This method has been used for many years and has good interpretative data to back it up. In this test, an air-dried sample of soil and water are mixed together in the volume ratio of 1 part soil to 2 parts water. The liquid extract is separated from the solids using laboratory-grade filter paper or a coffee filter. The extract is now ready for analysis.

### Soluble salts levels (milliSiemens/centimeter)

| 1:2       | SME      | PourThru | Indication |
|-----------|----------|----------|------------|
| 0-0.25    | 0-0.75   | 0-1.0    | Very low   |
| 0.26-0.75 | 0.76-2.0 | 1.0-2.6  | Low        |
| 0.76-1.25 | 2.0-3.5  | 2.6-4.6  | Normal     |
| 1.26-1.75 | 3.5-5.0  | 4.6-6.5  | High       |
| 1.76-2.25 | 5.0-6.0  | 6.6-7.8  | Very high  |
| >2.25     | >6.0     | >7.8     | Extreme    |

Growers should compare results of PourThru to SME to establish acceptable ranges.

This is very easy test for on-site greenhouse testing of pH and soluble salts using meters. The 1:2 method is a very good choice for occasional pH and soluble salts testing by growers.

### PourThru method

The major advantage of PourThru is that there is no media sampling or preparation. Unlike SME and 1:2 methods, plants do not have to be disturbed for testing because the extract is the leachate collected from containers during routine irrigation. The leachate can be analyzed on-site for pH and soluble salts using a portable meter or it can be sent to a commercial lab.

The PourThru Method is best for continuous monitoring and graphical tracking of pH and soluble salts. This method works best when irrigation and leachate protocols are established and carefully followed when sampling takes place.

### Taking samples

Soil test results are only as accurate as the sample taken. The first step is to identify the sample based on the crops to be sampled. In a greenhouse containing different species, plants should be sampled separately. If a problem is being diagnosed, it is best to have a sample from both normal and abnormal plants.

Ideally, samples for the 1:2 and SME tests should be taken randomly from 10 pots in each unit. The actual sample is taken from either a core or composite sample from all depths in each pot or a sample from the root zone. Never collect a sample from just the surface one-third of the pot.

Take the sample four hours after fertilizing. If controlled-release fertilizer is used, remove the prills from the soil sample.

Mix the samples from the 10 pots into one sample and submit it to a lab or conduct a test in-house.

Be consistent each time you take a sample. Variability can be introduced by inconsistent sampling.

### Information about a soil sample

When preparing to send in a soil sample for analysis, answer these questions:

- What is the crop?
- What is the age or stage of development?

- What is the growing medium (soil or soilless, commercial brand)?
- What is the fertilizer program?
- Is there a problem with the crop, and if so, what is it?

Answering these five questions provides a framework for interpretation of the test results. Send this information with the sample to the testing lab.

#### Comparing test results

Don't try to compare results from different labs or different testing methods. Even minor differences in procedures and techniques can result in big differences in the numbers.

Always use the correct interpretative data that match the test you conducted. Otherwise, you could make an incorrect interpretation. The amount of water used to extract plant-available nutrients and other details give large differences in test results.

#### Interpreting results

Interpreting soil tests involves comparing the test results with the normal ranges of pH, soluble salts and nutrient levels set by the testing laboratory. Normal ranges are often printed on the soil test report or on information sheets. These normal ranges are specific to the lab and its testing method.

Measuring electrical conductivity or soluble salts provides a general indication of nutrient deficiency or excess. Excess soluble salts are very common and generally result from too much fertilizer in relation to the plant's needs. Inadequate watering and leaching, poor drainage and diseased roots are other causes of excess soluble salts. Always check the condition of the root system when sampling soil for testing.

FOR MORE: North Carolina State University, [www.ncsu.edu/project/hortsublab/pourthru/index.html](http://www.ncsu.edu/project/hortsublab/pourthru/index.html).

The author thanks Douglas Cox, extension floriculture specialist at University of Massachusetts, who co-wrote this article. ❖❖

#### CONTACT INFORMATION

Tina Smith is Extension Floriculture Specialist, University of Massachusetts, (413) 545-5306; [tsmith@umext.umass.edu](mailto:tsmith@umext.umass.edu).

# Jiffy-7C®

## Propagating under stressful conditions?

- 100% Coir
- Maximum air porosity
- Outstanding water holding capacity
- Superior capillary action for uniform environment in all propagation trays

Now available in 105, 72 and 36 cell trays

**Expand your success  
Stress-Free Propagation**



# Jiffy®

Let's grow together

[www.jiffypot.com](http://www.jiffypot.com)

1 800 323-1047  
Tel: 440-282-2818  
Fax: 440-282-2853

Info Now! 800.928.1184 ext. 18035

August 2008 | GMPRO | 65

## Grower markets organic vegetables, fruit for small spaces

Elzinga & Hoeksema (E&H) Greenhouses in Kalamazoo, Mich., launched the Urban Gardener line of vegetables and fruit. The product is grown in a 10½-inch pot with accompanying trellises.

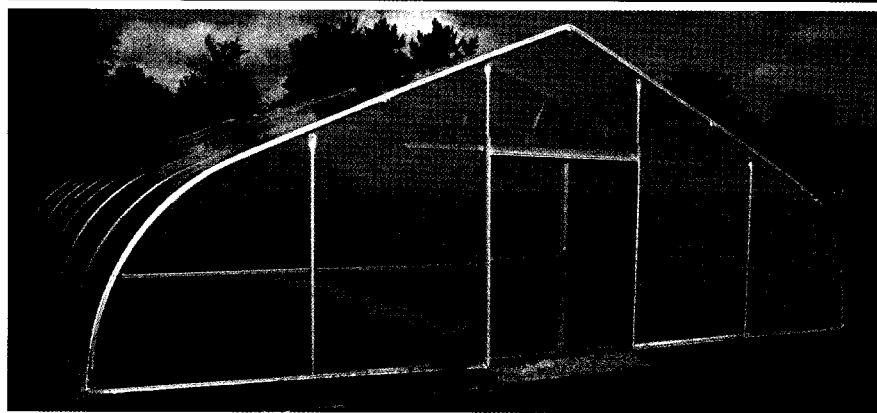
The Urban Gardener line was designed for growing in small spaces. Product includes cucumbers, peas, eggplants, peppers, pumpkins, strawberries and tomatoes. The plants are available for sale with fruit or veggies



The Urban Gardener product works well in small spaces.



### Commercial Greenhouses



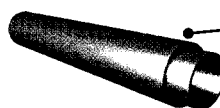
## PT30 greenhouse



The PT-30 is an innovative structure. It can be used as a seasonal cold frame but is also heavy-duty enough to be used as an inexpensive, year-round growing structure.

- Versatile and affordable
- Complete package saves you time
- Heavy-duty construction

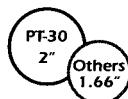
### 20% Larger Tubing!



PT-30 uses larger diameter tubing.

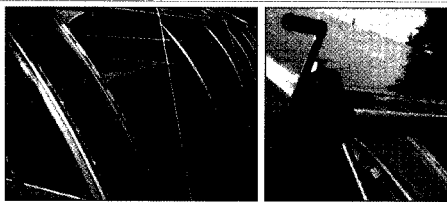
Others use smaller diameter tubing.

We manufacture the PT-30 arches with an industry leading 2" x 14 gauge tubing so that you can rest assured it will provide years of trouble-free use.



### NEW! Roll-up side ventilation

- \* Natural Ventilation
- \* Saves money
- \* Self-locking gearbox



To see our full line of retail and commercial greenhouses, visit us on the web at [www.poly-tex.com](http://www.poly-tex.com) or call us toll-free at **800-852-3443**.

©2008 Poly-Tex, Inc. All rights reserved.



**Now!** 800.928.1184 ext. 18028

62 GMPRO August 2008

already growing on the vines.

E&H struck a deal with Meijer retail stores throughout the Midwest to sell the 100 percent USDA-certified organic product.

FOR MORE: Elzinga & Hoeksema Greenhouses, (269) 327-5144; [www.elzingagreenhouses.com](http://www.elzingagreenhouses.com).

## WEBPRO: Private soil testing labs

If you are looking for a commercial soil testing lab to analyze the properties of your growing media, here are some options. (Listing doesn't imply endorsement by GMPRO.)

- [www.kaglab.com/Services/greenhouse/greenhome.htm](http://www.kaglab.com/Services/greenhouse/greenhome.htm) K Laboratories.
- [www.jrpeterslab.com](http://www.jrpeterslab.com) J.R. Peters Laboratory.
- [www.soilandplantlaboratory.com](http://www.soilandplantlaboratory.com) Soil and Plant Laboratory Inc.
- [www.scottstestlab.com](http://www.scottstestlab.com) Scotts Testing Lab.
- [www.al-labs-west.com](http://www.al-labs-west.com) A&L Western Laboratories.
- [www.agrianalysis.com](http://www.agrianalysis.com) Agri Analysis.
- [www.blinc.com/lab-tour.htm](http://www.blinc.com/lab-tour.htm) Brookside Laboratories.
- [www.bettersoils.com](http://www.bettersoils.com) Wallace Laboratories. ❖❖