Renewable growing media for Organic Greenhouses

Prof. Michael Raviv
Agricultural Research Organization, Newe Ya'ar Research Center, ISRAEL ✉ mraviv@volcani.agri.gov.il

BioGreenhouse

COST Action FA 1105
Vienna, Austria
November 17, 2014

The general consensus in Europe (and therefore also in Israel) is that Organic produce can only be grown in soil.

- ✓ **What is the source of this consensus?**
- ✓ **Is it scientifically or ideologically justified?**

These are the subjects of the current talk, aiming to provoke a general discussion and, perhaps, the writing of a Position paper.

In the EC Directive No. 834/2007 on organic production and labelling of organic products nothing is mentioned regarding the use of growing media!

Currently, however, the general understanding within the EU is that the use of growing media is restricted to seedlings, transplants and plants that are grown in pots and sold together with the pot to the consumer. Such plants should be grown in natural substrates and can be described as Organic.

As a result, no vegetables and fruits are grown in containers under Organic certification, in spite of the clear horticultural benefits of this practice.

What are the main benefits?

- ✓ Improved physical conditions in the rhizosphere, leading to better root growth and improved WUE.
- ✓ Better control of the nutritional status in the rhizosphere, leading to improved NUE and minimal nutrient loss (waste and pollution).
- ✓ Leachates can be collected and recycled.
- ✓ Better control of soil-borne diseases and nematodes, leading to minimal need for pesticides.
- ✓ All the above results with **much higher yields** per unit area, and per other production inputs.

All these mean much less environmental impact per unit of produce.

Growing out of soil is a subject of major discussion. Some Member States interpret Regulation (EC) No 834/2007 to say that growing in natural substrates **is allowed** in greenhouses to grow all crops, either because they find no legal text that forbids this practice, or because they consider that the biologically active substrates in the containers are soil-like and therefore in line with the regulation. Sweden and Finland follow one of these lines of thought and Denmark joined them several years ago. Therefore, surprisingly, a central value in organic farming, the soil, can mean different things in different Member States.

An Evaluation of the First Three Years, Looking for Further Development
Brussels 2012
Editors: Andrzej Szeremeta, Keith Ball, Francis Blake, Marco Schlüter and Lena Tuszynski

In countries such as USA, English-speaking Canada, Australia, New Zealand China and others, growing in containers filled with natural substrates is acceptable in OA. In some of them, even hydroponics, using organic fertilizers is fine…

Why, in my opinion, OA can adopt the use of containerized natural substrates also in Europe (and Israel…)?

Many potential substrates are available, such as numerous compost types, coir, volcanic material etc., all of them can be used without negative environmental impact. In many cases (e.g. composts) the environmental effect is positive, as otherwise the material is a waste, that must be treated. These “wastes” contain a huge amount of nutrients that otherwise must be produced with high energy input.

All the leachates coming from containerized crops can be collected, treated and recycled.

On the contrary, due to irresponsible activities or lack of exact understanding of the physical and chemical characteristics of the soil, soil-grown crops are frequently a significant source of pollution, leading to contamination of ground- and stream-water.

Journal of Horticultural Science & Biotechnology (1998) **73** (4) 485–491

Assessment of various control strategies for recirculation of greenhouse effluents under semi-arid conditions

By M. RAVIV[1*], A. KRASNOVSKY[1], S. MEDINA[1] and R. REUVENI[2]

COMMUN. SOIL SCI. PLANT ANAL., 32(7&8), 997–1028 (2001)

DO ORGANIC FARMING PRACTICES REDUCE NITRATE LEACHING?

Holger Kirchmann and Lars Bergström

Their main conclusion was:

- Reduction of nitrate leaching is not a question of organic or conventional farming, but rather introduction and use of counter- measures such as catch crops, minimum tillage etc., and most importantly keeping the N intensity at a level which assures long-term sustainability of the cropping system; this would require a reduction of the N input to levels somewhat below the ex-pected optimum yield.

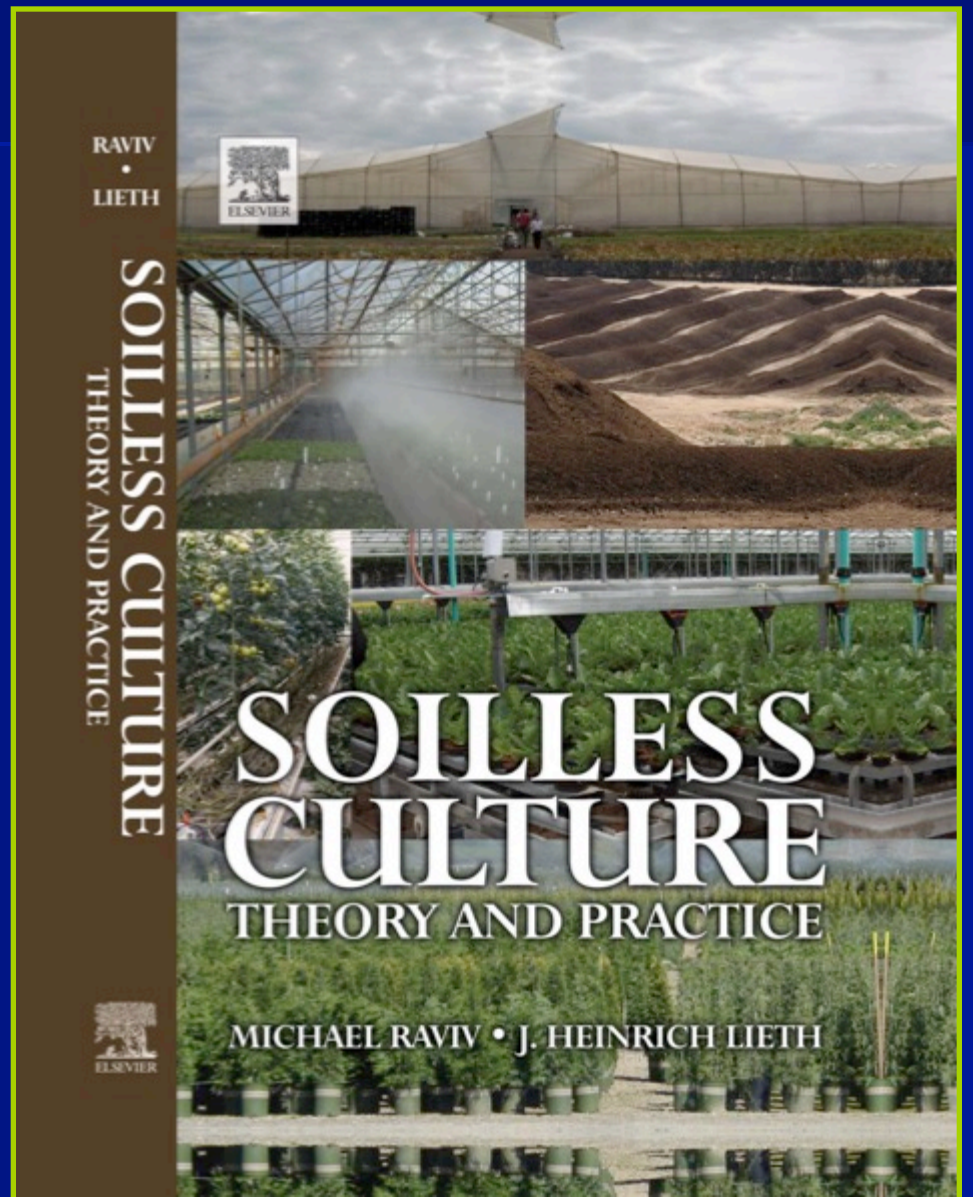
Later, Stopes er al., (2002) and others, using somewhat more prudent approach concluded that "under similar cropping, losses from organic systems are similar to or slightly smaller than those from conventional farms following best practice" **(but not significantly smaller….).**

And what about arid and semi arid countries, where the soil is infertile?

In conventional agriculture growers apply a lot of fertilizers to overcome soil infertility.

In order to assist Organic production in such soils, high application rates of organic amendments and fertilizers are vital. In addition to the economical burden, this is, again, a significant source of pollution as these soils are characterized by low CEC and AEC.

http://www.elsevier.com/wps/find/bookaudience.cws_home/713460/description#audience



Questions?
Suggestions?