Growing Strawberries in Substrates: Challenges and Opportunities

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Substrates for Strawberries

- Soil-free system in bags, pots or troughs
- Peat mixes or coir commonly used, also rockwool and pine bark
- Greatest use in Europe, about 3,700 acres (Lieten, 2009)
- Normally set up as a table-top system in tunnels or glasshouse

Dutch Glasshouse Substrate System in Pots


Dutch Substrate
System in Pots
under Tunnels

Advantages of Substrates

- Disease-free growing media
- More efficient use of water & nutrients
- Adapted to closed systems where water & nutrients are collected & recycled
- Ease of harvest in table-top systems
- Competitive yields


Irish Substrate System in Pots under Poly Tunnels

Disadvantages of Substrates

- Costly, can add $4,000 to $8,000 per acre
- Mining & disposal of substrates creates environmental concerns
- Less forgiving than soil-based systems
  - Frequent irrigation & fertilization
  - Frequent monitoring of water & nutritional status
  - Salts can quickly accumulate
  - Pathogens can be re-introduced

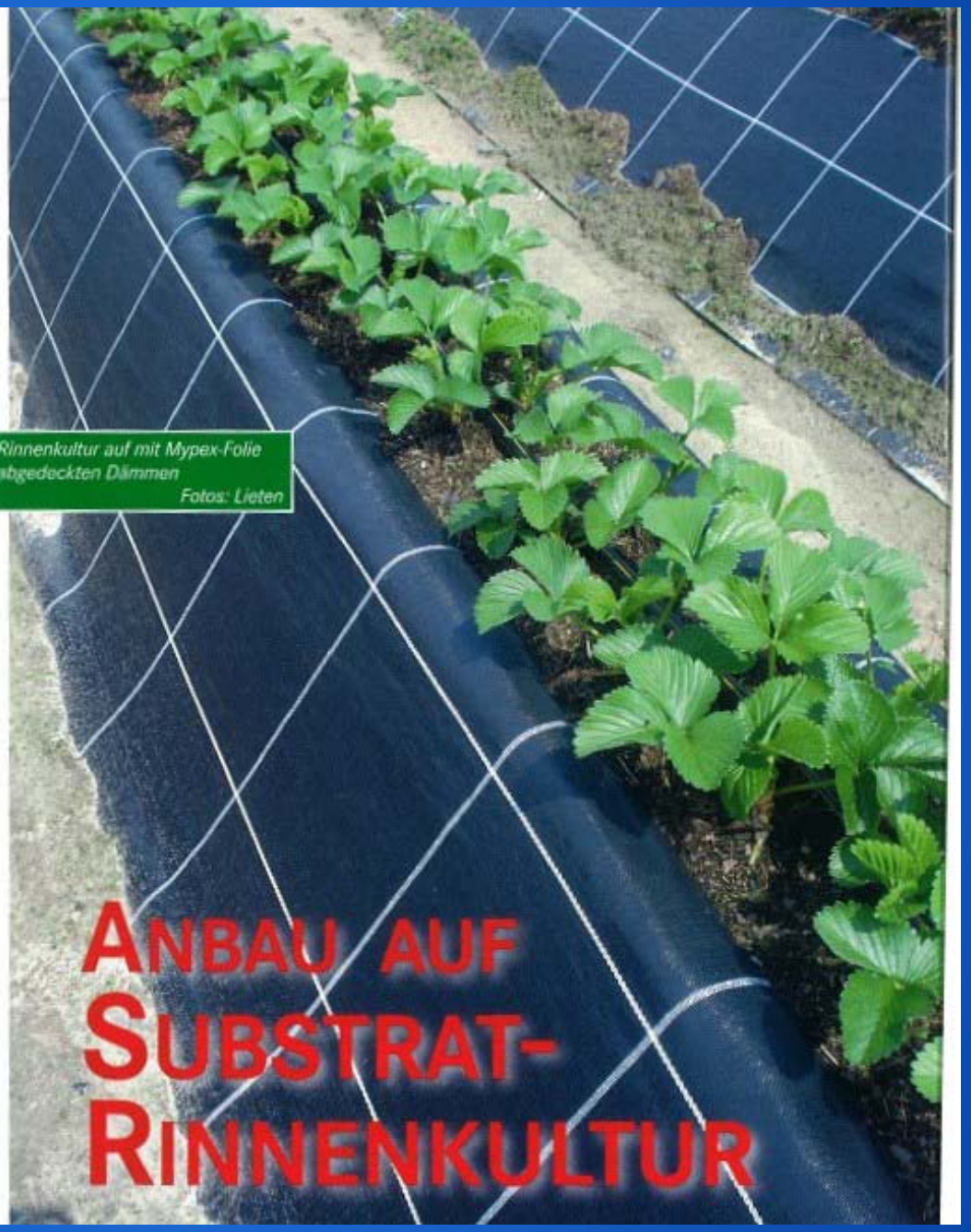

Leachate
Collection System

Raised Bed Trough (RaBeT) System

- Originated in Holland
- Uses standard raised beds to support troughs filled with substrate
- One or two continuous troughs per bed
- Troughs are lined with a weed-barrier fabric before filling with substrate
- Drip lines are added, & full-bed mulch is applied

Anbau auf Substrat-Rinnenkultur

In Ländern wie Spanien, Frankreich, England, Belgien und den Niederlanden setzt sich die Entwicklung zum Anbau auf Substrat stets fort. Die Vorteile solcher Kulturen sind nicht neu: Ein Anbau auf mehrjährig genutzten, z.T. ausgelaugten Böden im Erdbeeranbau ist möglich, der Ablauf kann intensiviert und eine höhere Produktivität erreicht werden, häufig verbunden mit einer besseren Qualität. Auch die Erdbeerfrüchte sind nicht mehr mit Erde oder Stroh beschmutzt und gleichmäßiger gefärbt. Darüber hinaus verringern sich Schneckenfraß und Insektenschäden im Vergleich zu Erdbeeren aus Bodenkultur, Pflückgeschwindigkeit und Arbeitsfreundlichkeit nehmen zu, was die Bereitschaft von Arbeitskräften bei dieser Anbauweise deutlich fördert. Außerdem besteht die Möglichkeit, mehrere Kulturen pro Jahr zu führen, was eine Produktionserweiterung und Ausweitung der Arbeitszeiträume, verbunden mit einer besseren Auslastung der Infrastruktur, mit sich bringt.



Rinnenkultur auf mit Mypex-Folie abgedeckten Dämmen
Fotos: Lieten

Die Auflagen für eine Weiteranwendung von Grunddesinfektionsmitteln nehmen jedoch zu. Methylbromid ist seit einigen Jahren nicht mehr in Gebrauch und das Damoklesschwert hängt über dem zukünftigen

CSC RaBeT Trials

- Started in fall 2008 in Santa Maria & Watsonville (MBA)
- Camarillo location added in the fall of 2009
- Continuing trials this year in Santa Maria & Watsonville

Cooperators

- Dan Legard, CSC
- Dong Wang, USDA-ARS, Parlier
- Steve Fennimore, Husein Ajwa & Raquel Serohijos, UC-Davis
- Dwight Rowe, Michelle Miller & Shiv Reddy, Sungro
- Oleg Daugovish, Surendra Dara & Mark Bolda, UC Coop Extension
- Growers: Greg France (S.M.), Stuart Yamamoto (Wats.) & Mike Ferro (Camarillo)

CSC RaBeT Trials

- Trials in the first season (2008-2009) focused on substrate versus soil, mulches and varieties
- Second season trials focused on substrates, soils amended with substrates, irrigation and fertility


Two Troughs shaped
into a Raised Bed

Laying out Weed-Barrier Fabric

Dispensing Peat:Perlite Substrate

Close-up of Coir Substrate


Close-up
of Peat :
Rice Hull
Substrate

Applying "Skunk" Mulch


1

Early Growth in 2008-2009 Santa Maria Trial

Lessons from First Two Seasons

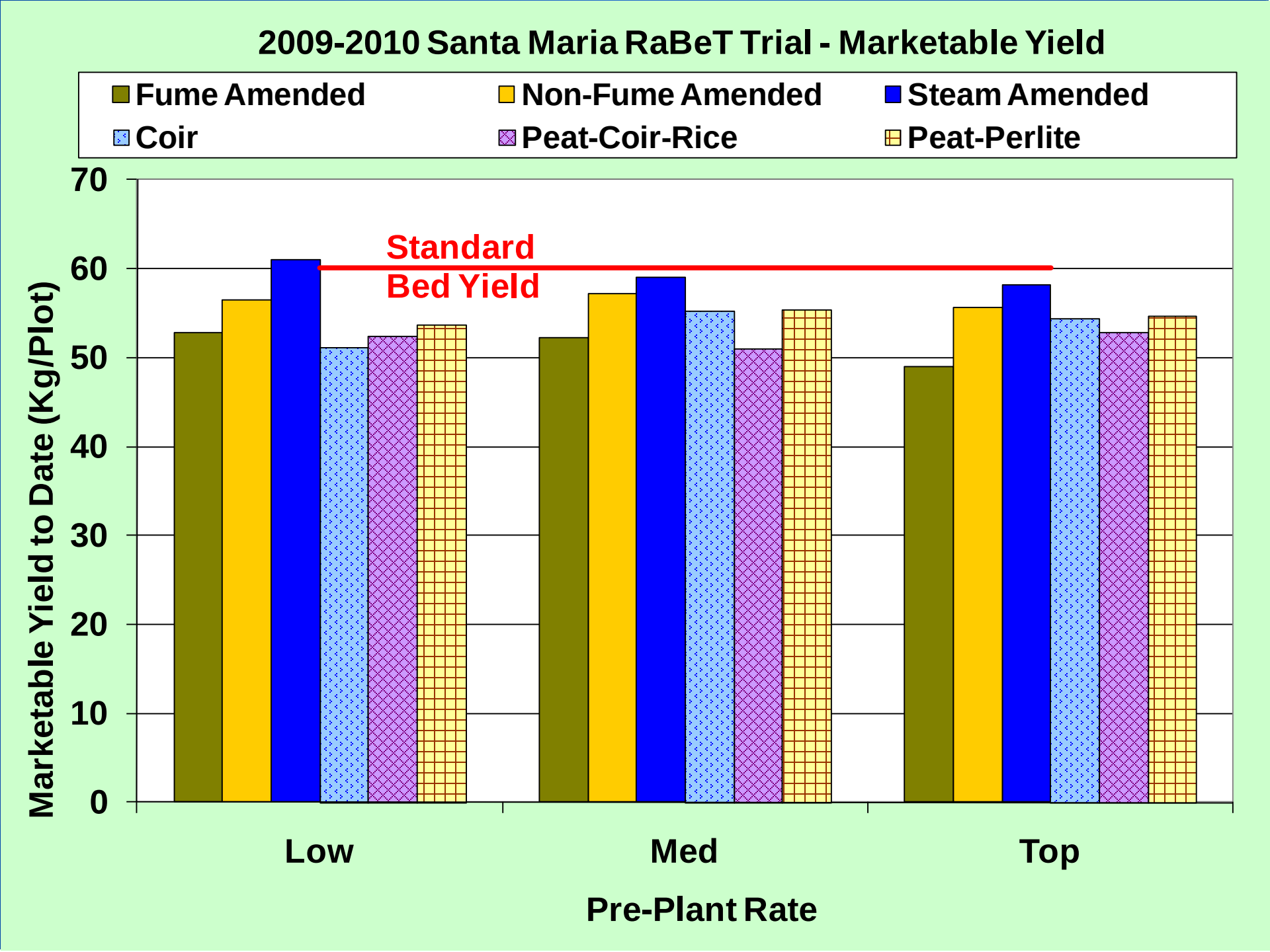
- Proper plant placement is important, crew management is key
- Early fertigation important in substrates, controlled-release fertilizers are not a substitute
- Salts can accumulate quickly if the water source has high EC

Lessons from First Two Seasons

- Weeds are not a problem in substrates, but can be severe in amended soils
- Sloped sites are difficult to water uniformly without pressure-compensating drippers

Success despite Challenges

- In Santa Maria, substrate yields were much improved in 2010 over the prior season. Marketable yields did not differ significantly between standard beds and either substrates or amended soils.
- Amended soils had higher total yields but also higher cull rates than substrates; as a result, marketable yields were very similar.


2009-2010 Santa Maria RaBeT Trial - Marketable Yield
Fume Amended
Non-Fume Amended
Steam Amended
Coir
Peat-Coir-Rice
Peat-Perlite
Standard
Bed Yield
Marketable Yield to Date (Kg/Plot)
70
60
50
40
30
20
10
0
Low
Med
Top
Pre-Plant Rate

This Season's RaBeT Trials

- Focus is on refining irrigation and fertigation techniques.
- Comparing two substrates (peat:perlite & coir) plus steamed amended soil to standard beds.
- Using pressure-compensated drip emitters (Netafin), custom fertigation and leachate monitoring to optimize plant growth.


Santa
Maria
Amended
Soil
Grower
Standard


BRUTE


1
COIR
1
2
T-PERLITE
2
3
3
4
4
5
5
BRUTE

THANK YOU!