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PROEFCENTRUM HOOGSTRATEN

Sustainable substrate contributes to reduced plant loss in strawberry

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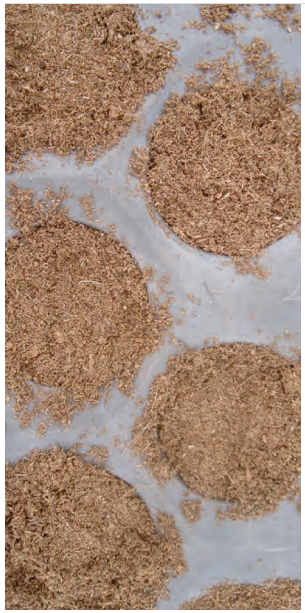
01

Introduction

- Peat and coir are key components
- Plant loss due to root diseases



Peat and coir are key components

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Peat
- Properties
  - Stable and inert
  - Different fractions
  - Belgium: annual usage of 600 000 m^3 fresh peat (23% strawberry)
  - In 2050: twofold increase in demand for peat
- Extraction is not considered sustainable
  - Ireland, Sweden, Finland, Baltic states
  - Storage of CO_2 (release of 247 kg CO_2/m^3 extracted)
  - 1m renewal per 100-1000 years
  - Annual peat extraction: 100 million m^3

Coir
- Properties
  - Excellent water holding capacity
  - Different fractions (chips, fiber, ccp)
- Production is not considered sustainable
  - Sri Lanka
  - A lot of water is needed (washing and buffering of coir)

Plant loss due to root diseases

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Most important root disease on substrate: ***Phytophthora cactorum*** (crown rot)
= Latent infections on plants after propagation
= plant loss in greenhouse

Composition of optimal substrate:
- Stable and inert (contain enough air)
- Water holding capacity
- Rooting of plants
- Better drainage of substrate (root diseases!)
- Sustainability
  - Alternatives:
    - o **Wood fibre**
    - o Upper layer of peat fields (**sphagnum**)

02

Set-up

- Tipping grounds
- Production substrates

Set-up substrates

- **Sonata** (Fresh Forward, The Netherlands): variety highly susceptible to *P. cactorum*
- Planting runner tips: 01/07/2020
- Start fridge storage (-1,5 °C): 17/11/2020
- Composition **tipping grounds** for production phase 2020

Tipping ground	Peat		Coco peat (CCP)	Perlite	Wood fibre
	Peat fine	Sphagnum (Accretio)			
1	60%	-	30%	10%	-
2	-	50%	50%	-	-
3	30%	50%	20%	-	-
4	60%	-	20%	-	20%

- Planting date: 23/12/2020 (heated greenhouse)
- Harvesting period: 15/03/2021-03/05/2021
- Composition **substrate blends** for production phase

Substrate blend	Peat		Coco peat (CCP)	Perlite
	Peat crude	Sphagnum (Accretio)		
1	100%	-	-	-
2	-	40%	40%	20%

- 8 objects, 4 repetitions of 70 plants per object

03

Results

- Root assessment
- Plant loss and yield

Root assessment

- Propagation phase
  - No visible differences
  - Healthy plants
  - Good developed root system
- **Substrate 2** (Sphagnum-CCP-Perlite)
  - Faster rooting
  - Better developed root system
- **Substrate 1** (Pure crude peat)
  - More wet during cultivation period
  - Higher risk for root disease spreading


Tipping ground 1 + Substrate 1

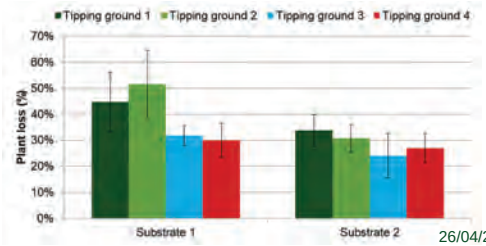

Tipping ground 4 + Substrate 1

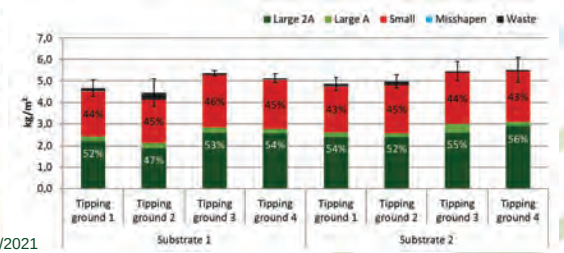

Tipping ground 1 + Substrate 2


Tipping ground 4 + Substrate 2

Plant loss and yield

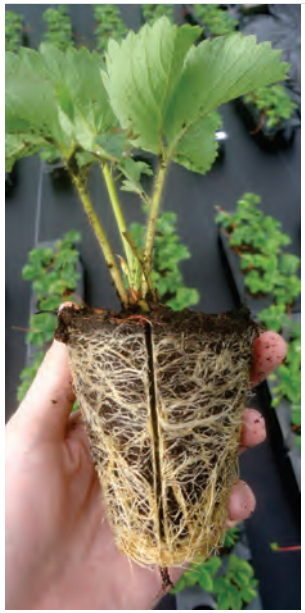
- **Substrate 1** (Pure crude peat)
  - More plant loss with tipping ground 1 (Peat-CCP-Perlite) and tipping ground 2 (Sphagnum-CCP)
  - Less plant loss with tipping ground 3 (Peat-Sphagnum-CCP) and tipping ground 4 (Peat-CCP-Wood fibre)
- **Substrate 2** (Sphagnum-CCP-Perlite)
  - Less plant loss due to Sphagnum: advanced rooting and less secondary infections
- **Yield**: same trends
  - Symptoms *P. cactorum* are visible in Substrate 1 and 2
    - Less production and more waste (dry shrunken fruits)
  - More plant loss → less production per square meter
  - Differences in grading are small





04 Discussion and conclusion

- Sphagnum
- Wood fibre



Discussion and conclusion

Based on results of trials performed in 3 consecutive years

- **Sphagnum** is good alternative for peat in substrates
  - Good water holding capacity
  - Stable and inert
  - Advanced rooting in tipping ground and production substrate
    - Reduced plant loss due to root diseases
  - Adding up to 50% in tipping ground
  - Adding up to 40% in production substrate
- **Wood fibre** is good alternative for peat or coir in tipping ground
  - Wood fibre, not chopped wood
  - More airy root environment and quicker drain
    - Reduced plant loss due to root diseases
  - Adding up to 20% in tipping ground
  - More research needed about wood fibre in production substrate
- More **sustainable substrates** containing **sphagnum** and **wood fibre**
  - Limit chances for root infections, reduce plant loss and optimize fruit yield

Thanks for your attention

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