From natural peat moss to a commercial growing media constituent

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1913

we make it grow

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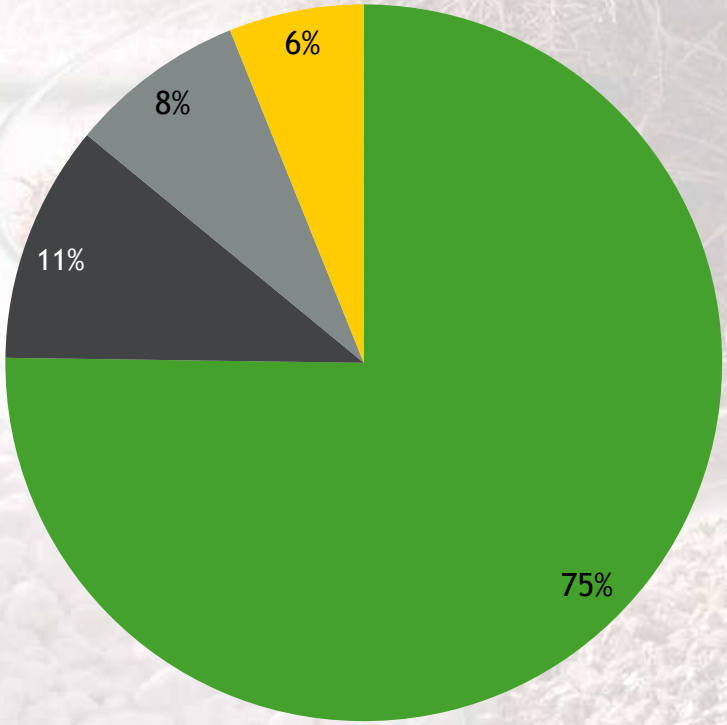
01

Introduction

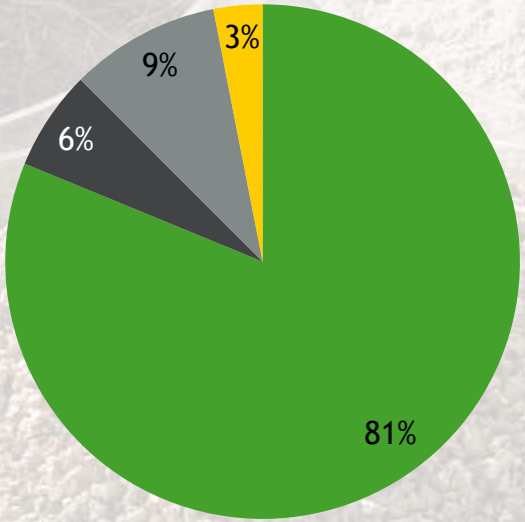
Amount of different growing media constituents used

EU 16 - 2013*



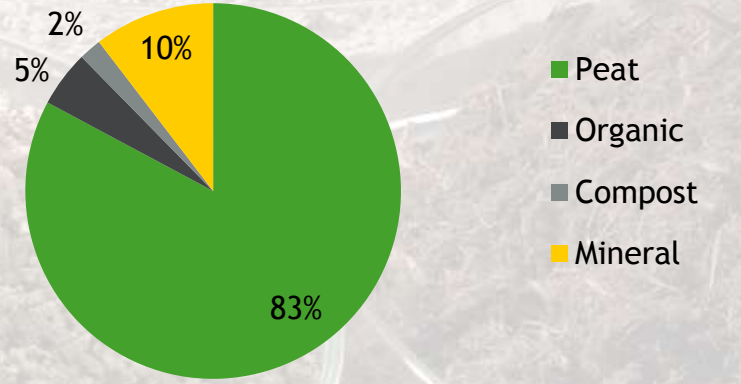
34.552.000 m³

Germany - 2013*



8.373.000 m³

Klasmann-Deilmann - 2016



3.486.000 m³

*Data from: Schmilewski, G. 2017.
EU 16 = Austria, Belgium, Denmark, Estonia, Finland, France, Germany, Ireland, Italy, Latvia, Lithuania, Netherlands, Poland, Portugal, Sweden, UK

SUBSTRATES

Growing media constituents at Klasmann-Deilmann

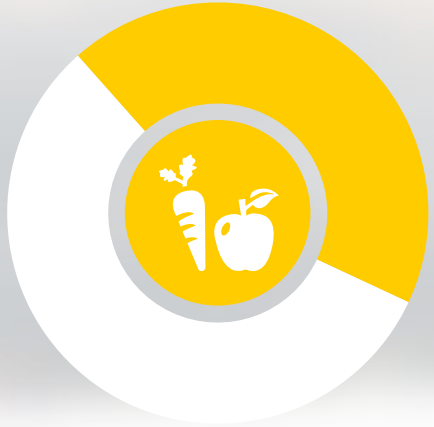
Alternative Raw Materials

Share of total production 2016:

6.8%

Our target:
Obtaining 15% of our raw materials
from alternative sources

Food Industry



Share of total sales 2016:

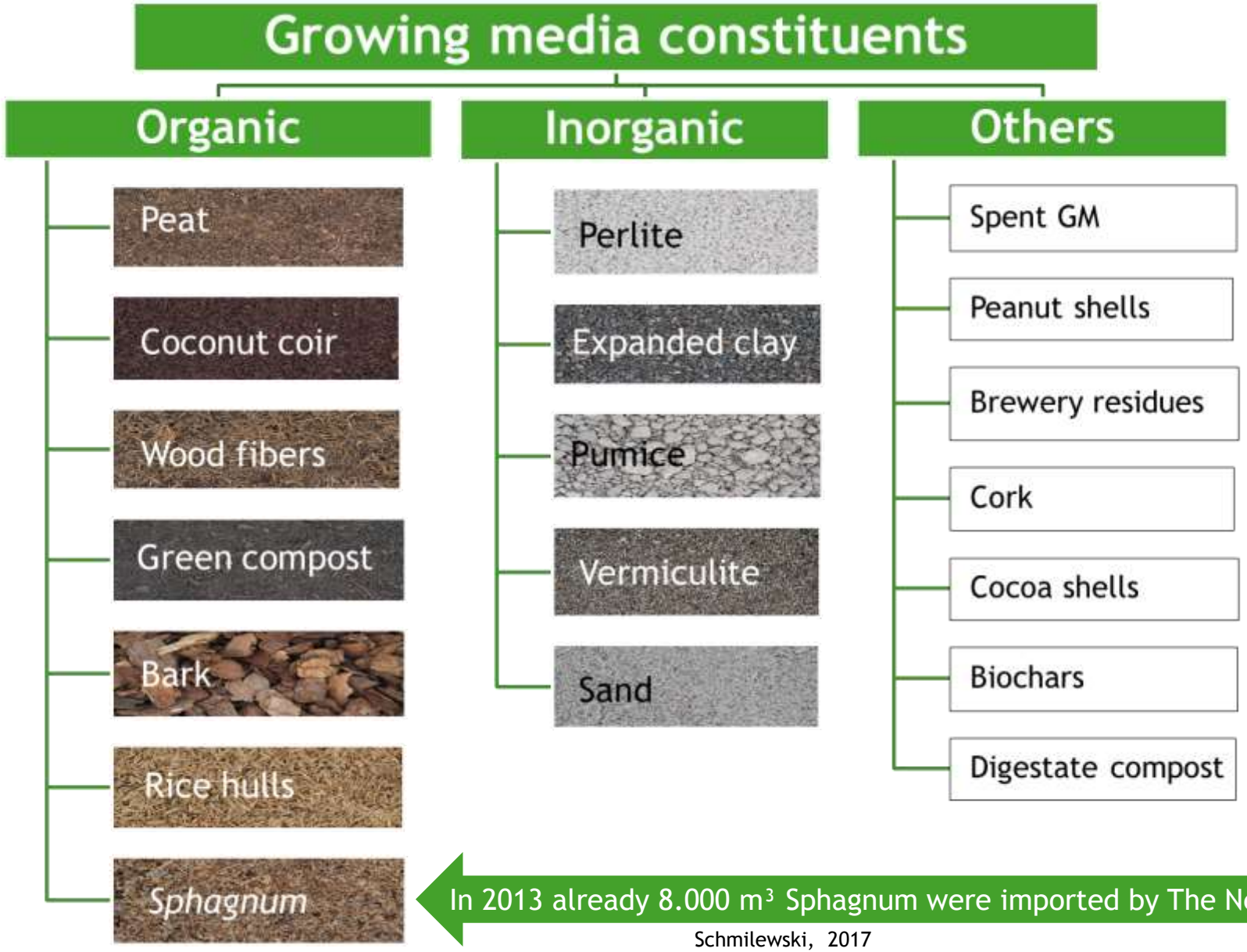
43.5%

A growing share of our substrates
contributes to food production

Introduction

Professional gardening today

Growing media constituents



In 2013 already 8.000 m^3 Sphagnum were imported by The Netherlands, France and Germany

Schmilewski, 2017

EU Sphagnum imports

- *Sphagnum* is imported from:
  - Finland: Harvest from unprofitable, drained peatlands (Silvan et al. 2017)
  - Chile: Manual harvest from *Sphagnum*-dominated wetlands (Díaz & Silva 2012)
  - Australia/ New Zealand: Harvest from natural sites
  - USA: Harvest from marsh sites
- Sphagnum is imported to:
  - The Netherlands, France, Germany and so on
  - In 2013 around 8.000 m^3 (Schmilewski 2017).
- Sphagnum so far is mainly used for:
  - Orchids, gardening or terrarium

Moss harvesting Finland (Silvan et al. 2017)

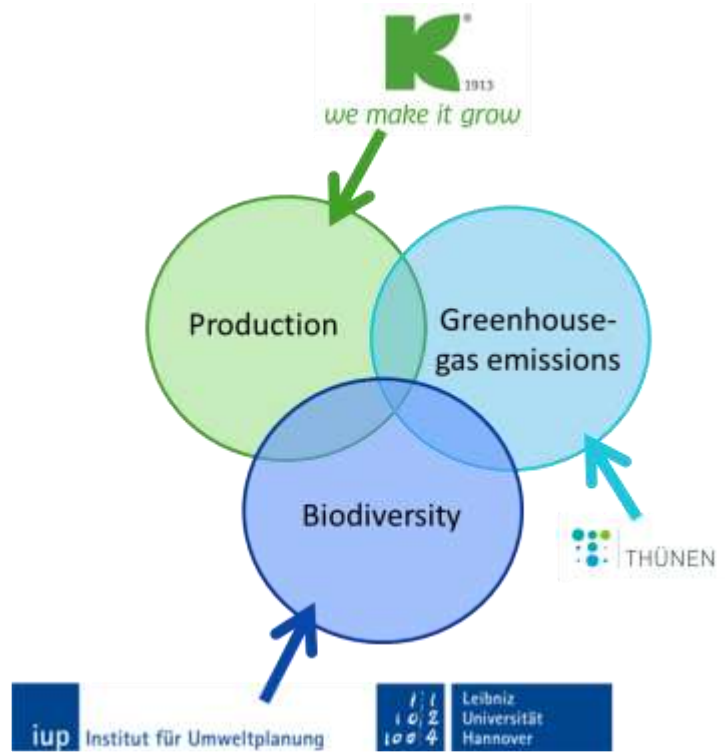
Moss Harvesting USA (Mossman381, 2014)

02

Sphagnum farming project at Klasmann-Deilmann

Sphagnum farming project at Klasmann-Deilmann

- Cultivation of hummock peatmosses (*Sphagnum* species), harvesting and processing to obtain a growing media constituent
- Establishment of two 5 ha large test sides following peat depletion. Residual peat layer of strongly decomposed (**black**) peat
- Investigation on animals (invertebrates), plants and greenhouse gas emissions by the University of Hannover (Dr. Martha Graf) and the Thünen-Institute Braunschweig (Dr. Bärbel Tiemeyer)
- Co-Funded by the Ministry of Food, Agriculture and Consumer Protection of Lower-Saxony and the German Foundation Environment (DBU)



Project sites

Sphagnum farming site

‚*Sphagnum*-Bank' – growing new donor material

Establishment of sites

Harvest of donor material

Inocolation of fiels with mosses and protection with straw

Established Sphagnum lawn after 1 year

03

From peat moss to growing media

Donor material

Procurement of donor material is difficult!

- Harvesting inoculation material from natural/near-natural bog sites.
  → High bureaucracy, most sites are protected.
- Other methods of propagation needed for scaling up *Sphganum* farming.
  → We set up a „*Sphagnum*-Bank“ for growing new donor material

Farming sites

Where to grow in Germany?

- On grassland bogs
  - High contamination with weeds -> excavation
  - High nutrient occurrence in soil and water
  - But lower land price compared to farmed bogs
- On cut-over bogs
  - Are either designated as conversation sites
  - Or have a high price

→ **subsidies are needed**

Cultivation & Harvesting

- Low productivity of mosses → test of different species & species selection
- Colonization with weeds → regularly mowing until lawn established
- Challenging hydro management (irrigation, drainage, availability, quality)

Contaminations (impurities)

- 90-98% of the donor material contains of *Sphagnum*
- **RHP** quantity threshold **<15 plants per m²**
- Untreated *Sphagnum* material showed partly **>600 plants per m²**

→ Hygenization is indispensable when *Sphagnum* is processed to horticultural substrate!

Hygenization methods

By hand

Weed out all visible parts of vascular plants and other non *Sphagnum* pieces.

→ not practicable

Gamma radiation

6 KGray

Waste heat biogas plant

60°C dry heat for 5 days, thickness 20cm

Vapour

90°C wet hot steam in existing facilities for 20min

Processing

- Chopping
- Drying
  - Air drying
  - Using waste heat (biogas plant, etc.)
  - Other methods?

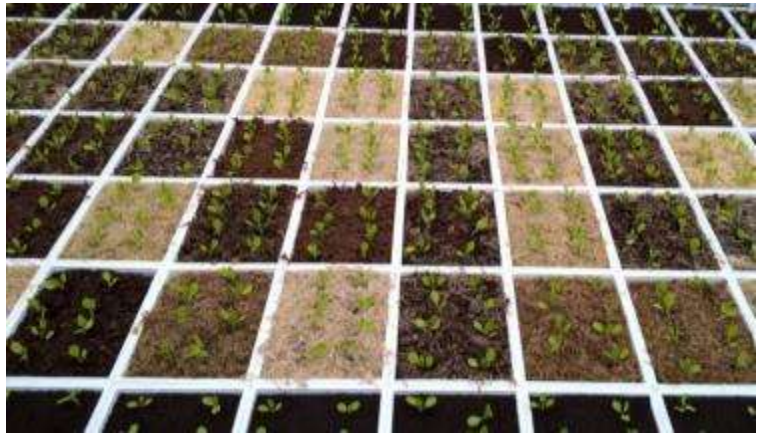
  } Moisture reduction from 90% to 20%

- Determination of volume weight
  - The dry material is more difficult to handle
  - Different methods are used to determine volume
  - *Sphagnum* can vary widely in moisture content
  - Long fibres have a higher volume/weight ratio than chopped *Sphagnum*
  - Volume/weight depends on *Sphagnum* species

Creating a growing media constituent

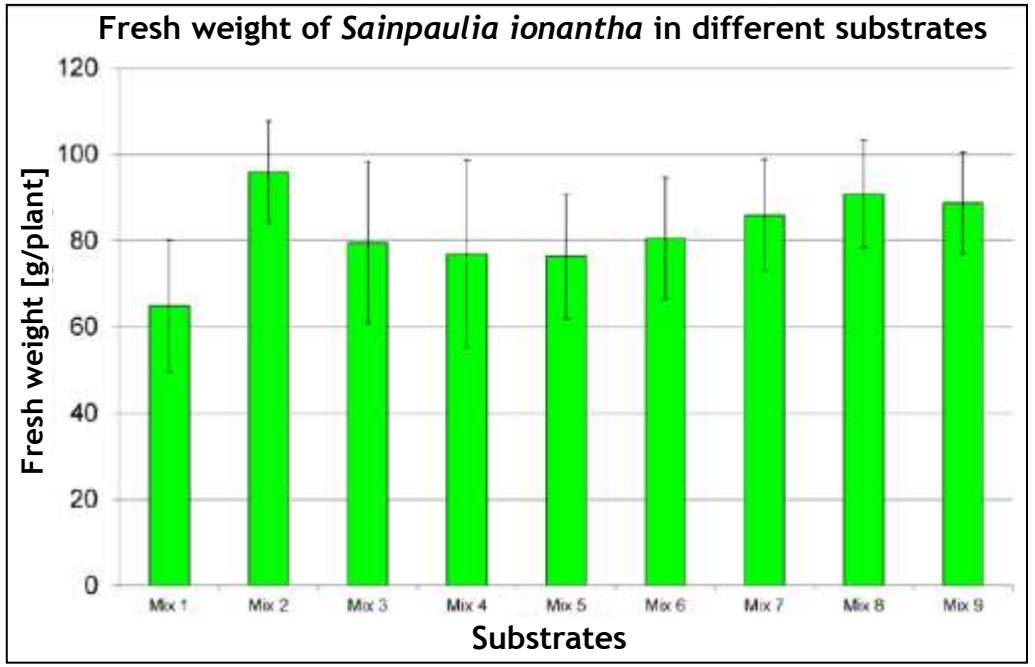
- Hygenised and dried *Sphagnum* is mixed with (white) peat to create growing substrate.
- Depending on *Sphagnum* species and culture grown in the substrate, *Sphagnum* can replace peat up to 100%

- Still under research:
  - Which *Sphagnum* species can be used for which culture and in which amounts?



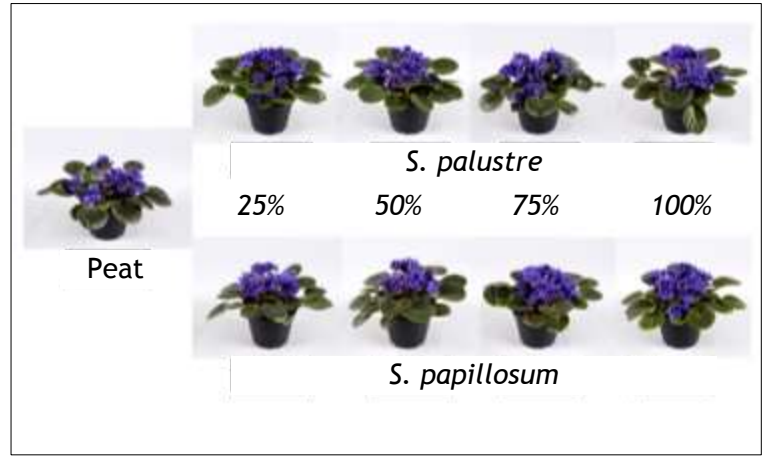
Cultivation

– First trials show outstanding results as growing media!



***Impatiens* Neu-Guinea**

Sainpaulia ionantha



04

Conclusion

Conclusion

- Fresh Sphagnum moss has shown its suitability as a growing media several times
- The peat industry would be highly interest if its available in required quantity, quality and price
- But:
  - Natural sites are limited
  - And artificial sites still have to overcome a number of obstacles.

Thank you for your attention!

Dr. rer. nat.

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