

Ingredients for soil fertility in vegetable production

Richard de Visser
HortiAdvice Scandinavia A/S



Ingredients

1. Organic matter management
2. Green manure strategy
3. Controlled traffic farming in vegetable production



Green manure and cover crops

- Benefits of vegetable growing season
- Crop rotation disease – be aware of Crucifera
- Avoid seed production by cutting or mowing (ex. Borago, oil radish, buckweat)
- Urgent soil recovery – taproots!
- Weed suppression = growth and cover speed
- Biomass production - by mixtures of highly potential species
- Handling green manure before soil tillage?
- Nematode control



Green manure and cover crops

- High sowing density
 - Increased and faster cover effect
 - Smaller and more shallow roots
 - Lower C/N-ratio
- Low sowing density
 - Reduced cover effect
 - Deeper and more vigorous rooting system



Mixtures do the job

- Multi-species mixtures of cover crops increase agro-ecosystem services
 - Weed suppression
 - Increased ground cover
 - Increased above-ground biomass
 - Reduced weed biomass
 - More effective nitrogen retention
 - Large degree of functional complementarity among different legume species
 - Stability of performance and establishment
 - Combined legumes and non-legumes cover crops synchronize better with the following crop

Species and mixtures

From a 2015 presentation by Wolfgang Sturny, Swiss No-Till & Fachstelle Bodenschutz des Kantons Bern



gartneri RÅDGIVNINGEN Green manure and cover crops

- Benefits of vegetable growing season
- Crop rotation disease – be aware of Crucifera
- Avoid seed production by cutting or mowing (ex. Borago, oil radish, buckwheat)
- Urgent soil recovery – taproots!
- Weed suppression = growth and cover speed
- Biomass production - by mixtures of highly potential species
- Handling green manure before soil tillage?



gartneri RÅDGIVNINGEN Dilemma – root knot nematodes (Meloidogyne hapla)

Legumes – essential for organic production - are very good hosts for root knot nematodes

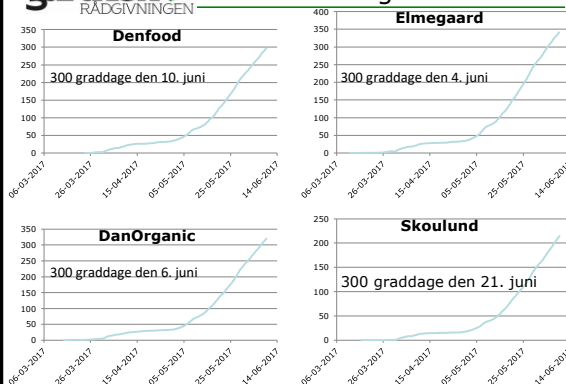


gartneri RÅDGIVNINGEN German strategy to control root knot nematodes

1. Leguminous *nematode* trap crop 1st. of September
2. Measure soil temp until 300 day degrees
3. Mulch down the trap crop
4. Black fallow for two months (ad compost)
5. Seed non-host weed competitive *nitrogen* trap crop (Avena Strigosa, variety Pratex)
6. Ready for seeding carrots in spring



gartneri RÅDGIVNINGEN Tested at 4 organic farms



gartneri RÅDGIVNINGEN Results

Catch crop for nematodes M. Hapla, German strategy 2017, (preliminary results)

| Location | | Meloidogyne hapla | Pratylenchus | | | Paratylenchus spp | Tylenchorynchus spp | Trichodorus spp | Beneficial nematodes |
|-------------|------------|-------------------|--------------|-----------|-----------|-------------------|---------------------|-----------------|----------------------|
| | | | crenatus | neglectus | penetrans | | | | |
| Lindegården | Control | 1610 | 0 | 820 | 580 | 0 | 240 | 10 | 3450 |
| | Catch crop | 10 | 0 | 219 | 134 | 0 | 130 | 10 | 2480 |
| Marienlyst | Control | 400 | 312 | 0 | 378 | 0 | 50 | 40 | 4470 |
| | Catch crop | 0 | 95 | 3 | 142 | 10 | 90 | 0 | 3990 |
| Skoulund | Control | 63 | 104 | 13 | 13 | 0 | 160 | 150 | 5680 |
| | Catch crop | 10 | 75 | 10 | 5 | 0 | 200 | 50 | 5900 |
| DenFood | Control | - | - | - | - | - | - | - | - |
| | Catch crop | 29 | 119 | 294 | 55 | 63 | 500 | 23 | - |

Soil samples has been taken 18th of Aug. 2017, at a time where that not all M. Hapla to be free living 12 but some root knots.

Samples has been tested at HLB, except DenFood tested at Blgg.

Control plot is clover grass, winter rye and oat at Karup, Sdr. Felding and Hvalpsund respectively, harvested in august.

Catch crop is clover grass with winter vetch seeded in september 2016 and mulched down 10. june 2017.

This is a demonstration and not trials with replications.

gartneri RÅDGIVNINGEN How to choose your cover crop or green manure

- Mineralization potential in the field
- Soil type
- Choose your purpose
 - nitrogen producing or –catching, soil reviving, organic matter, etc.)
- Potential sowing date
- Degree of sensitiveness to frost
- Crop rotation
 - crucifera, potatoes, onions, carrots etc.
- When to establish next crop
- And what crop to establish

