E4 Europæiske erfaringer med næringsstofforsyning, plastik og andre input til det økologiske Landbrug

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SEGES

Pathways to phase-out contentious inputs from organic agriculture in Europe

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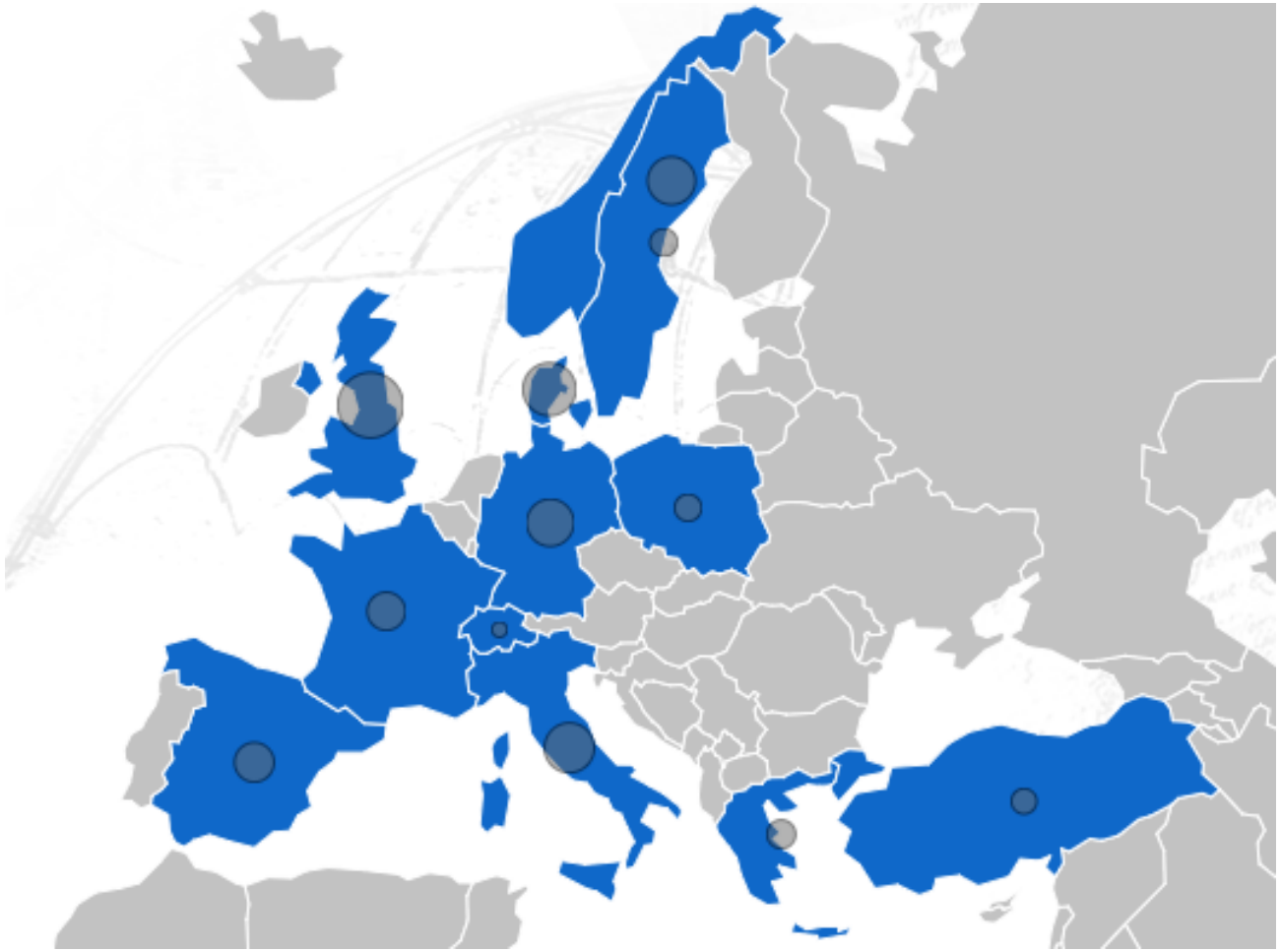
www.organic-plus.net



€ 4.1 m over 4 years, 11 Universities and 14 other research institutions/NGOs,
9 EU and 3 non-EU countries, > 50 associated partners

Organic-PLUS sigter mod at minimere og til sidst udfase diskutable input fra Økologisk landbrug. Dermed kan økologiske fødevaresystemer leve op til de af IFOAM formulerede principper om 'økologi'. Vores mål er at :

- **identificere og evaluere omstridte input, der i øjeblikket bruges i europæisk økologisk landbrugspraksis, ud over dem der var beskrevet i opslaget**
- **Teste alternativer i praksis og finde case bedrifter hvor de ikke bruges**
- **give miljømæssige, sociale og økonomiske vurderinger af udfasningsscenarier (både case og model) Arbejder med RISE**
- **formidle og sprede viden, ideer og resultater for at maksimere effekten af projektet**

Udfordringer i Økologisk Produktion mht. troværdighed

Hvilke udfordringer ser O+ på mht. input:

WP 5. Jord: konventionel gødning, spagnum, plastik

WP 3. Plante Produktion: mineral olier, kobber, svovl

WP 4. Animalsk Produktion: Antibiotika, ormemidler, konventionel halm

Animalsk produktion; her ligger vægten på at finde alternative præparater baseret på planteudtræk og forskellige aktivstoffer herfra, samt andre biologiske materialer som kan bruges som strøelse. Tove Serup

WP 5. Commercial organic fertlisers in Norway

Content: dry poultry manure, meatbone meal and vinasse, all form non-organic farming

«Marihøne» (ladybird) in western region

«Grønn Øko» in East and North

As per May 2019: 118 various products certified for use in organic farming, made from plant material or animal by-products, mainly for horticulture

Analyse af hvordan nogle nøgleafgrøder blev dyrket i forskellige partnerlande

Crops/ Countries	Apple	Broccoli	Cabbage	Carrot	Cereals	Citrus	Cucumber	Eggplant	Lettuce	Olive	Potato	Pepper	Straw-berry	Tomato	SUM
Denmark	1	1			1						1		1	1	6
France				1				1	1	1	1			4	9
Germany			1		2						1			1	5
Greece	1	1				1				1	1			1	6
Italy						3				2	2			2	7
Norway	1			1							1		1	1	5
Poland							1				1		1	1	4
Spain						3				4				2	9
Turkey						1		1		1	1	1	1	1	7
SUM	3	2	1	2	3	8	1	2	1	9	9	1	4	14	60
UK	2	2	2	2					1				1		8

Både mht. gødning og plantebeskyttelse

Alle land har deres egen lister med tilladte gødninger. Ofte er sammensætning fortoligt

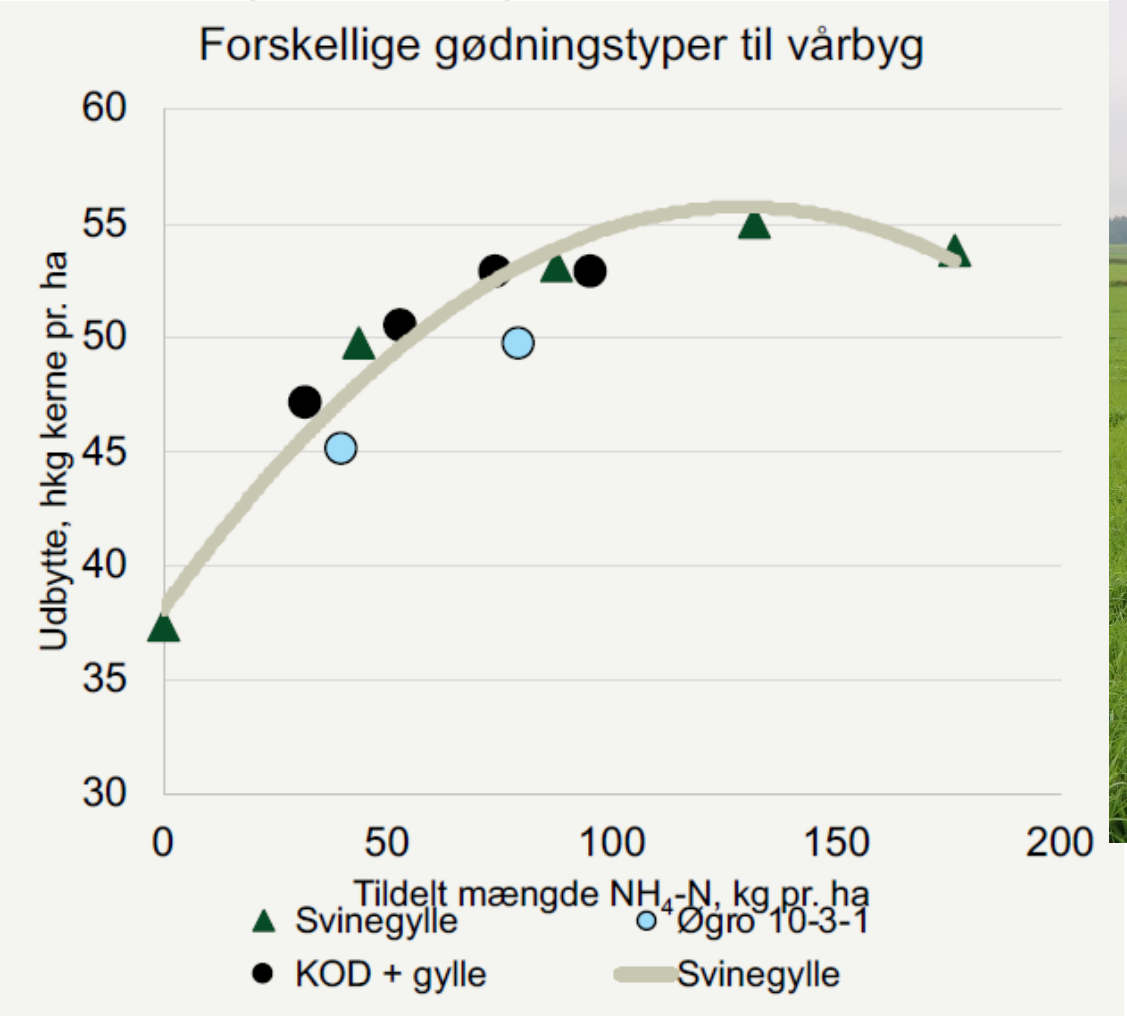
Frankrig

Product/Crop	Cattle manure	Green manure	Fertilizer pellets	Dehydrated manure pellets	Feather flour	Pork silk	Blood meal	Beet vinasse	Mineral potassium fertiliser, patentkali	Complete organic fertiliser, e.g. 6 3 12	Natural phosphate	Seaweed fertilizer
Carrot	x*		x									
Lettuce (different types)		x										
Olive										x#		
Potato	x*											
Tomato	x+		x	x	x	x	x	x	x	x	x	x

Tyskland

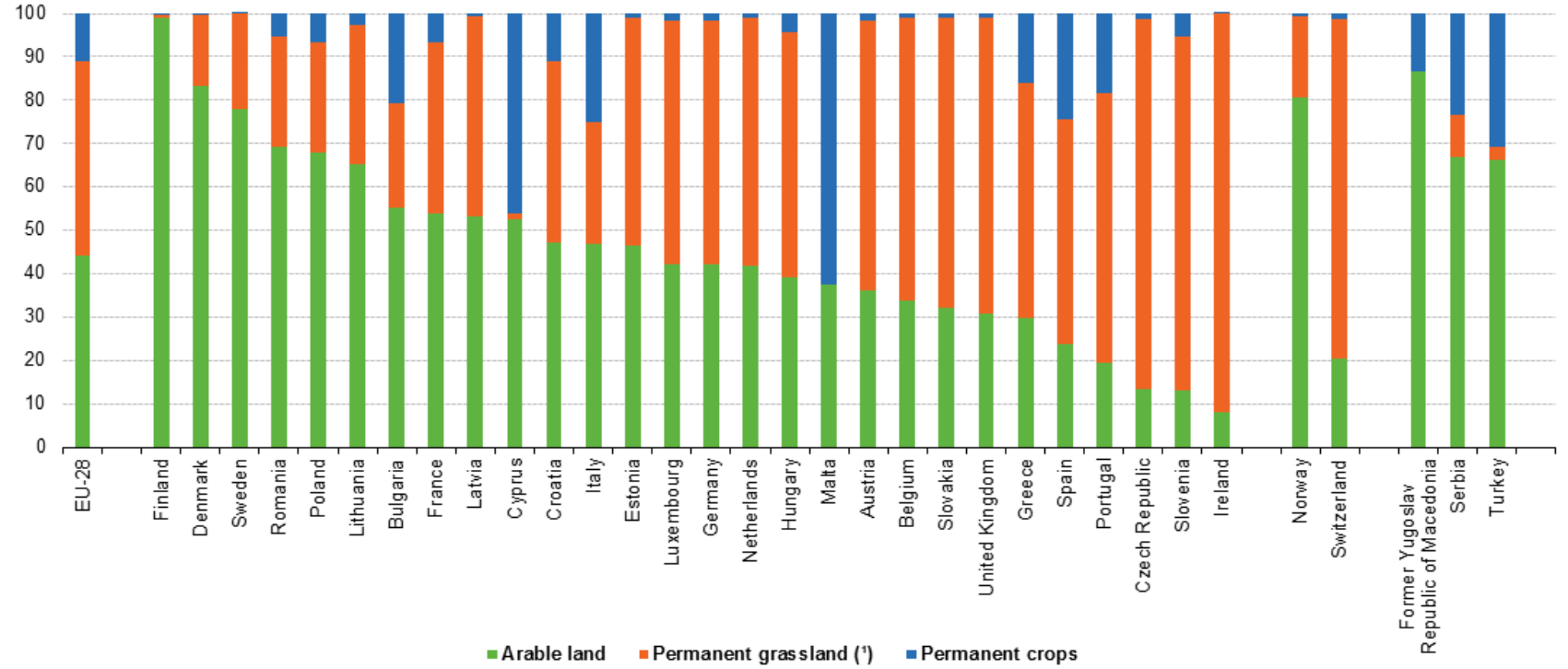
	Animal manure (own farm)	Non-organic manure	Com-posted manure	Horn meal	Maltaflor	Florapell	Sulphur	Phosphorus
Cabbage			x	x				
Cereals	x	x					x	
Potato	x							x
Tomato			x	x	x	x		

Eksperimenter i forskellige lande: Gødningsforsøg Danmark, Tyskland, Norge, England



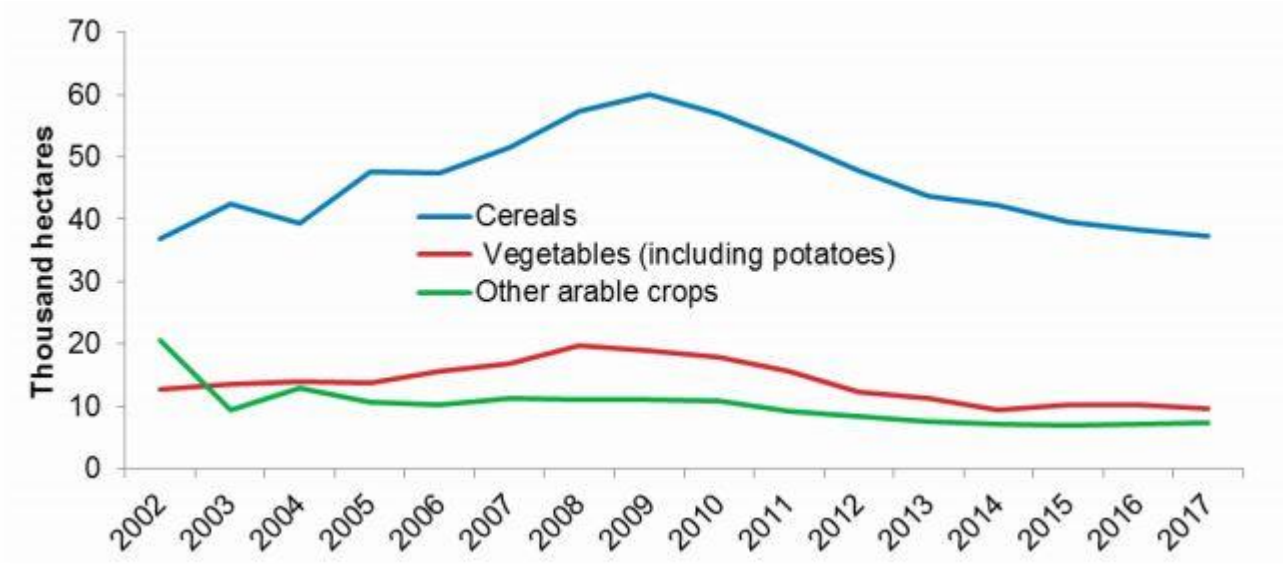
FIGUR 1. Udbytter og tildeling af forskellige gødningstyper til vårbyg i fem forsøg i 2019. (P13)

Meget forskelligt struktur i økologisk landbrug, som gør at manglen på næringsstoffer takles forskelligt



Note: No data available for Iceland
(¹) Pasture and meadow, excluding rough grazing.
Source: Eurostat (online data code: org_cropar)

Ikke fremgang alle steder (England)



WP 5. Plastics Research Team in Polen

Investigating how to synthesize alternatives for plastics in agriculture:
1. accessories
2. mulching materials

dr hab. inż. **Krystyna Malińska** Project manager & Researcher

dr hab. inż. **Przemysław Postawa**, Researcher

dr inż. **Tomasz Stachowiak,** Researcher

prof. dr hab. inż. **Małgorzata Kacprzak** Advisor & Researcher

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mgr inż. **Danuta Dróżdż,** Researcher

mgr inż. **Agnieszka Szczypiór,** PhD candidate

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Plastics in agriculture

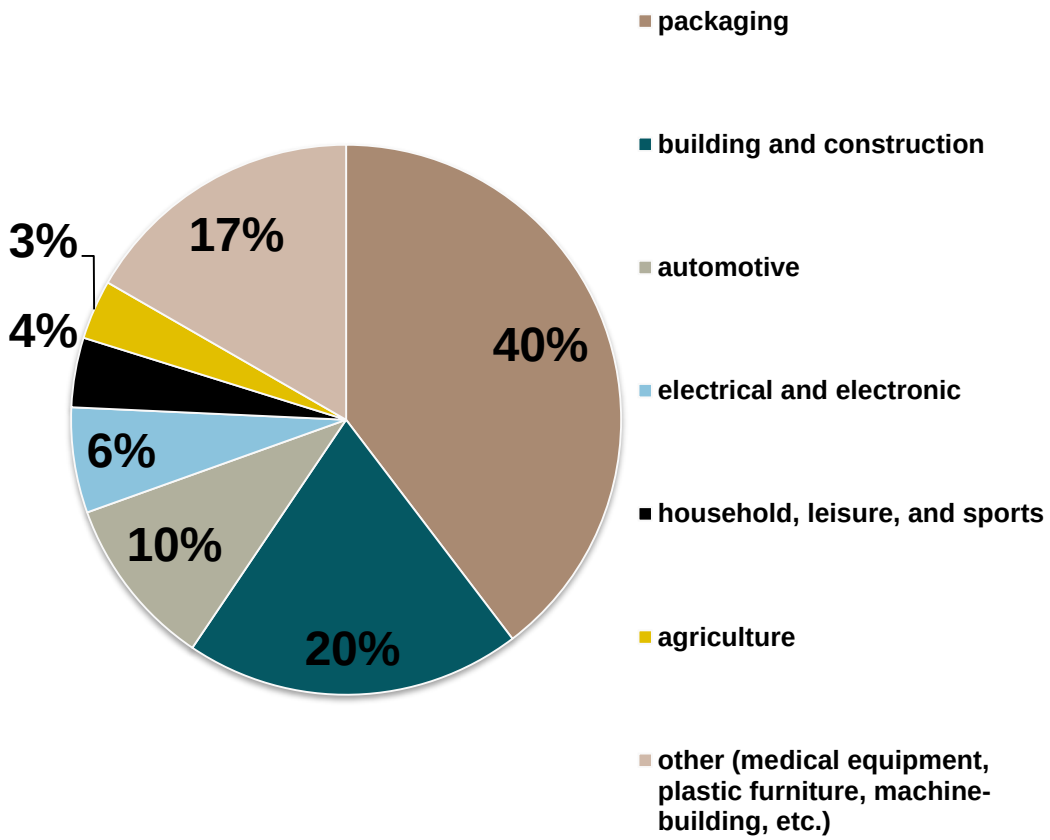
In Europe, more than 40 m tons per year of plastic are used in agriculture!

- **Protected cultivation films (mulch films) - Plastics such as polyethylene (PE), are the most commonly used materials in agriculture**

Other use:

- Nets (Mesch)
- Piping, irrigation /drainage
- Packaging
- Silage films
- Fumigation films
- Bale twines
- Bale wraps
- Nursery pots
- Strings and ropes, etc.

Demand for plastics in specific sectors in Europe in 2017



Source: Plastics – the Facts 2018 https://www.plasticseurope.org/application/files/6315/4510/9658/Plastics_the_facts_2018_AF_web.pdf

Problems to solve in general with plastics

Problem No. 1. Increasing quantities of non biodegradable fossil derived plastic waste in agriculture.

Problem No. 2. Difficulties in handling, collecting and processing non biodegradable fossil derived plastic waste from agriculture.

Problem No. 3. High costs of biodegradable non fossil derived plastic materials for agriculture.

How to solve these general problems?

Solution to the Problem No. 1.

Phasing out fossil derived plastics in agriculture and substiting them with alternatives.

Solution to the Problem No. 2.

Producing biodegradable non fossil derived materials and accessories

Solution to the Problem No. 3.

Adding waste-derived fillers to produce biodegradable accessories at lower costs (e.g. biochar).

Conclusions from manufacturing

Based on these results the major findings are as follows:

1. **Biochar added biocomposites showed stability** in terms of processing and they can be manufactured with the use of a conventional injection technology for thermoplastic polymers.

2. The investigated biocomposites showed high shape and size stability but **absorbed water** which can affect the size and mass of the material.

3. Application of biochars as fillers resulted in the **decrease of mechanical properties and impact strength** of the investigated biocomposites in comparison to PLA and BIOPLAST GS2189 but this will not affect potential applications of these biocomposites.

Conclusions

4. Thermal analysis showed that the addition of **biochars resulted in the improvement of stiffness and mechanical properties** of the investigated biocomposites in the range of temperatures above 0℃ which in turn led to the increase in softening temperature.

5. The analysis of biocomposites cross-sections showed that **biochars had the tendency to form agglomerates** which **can have a negative effect on mechanical properties of various objects manufactured from these biocomposites**. Therefore, proper dispersion of biochars in polymer matrix should be assured.

Praktiske eksperimenter med de nye materialer mangler i høj grad.

Aim for organic agriculture: England, Coventry University. Judith Conroy and Francis Rayns

To evaluate a range of biodegradable and non-biodegradable film mulches with respect to:

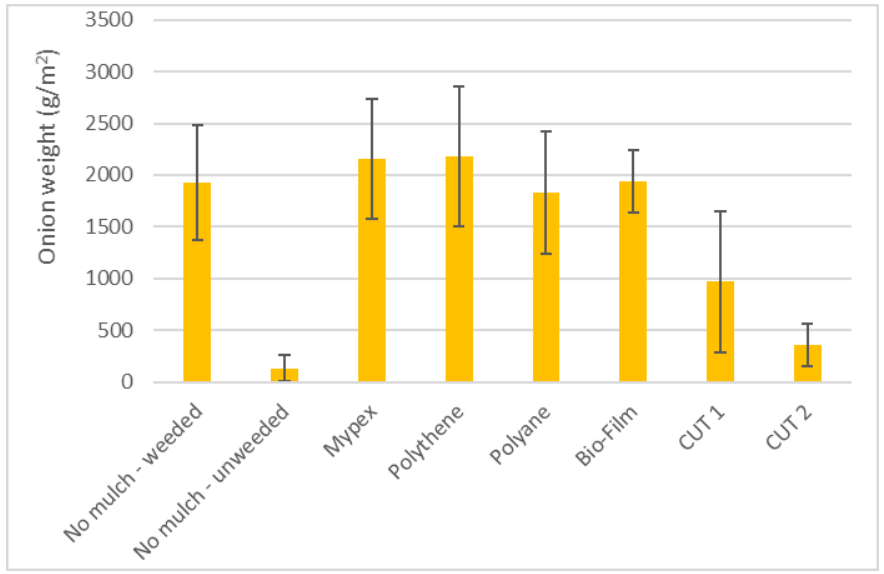
- Ability to suppress weeds
- Effect on crop yield and quality
- Rate of degradation in the field
- Release of plasticisers into the soil
- Effect on soil health
- Assess the environmental impact of each treatment (life cycle assessment)

Field experiments using following materials

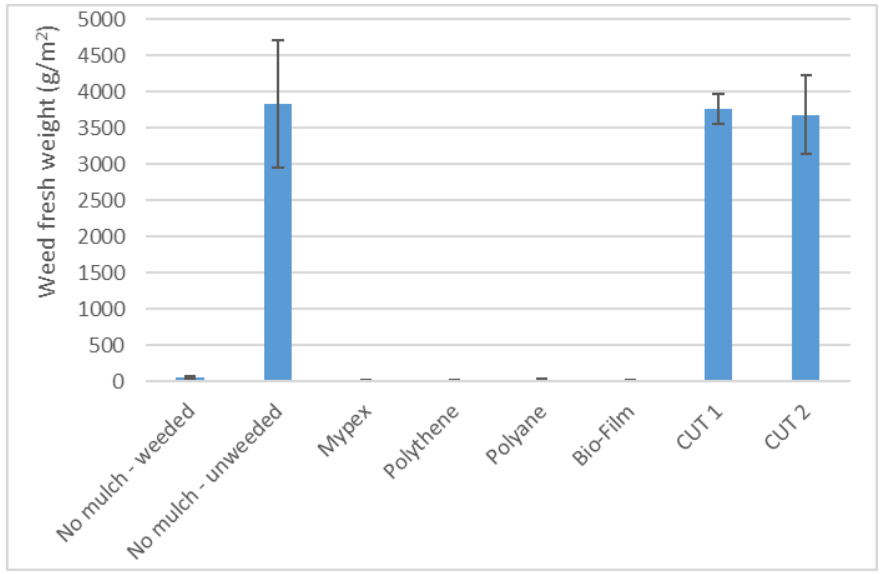
•1. Unmulched control (kept weed free by hand weeding)
•2. Unmulched control (not weeded whilst crops growing)
•3. Commercial non degradable plastic (Mypex)
•4. Commercial non degradable plastic (polythene)
•5. Commercial degradable plastic mulch 1 (Polyane)
•6. Commercial degradable plastic mulch 2 (Ilex Bio-Film)
•7. Polish degradable mulch CUT 1 (3 layer foil ABA without filler, 0.03mm thick)
•8. Polish degradable mulch CUT 2 (3 layer foil ABA with 20% filler $CaCO_3$, 0.025mm thick)

Results – Onion harvest

Onions



Weeds



The unweeded plots and the plots with white mulch all became very weedy, inhibiting onion yield.

The degradation of CUT 1 was slower than CUT 2 so the onions had some time to develop before the weeds became dominant.

Resultater

Mht. brug af kobber og svovl

Kobber er et Europæisk problem, og mange alternativer undersøges, men indtil videre er det mest ”mindre” kobber det ender med. Det betyder at mange lande fortsætter med at bruge det i vin, kartofler, og bær

Svovl i frugt og bære er udbredt, også i Denmark, men heller ikke her finder der klare alternative. Ingen forsøg med i Organic plus.

Mht. spagnum

Vi burde i Danmark se nærmere på hvor meget der bruges:
Til udplantnings planter og urter

WP 6. systemanalyse: RISE og LCA vurderinger af alternativer.

- De kommende 2 år vil vi analysere med RISE hvordan ejendomme der bruger alternativer, klarer sig. Case bedrifter i alle lande
- Aarhus universitet udfører en gennemførligheds analyse af alternative produkter og scenarier
- LCA analyser udføres på produkterne der bruges, samt på produktionen af produkterne på gården

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