

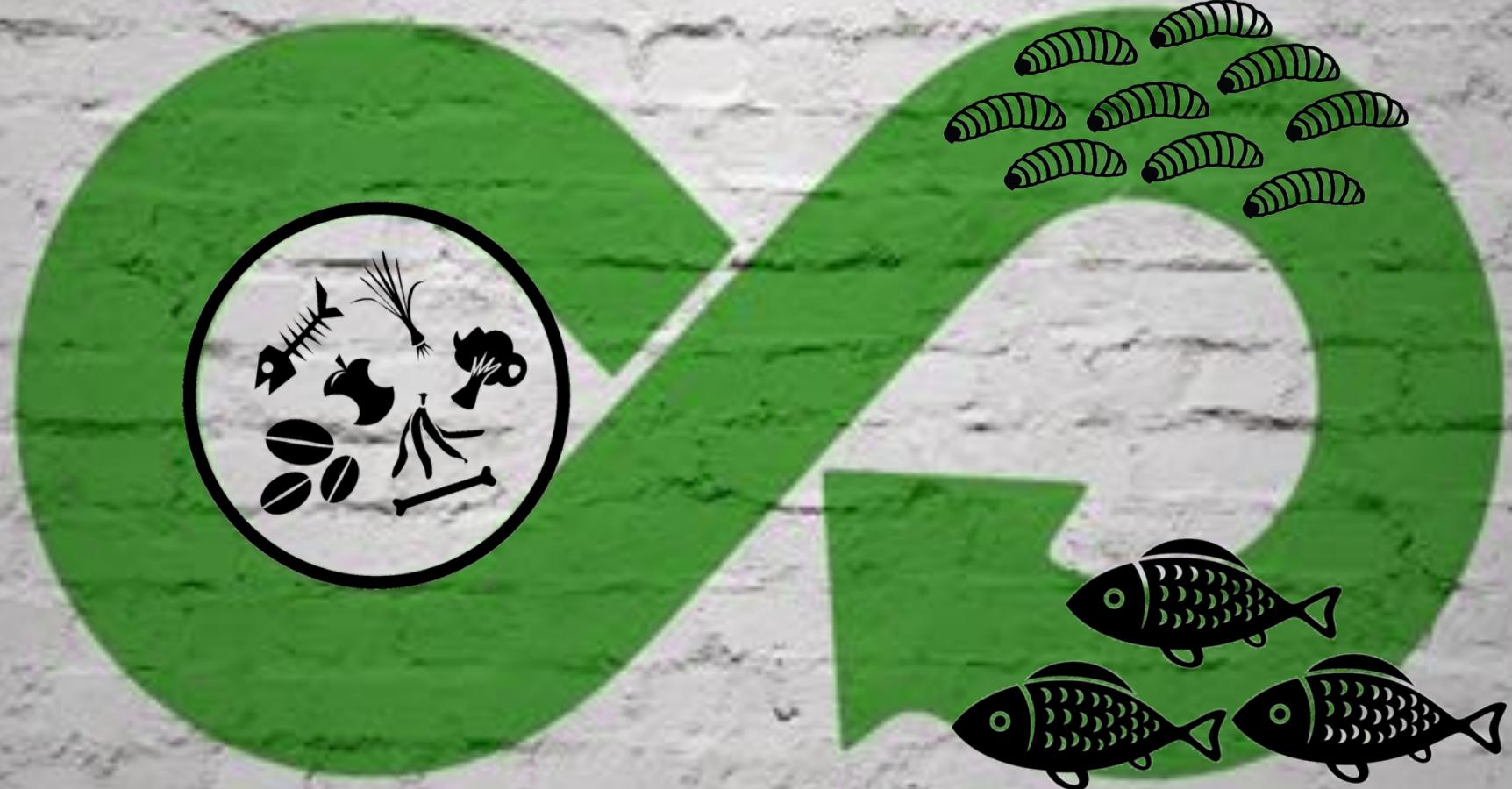


# Værdiforøgelse af restbiomasse gennem insektproduktion med den sorte soldaterflue

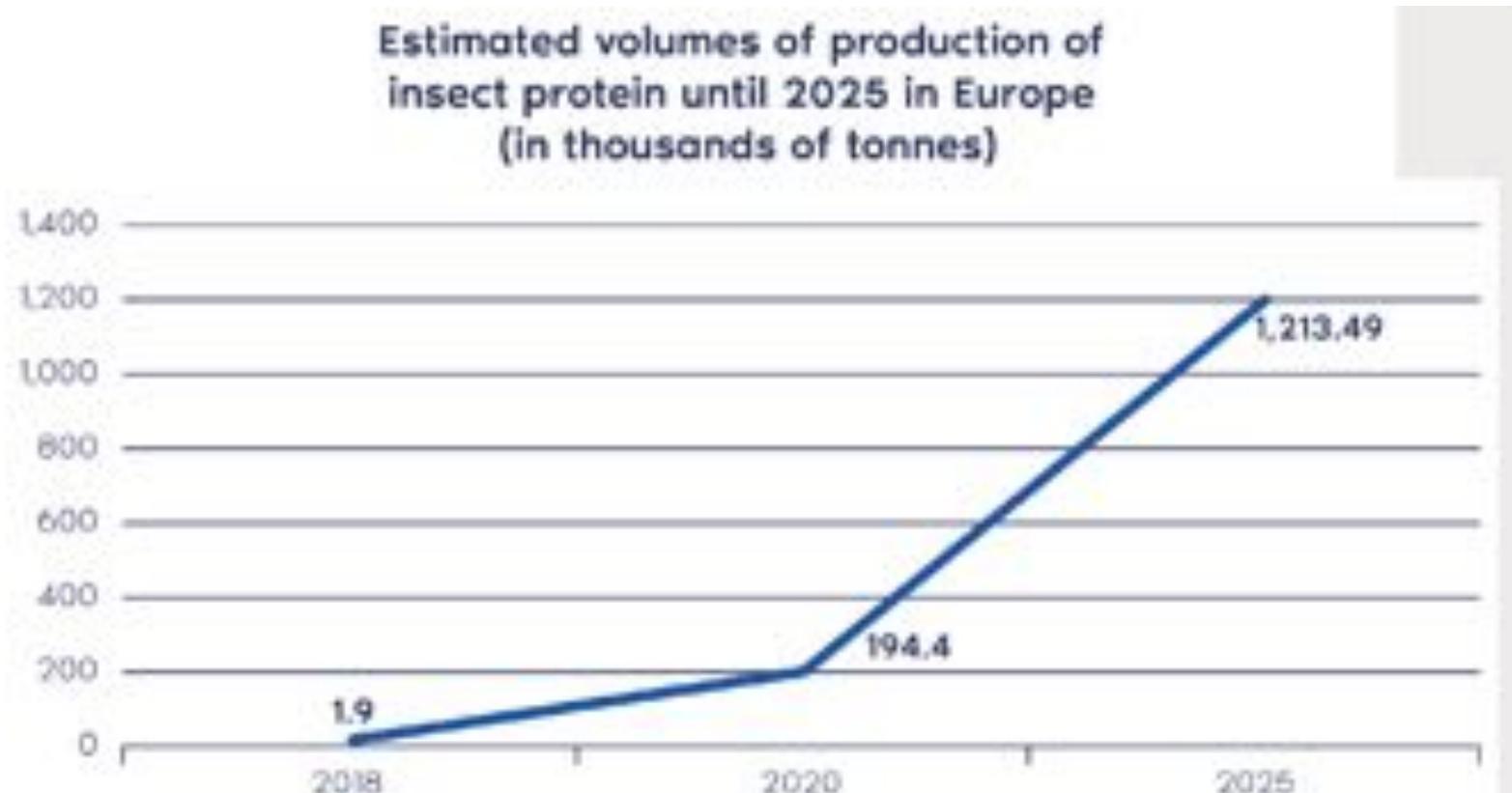
Lars-Henrik Lau Heckmann, Sektionsleder, ph.d.



**80-100 mio. tons madaffald i EU  
eller... >1000 mia. DKK tabt årligt**



# Insektproduktion i EU – nuværende og fremtidig volumen

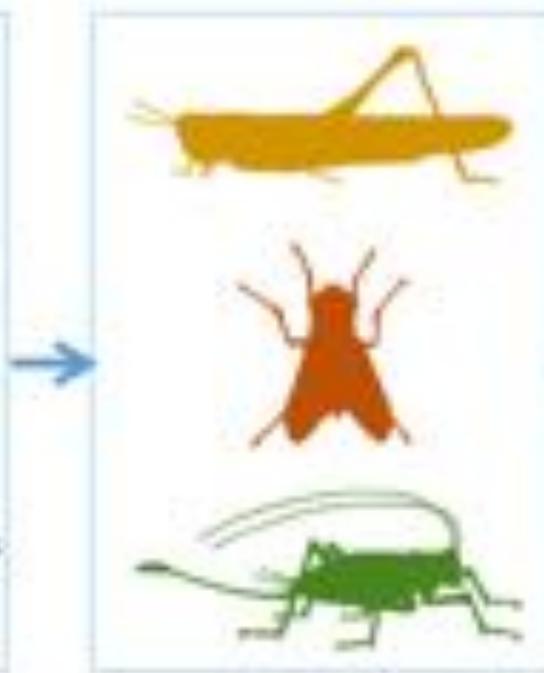


Kilde: [IPIFF Vision Paper](#)

# EU regulatorisk overblik

Seven species defined  
by EU as farmed  
animals for feed use

|                                                                                     |                              |
|-------------------------------------------------------------------------------------|------------------------------|
|    | Vegetal substrates           |
|    | Former food - Dairy and eggs |
|    | Former food - Meat and fish  |
|    | Catering waste               |
|   | Slaughterhouse products      |
|  | Animal manure                |

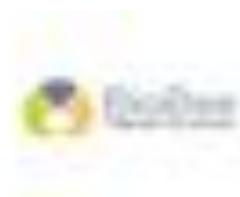


Allowed for aquaculture since 1st July 2017

Currently legal US/CA –  
EU expected in 2019

Currently not legal EU or  
US/CA – EU expected in  
2020+

# EU insekt-sektoren



Природна кибернетика

MUTATEC



SHACHAR



nextProtein  
Scaling the Future

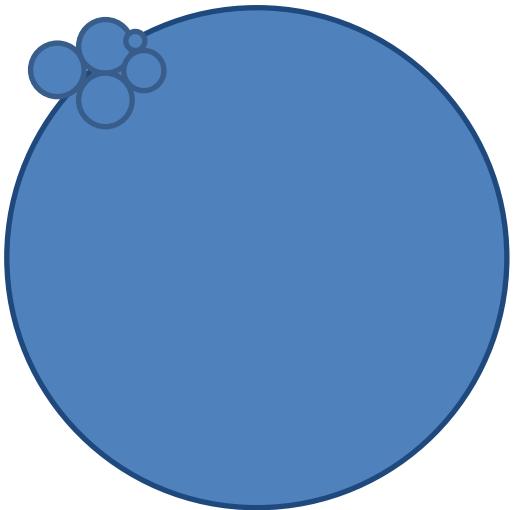
MealFood Europe



KOPPERT  
BIOLOGICAL SYSTEMS



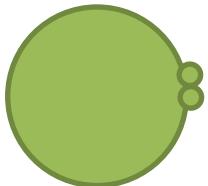
# Danske forsknings-/udviklingsprojekter 2018/19 (>100k €)



## Black Soldier Fly (BSF)

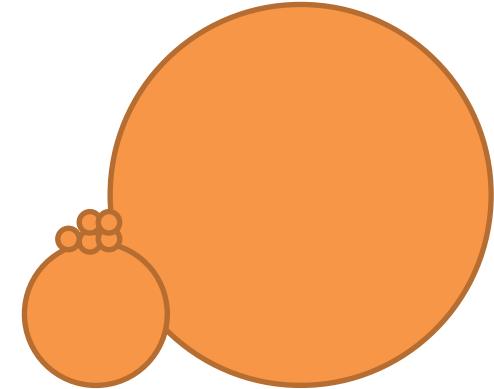
- [WICE](#) (390k €, MUDP)
- SUPERIOR (375k €, MUDP)
- Green Biorefining (360k €, F&I)
- BIOCAS (~100k €, Interreg/EU)
- WICE4SOIL (~260k €, MUDP)
- ENORM (~100k €, IFD)
- ENORM BioFactory (~8.7M €, MUDP)

**>16M € portfolio**



## Crickets

- InUrban (~600k €, GUDP)
- Syngja (200k €, IFD)
- Synjga2 (185 €, FFI)



## Mealworms

- [inVALUABLE](#) (3.7M €, IFD)
- [SUSMEAL](#) (1.1M €, IFD, Eurostars)
- Consibio (~100k €, IFD)
- Wholi Foods (~100k €, IFD)
- ENORM (~100k €, IFD)
- NLF (135k €, IFD)
- Ikadan (135k €, IFD)

# Performance of BSFL reared on different substrates

| <b>Substrates tested<br/>(Project)</b>                            |  | <b>Applicability</b>                              | <b>FCR (dry matter)</b> |
|-------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------|-------------------------|
| Grass, lucerne and red clover<br>(Green Biorefining)              |                                                                                   | N/A (tested individually at 100% inclusion level) | -                       |
| Spent grains + different carbohydrate-rich by-products (SUPERIOR) |                                                                                   | Medium-high                                       | -                       |
| Dairy by-products (SUPERIOR)                                      |                                                                                   | Medium                                            | -                       |
| Beach cast + spent grains (BIOFISK)                               |                                                                                   | Low                                               | 7-10                    |
| Beach cast + catering waste (BIOFISK)                             |                                                                                   | Medium                                            | 3-7                     |
| Catering waste ( <a href="#">WICE</a> )                           |                                                                                   | High                                              | 1.6-2.4                 |
| Chicken feed                                                      |                                                                                   | High                                              | 1.6-2.8                 |

WICE partners cover the biogas insect value chain



Organic household waste



Black Soldier Flies (BSF)



Mink

## Outputs

- Establishment of a pilot production of BSF reared on organic household waste
- Assessment of feed potential of BSF for mink - high (~90%) digestibility of protein and fat
- Assessment of insect frass ('manure') in plant production and biogas





**'Næste generation af dansk udvikling med soldaterfluen'**

**WICE4SOIL (MUDP) 2019-2020**

**Enorm BioFactory (MUDP Fyrtårn) 2019-2022**

# Tak for opmærksomheden!



## Kontakt

Lars-Henrik Lau Heckmann

E: [LHLH@teknologisk.dk](mailto:LHLH@teknologisk.dk)

M: 7220 1537