

# Molecular tools pave the way for IPM solutions

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**Crop protection future in agriculture- side event  
24 May 2023, SLU, Uppsala**

# Oilseed rape is a popular cash crop



# How to avoid clubroot?



Healthy root of winter OSR



Winter OSR in spring

# Soil bioassay

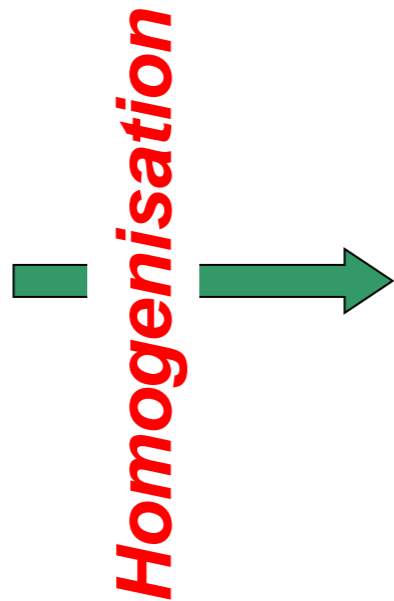


*Plasmodiophora brassicae* is an obligate parasite that cannot be cultured

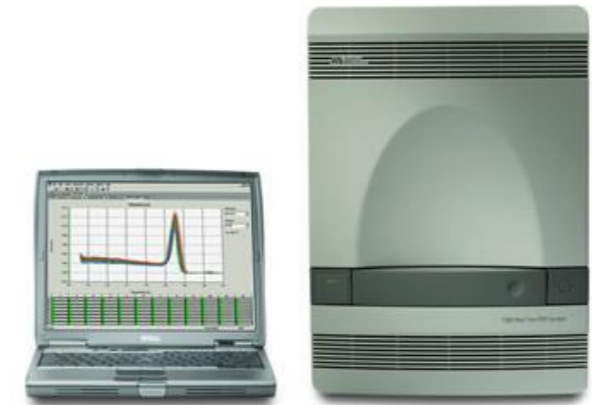
# Extraction and DNA-analysis



Soil sampling  
2 kg



DNA extraction  
from 0,5 g soil



Analyse with qPCR  
and species specific  
DNA-sequences

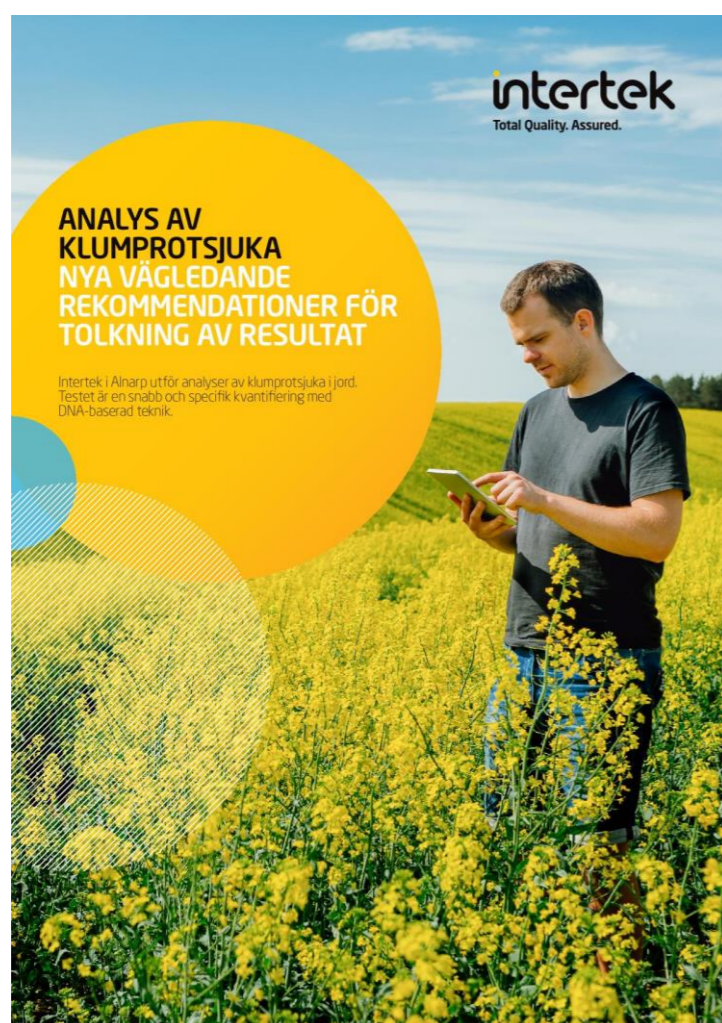
**2012: Commercial analyses on the market  
(Eurofins, Intertek Diagnostics)**

# IPM approach;

## 1. Proactive soil sampling and DNA-analysis



# New guidelines 2022



- ✓ Grow a resistant cultivar when *P. brassicae* DNA is detected **>500** gene copies per g soil.
- ✓ Risk for multiplication of the pathogen at **>100 000** gencopies per g soil
- ✓ Resistance at pressure

Wallenhammar et al., 2021, *Pathogens*, 2021,10,433.  
<https://doi.org/10.3390/pathogens10040433>

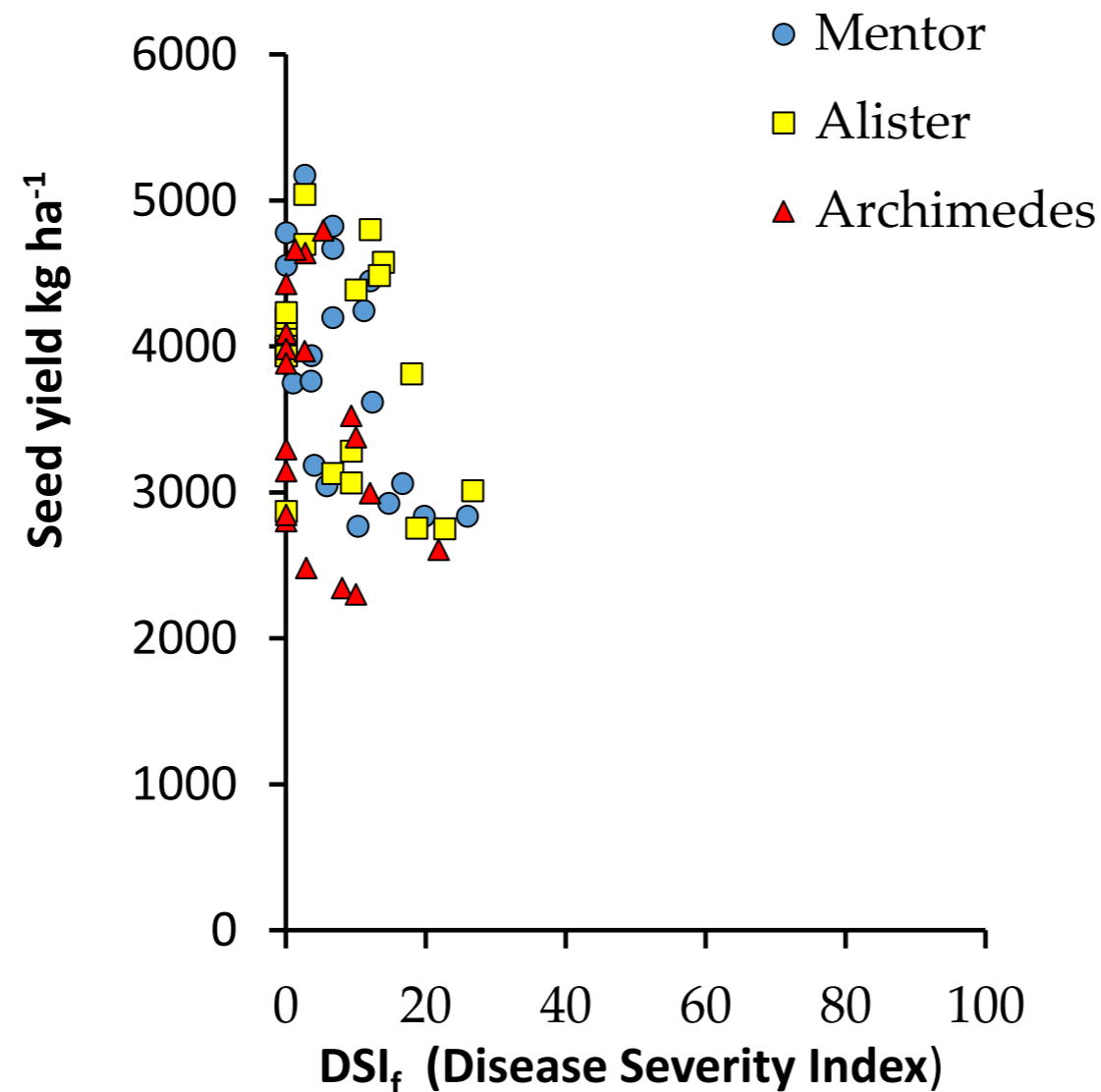
# Resistant cultivars is considered the most effective tool for managing clubroot

- **2013** European clubroot resistant (Cr) winter OSR cultivars are tested in field trials in contaminated soil by the Swedish Seed and Oilseed growers (OS7-25)
- A supply of **Cr- winter OSR** cultivars available





# Disease severity index (DSI) and seed yield for clubroot resistant cultivars in five field trials 2017 and 2018.



# Clubroot workshop



# Thank you for your attention!



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