

New DNA tools to study:

location-dependent effects
of seed treatment

Ole Søgaard Lund, KU

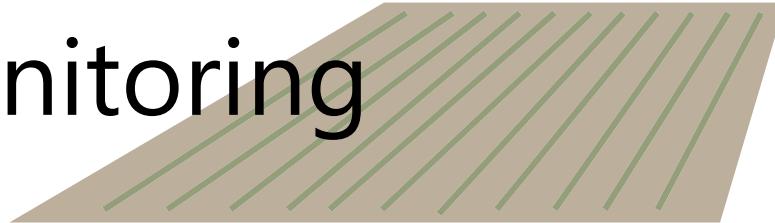
New DNA tools to study:

location-dependent effects
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...what's going on in the field ?

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Field monitoring

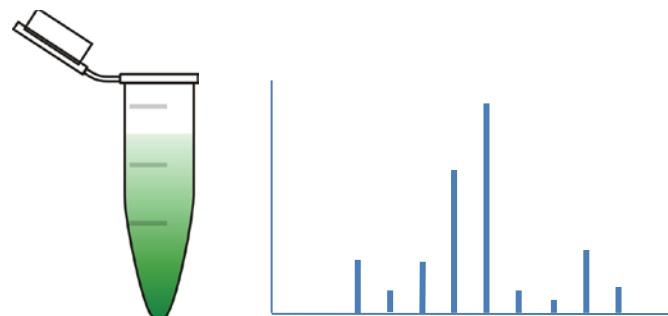


PLATFORM 1



Remote sensing
Crops & weeds

PLATFORM 2



DNA profiling
Pathogens & pests

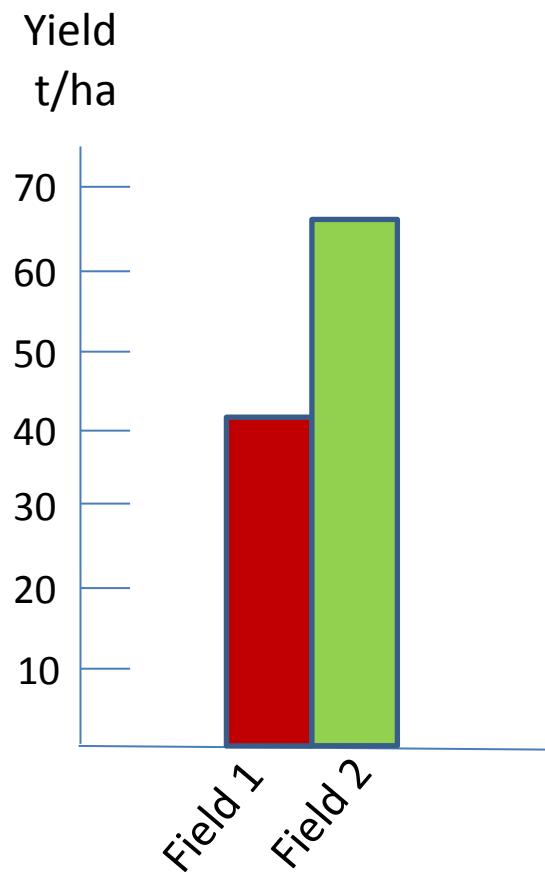
DNA-profiling of plant associated organisms

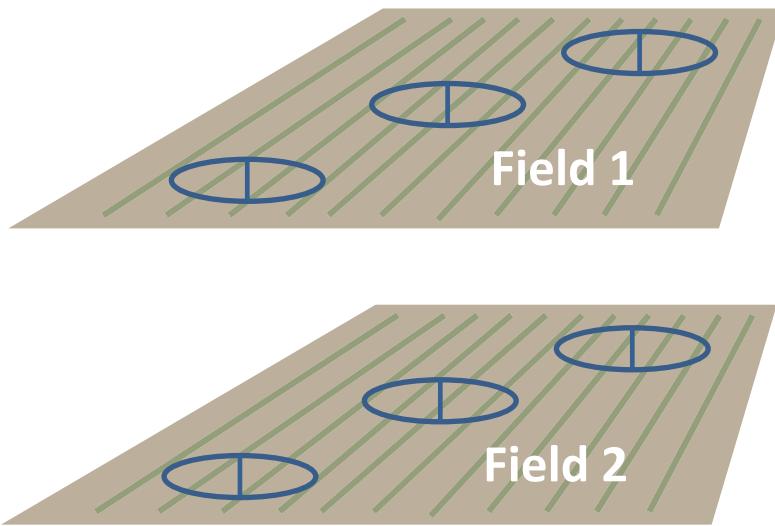
Bacteria, fungi, nematodes etc.

Differences in microbial populations between

- Fields
- Treatments
- Cultivars

.....a case study: Field-to-Field Variation





Per field :
- 6 samples
- 3 plots x 2 samples
- 24 beets åer sample

Each plot (sample) Total DNA extraction

Harmful organisms/agents:

Viruses

Bacteria

Prokaryotes

Fungi (*Asco-, Basidio-, Zygomycetes*)

Oomycetes

Plasmodiophorids

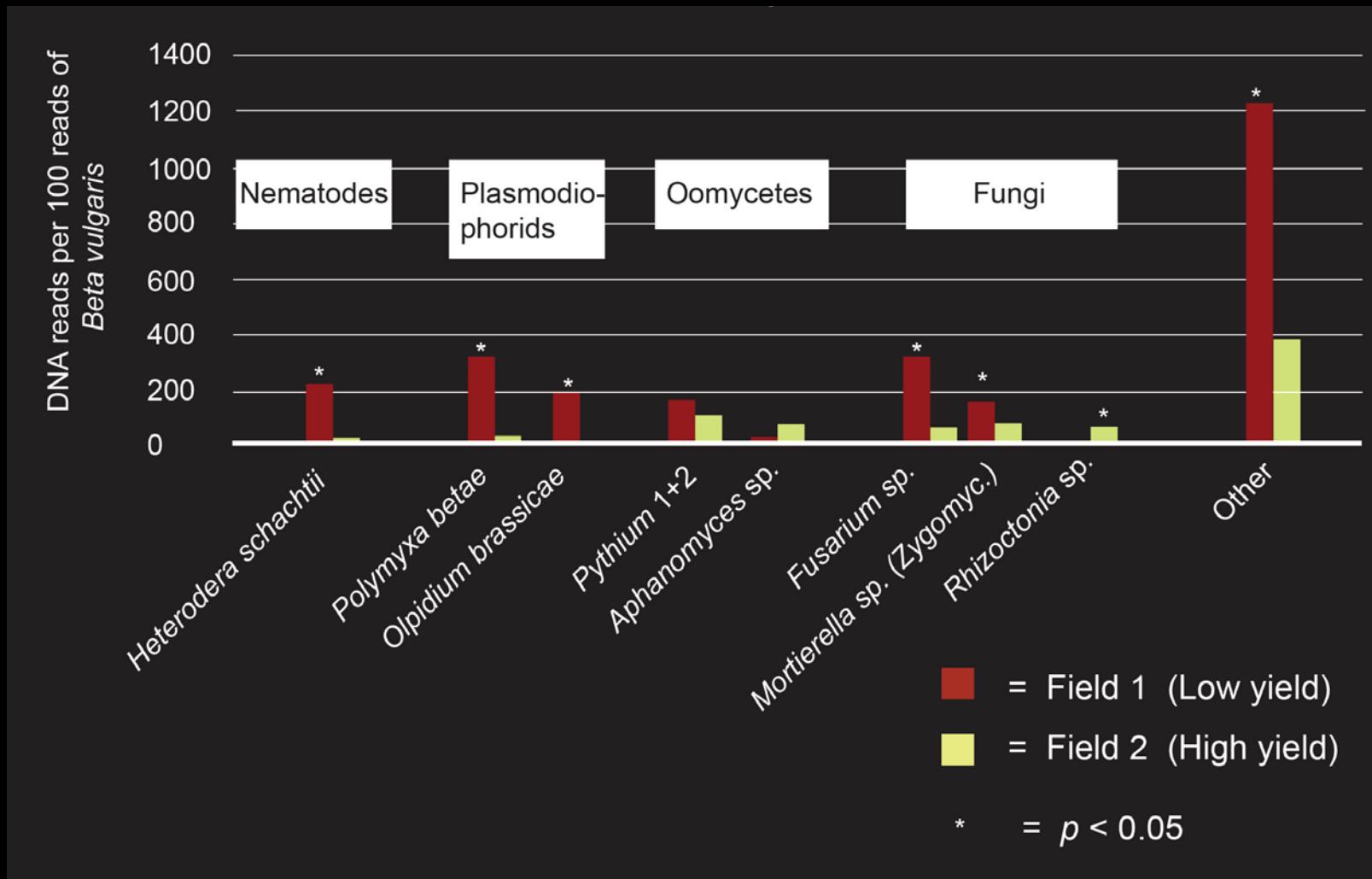
Nematodes

Mites

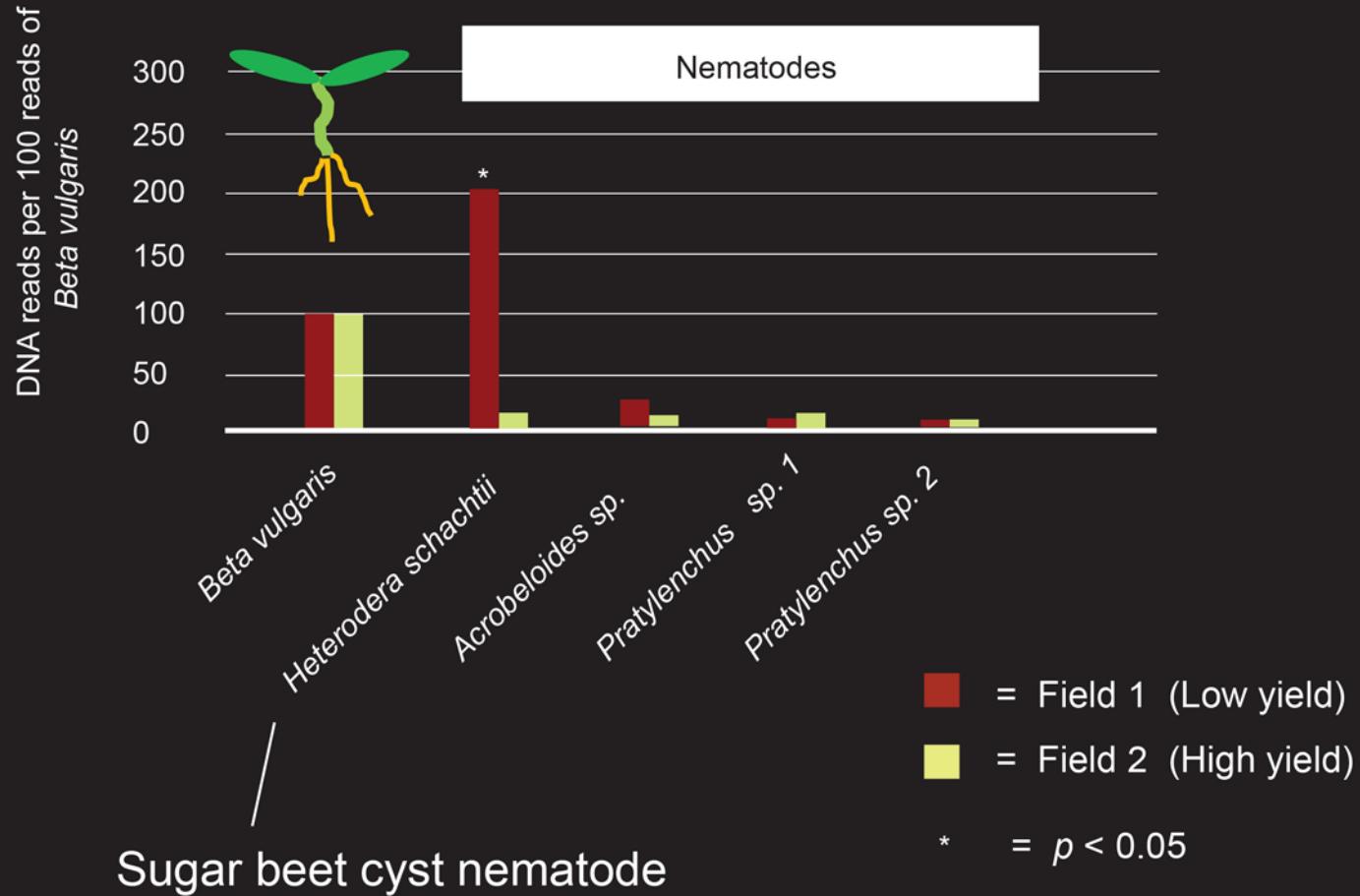
Insects

Eukaryotes (Nucleated cells)

DNA profile of common eukaryotes



DNA profile of nematodes (zooming-in)



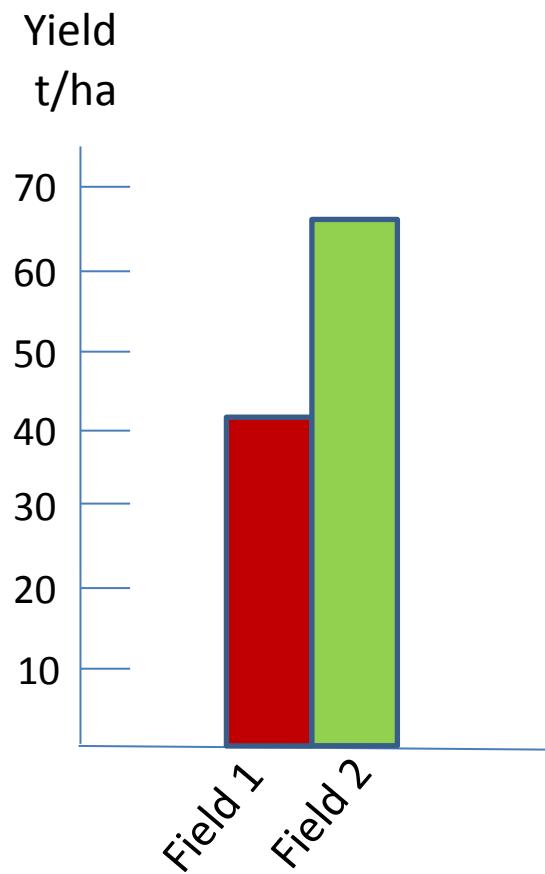
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Sorghum seedlings, 1 week, autoclaved soil



96 sorghum seedlings

Seed treatment

1 week in sterile soil

NoT H₂O HT

Surface sterilisation of Root & Stem

Isolation form slices on agar
(Filamentous fungi)**14 25 2**Amplicon sequencing
(All fungi)

<i>Curvularia</i>	5.9	6.9	0
<i>Epicoccum</i>	1.6	6.5	0.02
<i>Fusarium</i>	0.3	1	0.8
Total	7.6	14	0.8

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Eukaryotes (Nucleated cells)

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Prokaryotes

Eukaryotes

Ribosomes

No

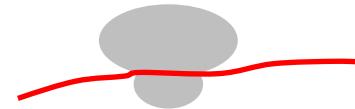


16-23 S



18-28 S

Ribosomal genes (DNA)



Prokaryotes



Eukaryotes



Fungi, etc

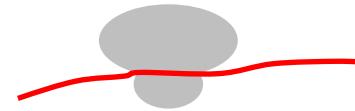
Animals

Plants



18S PCR primers

Ribosomal genes (DNA)



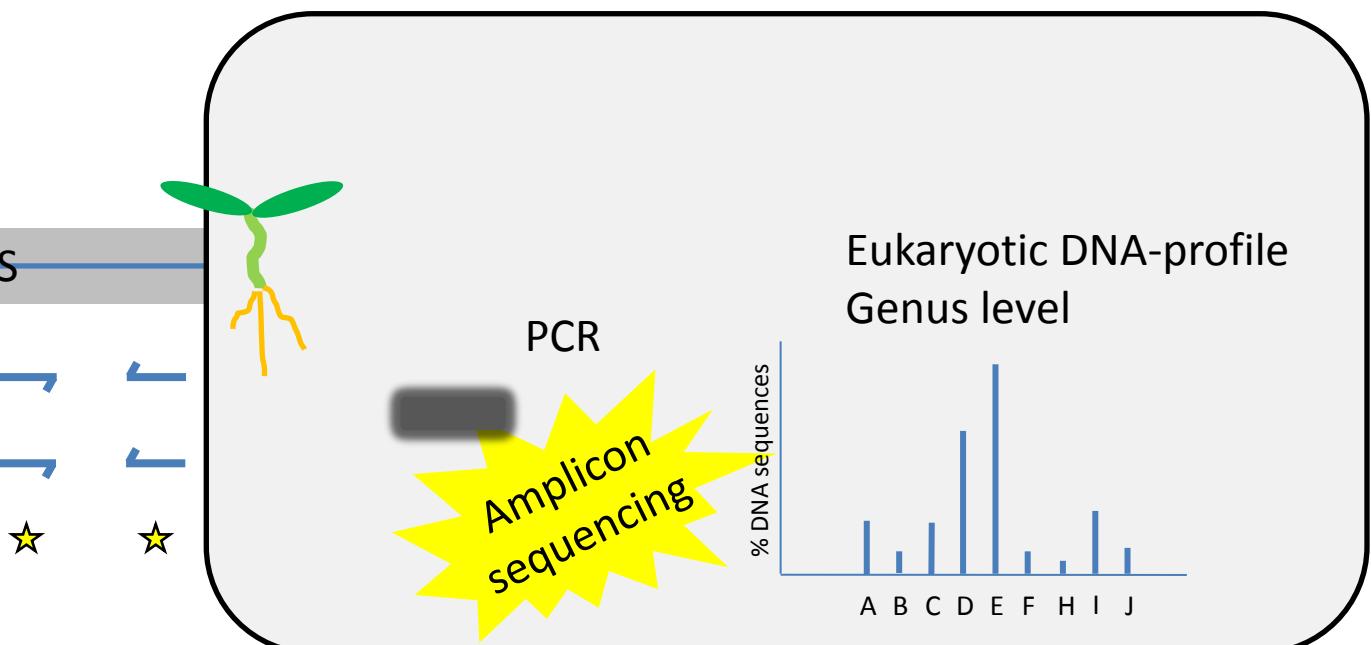
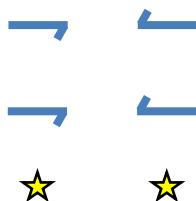
Prokaryotes



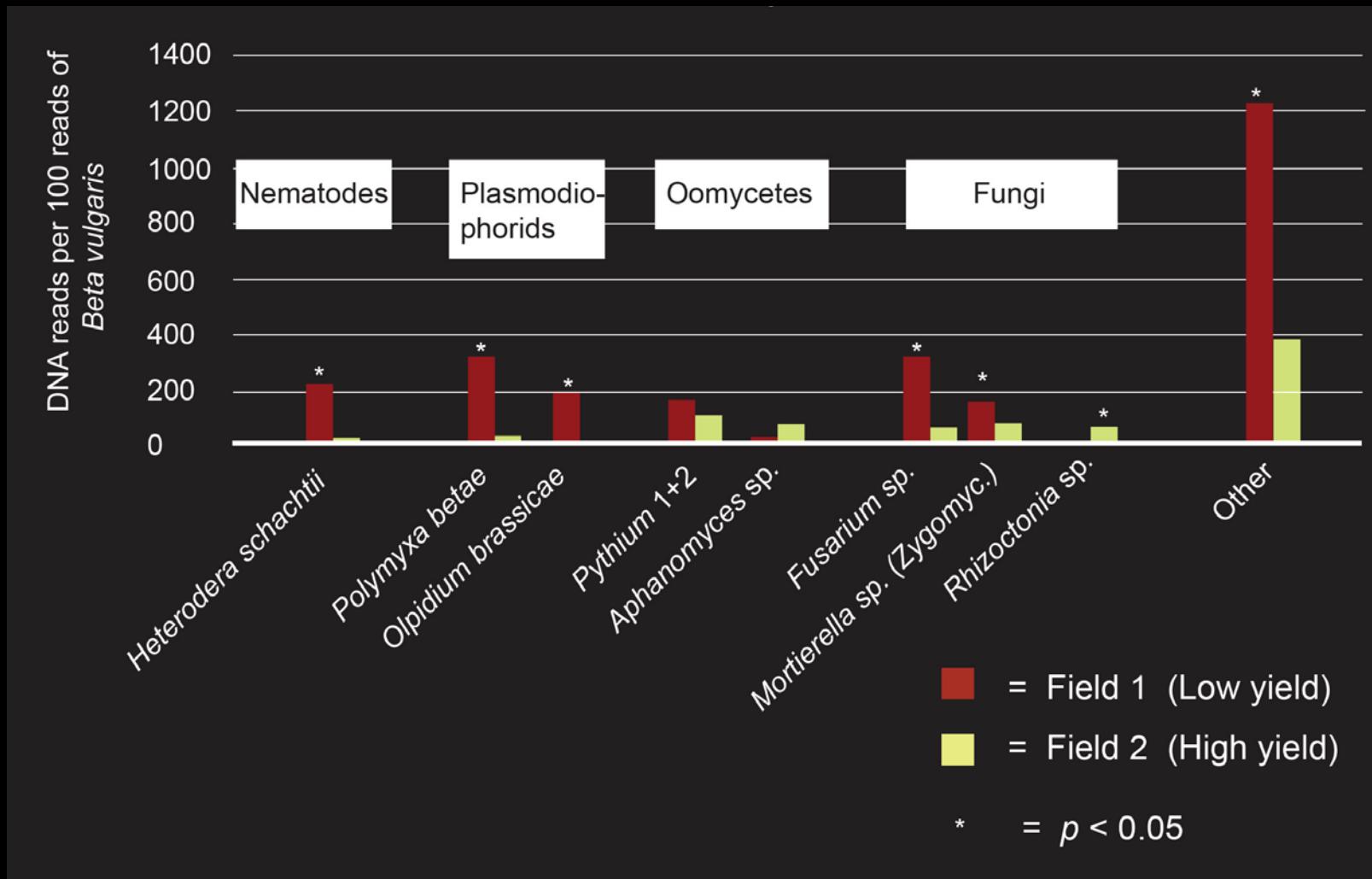
Eukaryotes



Fungi, etc
Animals
Plants



DNA profile of fungi and nematodes



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Nordic Beet Research

Bayer Crop Science

European Union

Plant Protection Group

- Plant protection (conventional / organic)
- Biology of harmful species (Microbes, Weeds)
- **Field monitoring**

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Jon Nielsen

Jesper Cairo Westergård

Signe Marie Jensen

Michaela Schiller

Lene Klem

Svend Christensen

